

Individuation in  
Light of Notions of Form  
and Information



CARY WOLFE, *Series Editor*

Individuation in  
Light of Notions of Form  
and Information

GILBERT SIMONDON

*Translated by Taylor Adkins*

posthumanities 57

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*In memory of*  
MAURICE MERLEAU-PONTY



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## Publisher's Note

This first English-language translation of Gilbert Simondon's magnum opus *Individuation in Light of Notions of Form and Information* follows the comprehensive, authorized edition published in France by Éditions Millon in 2013. Unlike the earlier 1964 Presses Universitaires de France and 1989 Aubier editions, which divided the thesis into two separate works, the text is presented here in its complete and intended order. The complete doctoral thesis appears in its entirety as volume 1 of this two-volume edition. Both those familiar with Simondon as well as newcomers to his work will find that the more recent Millon edition also includes valuable research notes, lectures, drafts, and related texts that provide a unique insight into the author's thinking process; these supplemental texts appear as volume 2 of this edition.

The publisher would like to thank Nathalie Simondon and Dominique Simondon for their guidance and generous cooperation in making this integral work of contemporary thought available to English-language readers.



# Foreword

## *Introduction to the Problematic of Gilbert Simondon*

JACQUES GARELLI

### THE PHILOSOPHICAL AND SCIENTIFIC HORIZON OF THE METHOD

If it has been noted that this work is paradoxically situated at the confluence of a meditation inspired by the Ionian physiologists on the notion of *Physis*, Anaximander's thought on the unlimited (ἄπειρον) [ápeiron], Plato's thought on the One and the indefinite dyad of the Large and Small (such as this principle particularly appears in the discussions of books *M* and *N* of Aristotle's *Metaphysics*), the critique of the Aristotelian and substantialistic, atomistic, hylomorphic principle of Leucippus and Democritus and, moreover, the most recent theories of thermodynamics, quantum physics, and information,<sup>1</sup> it has rarely been emphasized that *The Individual and Its Physico-biological Genesis* was dedicated "in memory of Maurice Merleau-Ponty." This is an essential guiding thread, at least if the "memory" implies recognition and is therefore faithful in its recollection. Of what? Of the Merleau-Pontian thought of the pre-individual in its ties to individualizing formations, of its invitation to contemplate the pre-Socratic thought of the "element," of its critique of Gestalt theory, of hylomorphic dualism and symmetrically of the materialist atomism developed by several currents of contemporary psychology, and lastly, of a radical critique of Nothingness and the dialectic, in the sense that this notion and this procedure manifest a sort of reverse positivism of negation that steers philosophy away from the pre-individual dimension of the World.

Furthermore, on the methodological plane there is an attitude shared by Merleau-Pontian phenomenology and the epistemology of microphysics, such as it is stated in Niels Bohr and Werner Heisenberg, according to which

we cannot radically separate the scientific “object” discovered at the end of research from the path of the thought and the operative processes that have led to revealing and constructing it. This attitude is developed with an extreme originality and a personal inflection due to the Simondonian conception of transduction and information that we will have to carefully examine. Moreover, it seems difficult to perceive the problematic of Gilbert Simondon which, among other things, poses the question *On the Mode of Existence of Technical Objects*<sup>2</sup> as a renewed form of physicalism. The dedication to Merleau-Ponty would therefore make such a positivist attitude of this style rather unexpected.

On the contrary, what Gilbert Simondon invites us to contemplate and remodel according to a radically new perspective is the strange relation between the pre-Socratic thought of the “Unlimited” and of the “element,” on the one hand, and that of the Merleau-Pontian style of pre-individual Being in its processes of individuation, which are linked (and this is the very paradox and barely understood originality of Gilbert Simondon) to the thermodynamic conception of metastable systems that are irreducible to the order of identity, unity, and alterity. Such are the stakes of this work whose force of invention prohibits any attempt seeking to isolate it in a current of thought that would form a school.

If phenomenology can glean something of interest from this meditation, it would be through the questions posed to it, through the course, pathways, bifurcations, and modes of problematization that Simondon’s meditation deploys on the horizon of the very questions inherent to the phenomenological enterprise. Furthermore, it is on behalf of the central question of the pre-individual, in its processes of individuations, that we are attempting to grasp the legitimacy of the notions of metastable system, potential, and energetic tensions (of transductivity and information) in a thought of the pre-individuality of being.

REEVALUATION OF CLASSICAL CONCEPTS AND MODES OF THOUGHT:  
CRITIQUE OF THE PRINCIPLE OF INDIVIDUATION

In a note from February 1960, Merleau-Ponty writes:

But what is fine is the idea of taking literally the *Erwirken* of thought: it is really *empty*, is of the *invisible*—All the positivist bric-a-brac of “concepts,” “judgements,” “relations” is eliminated, and the mind wells up as water in the fissure of Being—We must not look for spiritual things, there

are only structures of the void—But I simply wish to plant this void in the visible Being, show that it is its *reverse side*—in particular the reverse side of language.<sup>3</sup>

Gilbert Simondon's critique of the principle of individuation—whose corollaries are those of form, matter, substance, and fixed and stable (autonomous) terms posited as realities-in-themselves that form the structure of the World, relations, and inductive and deductive judgments—proceeds in the same critical style as the one recommended by Merleau-Ponty.<sup>4</sup>

In fact, this mutual appeal of Merleau-Ponty and Gilbert Simondon to the radical recasting of philosophical concepts will be articulated through the conscious apprehension of a tightly conjoined movement of being and of thought, a movement which generates the complex processes of individuations that arise from a transindividual dimension of being.

The striking simplicity of Gilbert Simondon's demonstration—from the very first lines of his doctoral thesis—should not make us forget all the preparatory work that stems from a profound meditation on the Ionian physiologists<sup>5</sup> as well as the thought of Plato and Aristotle. Thus, the conclusion of a long historical meditation followed up by years of teaching and reflection is what leads to the introduction of the present work: what is the crux of the argument?

#### THE UNQUESTIONED PRESUPPOSITIONS OF THE PRINCIPLE OF INDIVIDUATION

The first presupposition has an ontological characteristic in the sense in which takes for granted that the individual is the essential reality to be explained.<sup>6</sup> This conviction comes from the primacy accorded by Aristotle to the Individual, the σύνολον [súnolon], regarding the question of Being qua Being. As Simondon asks, why should Being in its totality end up integrally in a multiplicity of individualities to be known? Why would the being, as such, not include a pre-individual dimension? Correlatively, why would the individual, such as it appears, not conserve a dimension of pre-individuality in its dimension of being, which would be somewhat associated and irreducible to what can be thought in terms of the “individual”? This is a dimension that would never cease to intervene in the formation and evolution of the individual, which, afterwards, takes on a twofold, relative value: with respect to pre-individual being (from which it proceeds without eliminating) and with respect to itself, insofar as the individual conserves an associated

pre-individual dimension that never stops modeling its future individualizations. If this were the case, the whole quest for the principle of individuation and the very idea of this principle would have to be reformed.

Indeed, we should recall that Duns Scotus writes his treatise *On the Principle of Individuation* concerning a theological problem, that of “the distinction between angels and persons.” This work involves a problematic that develops within the framework of a metaphysical discussion that is subordinated to Aristotelian logic and guided by hylomorphic dualism and the theory of four causes. Thus, starting from “Question I” of *Ordinatio* II, distinction 3, part I, which is entitled “Whether material substance is individual or singular of itself, i.e. from its nature,” Duns Scotus expresses himself in the following terms:

As to the third distinction one must ask about the distinction of persons in angels. But to get a view of this distinction in angels one must first inquire about the distinction of individuals in material substances; and just as different people speak differently about these distinctions, so they speak in different ways about the plurality of individuals in the same species of angels.<sup>7</sup>

However, the second question manifests the substantialistic origin of the discussion in the objection that Aristotle addresses to Plato. It is stated in these terms:

For the affirmative: In book VII of the *Metaphysics*, philosophy established against Plato that “the substance of each thing belongs to that of which it is substance and does not belong to anything else.”<sup>8</sup>

The logical and metaphysical processes of the discussion along with the thought of substance (which is never called into question) need to be critiqued for the problem of individuation to be posed.

The second unquestioned presupposition is that individuation has a principle that would be anterior to it and would allow for the formation of the singular individual to be explained. The fact that this three-dimensional hierarchical structure (the individual, individuation, principle of individuation) is polarized by an unquestioned ontological privilege granted to the individual (which constitutes the ultimate finality of research) is aggravated by the fact that the quest for the principle of individuation as such derives

from a paralogism that crystallizes into the twofold nature bestowed upon the principle. In this sense, two historical attitudes pursue this false path. The first, which is substantialistic, atomistic, and monistic, discovers in the atom of Leucippus and Democritus the absolute elementary principle that allows for an explanation of the formation of the individual and of the individuated universe. The theory of the clinamen in Epicurus explains the fortuitous formation of more complex individuated structures based on the unitary atom. Despite the caveats of Bohr and Heisenberg, modern atomistic materialisms that continue to conceive of quantum particles as infinitesimal first substances with an autonomous reality qua formation of matter follow the path of this same illusion.<sup>9</sup> The paralogism consists in conferring onto the already individuated atom the status of a principle that is supposed to explain the very formation of the individual as such. In other words, and in a contradictory way, the individual is elevated to an object of research while also being taken as a principle of its own explanation. But the dualistic hylomorphic attitude of the Aristotelian style hardly escapes from the same contradiction, since *the form* and *the matter*, insofar as they are conditions and principles of the formation of the σύνολον [súnolon], are in fact treated as unitary terms, already individuated “causes.” However, it is not enough to explain that it is exclusively by abstraction and *a posteriori* that these principles can be extracted from the single concrete reality that the σύνολον [súnolon] is, for, on the one hand, they are elevated to supreme and therefore principal and primary metaphysical causes. But, on the other hand, Gilbert Simondon’s novelty is to demonstrate—through concrete examples borrowed from the formation of natural individualities, such as islands in a river, sand dunes under the pressure of the wind, ravines hollowed out by water streams, and the formation of crystals, but also through technological examples, like the fabrication of a brick or the cutting of a tree trunk—that the formation of a natural or technical individual is never ends up in the application of *a form* to *a matter*. The hylomorphic schema certainly leaves out the energetic conditions of form-taking—which reside in the already deposited energetic conditions in the structure of matter—that natural conditions due to chance or manpower can unleash, orient, and channel in the formation of an individual. Conversely, at the end of the half-chain of form-taking, there is no structuring form that does not depend on a certain material structure of the form that allows for the potential energy included in the form to structure matter. This is an extremely complex problem that renders the hylomorphic principle of individuation obsolete. However, on

the plane of artistic creation, i.e. the formation of material individualities which, through the assemblage of their structure, provoke thought, it can be shown that the formation of a poem (which in its individuality is irreducible to another poem), the formation of a painting, or the formation of a statue never involves a monistic or hylomorphic principle of individuation. But it does involve a process of differentiation that develops from a field of pre-individual tensions and constitutes the metastable horizon of the World of the work. Thus, the quest for the hylomorphic principle of individuation (be it atomistic, substantialistic, or dualistic) is led to the contradiction of seeking—within the individual already formed in atoms or particularized according to the fixed terms of a form and of a matter raised into causes—what would precisely have had to explain the formation of the individual as such. This situation leads Simondon to pose the following questions:

Can individuation be conceived as without-principle, since it is itself a process intrinsic to the formations of individuals, which are never completed, never fixed, never stable, but always accomplishing in their evolution an individuation that structures them, without these individuals fully eliminating the associated charge of pre-individuality that constitutes the horizon of transindividual Being from which they stand out?

#### METHODOLOGICAL CONSEQUENCES OF THIS DISPUTE

Such is the radical novelty of Gilbert Simondon's problematic, which will allow us to conceive in terms of transduction the processes of differentiations that are deployed starting from a metastable pre-individual system, wrought with tensions, of which the individual is one of the phases of deployment. It's in this context that the notions of potential charge, oriented tensions, supersaturation, and phase-shift, borrowed from thermodynamics, and the notion of the resonance internal to systems, intervene. According to this perspective, instead of reducing ontogenesis to the dimension restricted to and derived from the genesis of the individual, it is a question of conferring onto it the vaster characteristic of the "becoming of being, that through which the being becomes insofar as it is, qua being."<sup>10</sup> The ontological dimension of the problem is reinforced in the care with which Simondon emphasizes the incompetence of the principle of identity and of the excluded middle, formed in a perspective of substantialistic and identitarian logic of the individuated being in order to deal with the problematic of pre-individuated being. This is why Gilbert Simondon can declare:

Unity, which is characteristic of the individuated being, and identity, which authorizes the usage of the principle of the excluded middle, do not apply to pre-individual being, which explains why the world cannot be recomposed after the fact with monads, even by adding other principles like sufficient reason in order to organize these monads into a universe.<sup>11</sup>

This reference to Leibniz, as well as references to the pre-Socratic philosophers and to Plato and Aristotle, attest to the philosophical breadth of the debate that is irreducible to a strictly physicalist attitude. Not only does Gilbert Simondon justify the philosophical usage of notions borrowed from thermodynamics as part of a paradigm shift, he deftly accounts for the historical methodological reasons that have boxed the Ancients into alternative trenches, established between being and becoming, movement and rest, substantial stability and chaotic instability.<sup>12</sup>

However, three givens intervene in the comprehension of the metastable equilibrium with which thermodynamics has familiarized us and which Simondon introduces into his problematic in a very original way.

First, we must consider the potential energy of a system.

Second, we must consider the notion of order of magnitude and of different scales within the system.

Third, we must consider the increase of entropy, which corresponds to the energetic degradation of the system and implies the resolution of initial potentialities. Thus, the apprehension of individualizing forms is a correlate of the progressive degradation of potential energy. A so-called completed form, which is a stabilized energy, corresponds to the highest degree of negentropy.

Guided by this paradigm, which is borrowed from thermodynamics and not from the physics of fixed substances that ignores the problems of energy (as the concepts of classical philosophy confirm, particularly with the idea of *res extensa*), Simondon will attempt to think the order of a being's pre-individuality in terms of supersaturated potential charges within a metastable system, on the basis of which the degradation of energy sequential to a state of overtension of the system will produce processes of differentiations and individuations. Thus, it is by phase-shifting that a metastable system charged with a supersaturated energetic potential individualizes while also simultaneously spouting—from its not-yet-individualized internal tensions—a profusion of individualizing forms, which, afterwards, are capable of being structured into further systems and reforming into new metastable equilibria. Consequently, according to Simondon's expression:

. . . every operation and every relation within an operation is an individuation that splits and phase-shifts pre-individual being, all while correlating the extreme values and orders of magnitude, which are initially without mediation.<sup>13</sup>

This is a situation that confers onto relations a charge of being that exceeds and overflows the order of strictly logical knowledge and significations. And it allows us to avoid the dualism between the act of abstract intellectual knowledge and the inert objects on which the cognitive act bears.

How is this pitfall avoided?

First, by conferring a dimension of being onto the relations traditionally treated in strictly logical terms, as can be seen at work in the classical theories of deduction and induction.

Second, by treating the operation of transduction in conjunction with that of individualizing form-taking, which manifests the passage from the pre-individual metastable field to individuations in formation. Let's examine the first point. The relations between the fields of extreme tensions of the metastable system charged with potentiality have the status of being, to the extent that the differential values between what can no longer be qualified by preexisting terms are not yet individualized but correspond to the "dimensions" and "scales of tensions" from which the resolving energy of the system emerges. According to this perspective:

Relation does not spring forth between two terms that would already be individuals; relation is an aspect of the *internal resonance of a system of individuation*; it belongs to a system state. This living being, which is both more and less than unity, conveys *an interior problematic* and *can enter as an element into a problematic that is vaster than its own being*. For the individual, participation is *the fact of being an element in a vaster individuation* through the intermediary of the *charge of pre-individual reality that the individual contains*, i.e. due to the potentials that it harbors.<sup>14</sup> (Simondon's emphasis)

According to the second point, transduction, in strict solidarity with the discharge of the supersaturated potential energy of a metastable system, will appear as a form-taking and, on this basis, in the conjoined, twofold topological and noetic sense, as "in-formation." Since, through the very movement in which a process of transduction—the correlate of the discharge of

pre-individual potential energy of a metastable system—topologically “informs” a structure, which is given to be witnessed and to be thought, we can see that it noetically “informs” about what it makes appear and according to its associated pre-individual charge, i.e. the horizon of pre-individual being from which it detaches. This is why transduction (in contrast with induction and deduction, which do not have the status of being but are strictly logical relations exterior to the preexisting terms that they link up) manifests as never exterior to the terms that it brings forth, according to a twofold dimension of thought and of being. As an individualizing movement of knowledge, but also a movement of being, transduction is a form-taking in conjunction with the energetic discharge of the metastable system that is revealed as being more than unity and more than identity. On this basis:

Transduction is therefore not merely the reasoning of the mind; it is also intuition, because it is that through which a structure appears in a domain of a problematic as providing the resolution to the problems posed. But contrary to *deduction*, transduction does not go elsewhere to seek a principle to resolve the problem of a domain: it extracts the resolving structure from the very tensions of this domain, just as the supersaturated solution crystallizes due to its own potentials and according to the chemical nature that it holds, not with the contribution of some foreign form.

It is in this sense that transduction is a discovery of dimensions whose system makes those of each of the terms communicate, such that the complete reality of each of the terms of the domain can become organized into newly discovered structures without loss or reduction.<sup>15</sup>

Furthermore, the good form is not the stabilized, fixed form that Gestalt theory believed to locate, but the form rich in energetic potential, charged with future transductions. The good form does not stop making us think, and, in this sense, it does not stop generating further individuations, to the extent that it allows us to anticipate future individuations. Therefore, the information borne out of transductive movements is no longer conceived as the transmission of an already coded and established message sent by an emitter and transmitted to a receiver, but as form-taking: this is topological information, which, on the basis of a field wrought with the pre-individual tensions of the very movement in which the form is individualized, informs in the noetic sense the same thing as what appears topologically and from which it detaches. This is a “timeline,” a “Worldline,” which points toward a

pre-individuality of being and which is the source and the origin of the latter. In this sense, information is a “theater of individuations.” This involves a situation that cannot be understood except within the framework of the passage of an energetic problematic of metastable states to states in the process of stabilization, which, afterwards, are in a state of resolution, but also of energetic impoverishment, just as volcanic rocks, in the splendor of their individual forms, manifest the energetic death of an anterior lava flow. Furthermore, the pure form—the good form of Gestalt theory—is a stabilized energy that has arrived at the end of all its processes of individuation and transformation. The same can be said of the pure and completed pictorial form, which is outlined in the horizon of the quasi-illegible muddle of anterior sketches, such as the admirable preparatory designs of drafters that allow the quill to run, forming the pre-individual matrix for future beginnings. On this basis, the design is a metastable field wrought with tensions from which progressively emerge the lines in which the individuating forms stabilize. Nonetheless, these forms will be able to again become energetic capacity if they are paired with other forms and if they are integrated into a more complex structure in which they will compose as energetic potential into phases of tensions and a quest for resolution. The act of the painter in direct grips with this field of colored and linear metastability is a theater of individuations.

Such is the situation, for example, of a fragment of a bust photographed in a “collage,” which in itself possesses a fixed form of a fragment of stable reality, indexed and defined by a name, but which, once it is integrated into the new “system,” takes on a value of a potential charge whose enigmatic dimension is relative to the metastable whole of the composition. However, in this metastable system in a phase of internal resonance, it is the enigmatic characteristic of form-taking introduced by a foreign element that remodels the whole by making questions emerge. This is what indicates that questioning is crossed chiasmically on the meta-unitary structure of the composition, charged with a potential for inexhaustible forms and meanings.<sup>16</sup> Thus, form-taking in the topological sense of the term, through its structural metastability charged with unresolved tensions, reveals topological “information” and noetic “information” tightly interwoven and held in an overlapping chiasmus.<sup>17</sup>

Moreover, Gilbert Simondon’s meditation focuses on the non-identitarian World, where individuations always reflect an underlying field of pre-individuality that is most often unapparent or forgotten. And it is precisely this inexhaustible enigma that Simondon attempts to contemplate.

THE CRISIS OF UNDERSTANDING IN THE  
PHYSICAL SCIENCES AND ITS CONSEQUENCES IN THE  
PHILOSOPHICAL CONCEPTION OF BEINGS

Nonetheless, an interrogation remains concerning the usage of theories borrowed from thermodynamics and quantum physics in the philosophical problematic of the pre-individual and the contemporary conception of beings. Without discussing the properly technical aspect of the problem, it is nevertheless necessary to recall the complexity of the debate, and it is important to reflect on the exemplary prudence of Niels Bohr and Werner Heisenberg each time they have tackled the question concerning the philosophical status (but which could also be called the “mode of being”) of the quantum particle. This question of ontological consequence was central to the meditations of these physicists. It is also worth recalling the end of the conversation between these two scientists, which concerns the notion of “*Understanding*” in *Modern Physics*.<sup>18</sup> This is a problem that is also our own, not just as soon as the question of beings is posed, but also as soon as the philosopher—acknowledging that the dominant state of nature is not matter but energy—calls into question the capacity of our mind to “understand” the components of this phenomenon.

Thus, the pressing question formulated by Heisenberg:

If the inner structure of the atom is as closed to descriptive accounts as you say, if we really lack a language for dealing with it, how can we ever hope to understand atoms?

Bohr hesitated a moment, as Heisenberg reports, then said:

I think we may yet be able to do so. But in the process we may have to learn what the word “understanding” really means.<sup>19</sup>

It is by having this attitude of circumspection present to the mind that we can attempt to evaluate it, and this attitude is no less prudent in Simondon when he refers to the theory of quanta and to the possible usage of wave mechanics in the clarification of the pre-individual problematic. The crisis of meaning that has shaken the scientific and philosophical problematic of the twentieth century cannot avoid these questions.

Thus, after having contested mechanism and energeticism, which remain theories of identity that cannot on this basis completely account for reality,<sup>20</sup>

Simondon notes the insufficient nature of the theory of fields added to the theory of corpuscles, just like the conception of the interaction between fields and particles, due to the fact that these attitudes remain partially dualistic. Nevertheless, according to Simondon, they allow us to regain our bearings toward a renewed theory of the pre-individual.<sup>21</sup>

Here, we find Simondon returning to the theses that Bohr elaborated regarding the complementarity of the theory of quanta and of wave mechanics and where Simondon, via a new path of exploration, tries to “see these two new theories, which have remained impenetrable to one another to this day, converge.”<sup>22</sup>

In fact, it is a question of envisioning these two theories as “*two ways of expressing the pre-individual* through the different manifestations in which it intervenes as pre-individual.”<sup>23</sup>

According to this methodological approach, Simondon notes:

By way of another path, the theory of quanta grasps *this regime of the pre-individual* that surpasses unity: an exchange of energy occurs through elementary quantities, as if there were an individuation of energy in the relation between particles, which can in a sense be considered as physical individuals.<sup>24</sup>

It is in the framework of this hypothesis integrated into what he calls “an analogical philosophy of the ‘as if’” that this philosopher proposes to conceive, below the order of the continuous and the discontinuous, “the quantum and the metastable complementary (the more than unity), which is the true pre-individual.”<sup>25</sup>

Reflecting on the necessity in which physics is found to correct and pair together basic concepts, Simondon suggests the hypothesis according to which this necessity “perhaps translates the fact that *concepts are adequate only to individuated reality* and not to pre-individual reality.”<sup>26</sup> If this is taken into account, no positive physical certainty can give an objective solution to a philosophical problem, such as the one posed by the pre-individual dimension of a primordial “there is,” from which will be released, afterwards, a detailed problematic of beings in the phase of individuation, precisely because the act of “understanding” is crossed chiasmically over the physical field and because this conjoined structure of being and knowledge poses a philosophical problem that exceeds through its interlinked structure of “chiasmus” a simple problem of a positive style, whatever the timeframe of the envisioned scientific theory may be.

It is thanks to this framework of thought that the reevaluation of the principle of complementarity stated by Niels Bohr and the signification to be granted to the twofold approach of the physics of corpuscles and wave mechanics—such as Louis de Broglie reformulated it at the end of his life after his simplified presentation to the Solvay Conference in 1927, which had been critiqued by the founders of quantum physics—are presented in a new light. On this basis, Simondon suggests, in addition to the reevaluation of Niels Bohr's principle of complementarity, an original interpretation of Heisenberg's uncertainty principle as well as a reevaluation of the introduction of statistical calculus into the mathematical formulation of this principle.<sup>27</sup> It is in this framework of reform that Simondon presents his conception of transduction as the effort of thinking, in one and the same unity, "the object" of research and the movement of knowledge that drives it.

Afterwards, taking into account this reform of method, the question that immediately arises is knowing whether the distinction posited by Heisenberg between the effective reality of the quantum particle and the knowledge the physicist has of it, does not appear as tainted with a dualism that would be controlled by the methodological privilege granted to the individual unit of the quantum particle initially considered as the "reality" to be explained, whereas it perhaps only appears as a possible process of individuation coming from a pre-individuality that would be in a relation of discontinuity relative to the field of its manifestation.

Such are the philosophical and not just epistemological stakes of Gilbert Simondon's questioning. In fact, this non-identitarian conception of beings, which must be returned to a field of primordial metastability, exceeds the framework of a subatomic physics or a problematic of the technical object and of vital individuation.<sup>28</sup> This conception is established following three different axes of research, (1) through the perception of the thing in the world, (2) through the question of artistic creation in its entirety, (3) through the timeless conception of ontological difference, as long as the question of Being, as Heidegger teaches, remains that of the Being of beings.<sup>29</sup>

However, the non-identitarian dimension of beings, in regard to which ontological difference is marked, prevents us from posing this question according to the terms used by Heidegger in each of his works.<sup>30</sup> For what this philosopher took as an individual reality (with a fixed and stable unitary nature) of "intra-worldly" beings is immediately revealed as a non-being, non-*ens*, "no-thing." This is what unexpectedly introduces the problematic of Nothingness at the very heart of the structure of beings, which, afterwards,

are no longer beings! This is a paradox that requires surpassing the question of ontological difference such as Heidegger conceived it.<sup>31</sup>

Thus, a whole field of contemporary philosophical research is invited to fundamentally renew the mode of questioning of the thing in its relation to the pre-individuality of the world. Beyond the strictly epistemological character of his undertaking, not the least of Gilbert Simondon's merits was to have drawn philosophical attention to this paradigm shift in thought.

# Introduction

There are two paths according to which the reality of being qua individual can be approached: a substantialistic path, which considers the being as consisting in its unity, given to itself, founded on itself, not engendered and as resistant to what is not itself; and then there is a hylomorphic path, which considers the individual as generated by the encounter of a form and a matter. The self-centered monism of substantialistic thought is opposed to the bipolarity of the hylomorphic schema. Yet both of these two ways of approaching the reality of the individual have something in common: both suppose that there is a principle of individuation prior to individuation itself that is capable of explaining, producing, and guiding it. We are prompted to revisit the conditions of the individual's existence starting from the constituted and given individual. This manner of posing the problem of individuation based on the acknowledgment of the existence of individuals conceals a presupposition that must be clarified, since it involves an important aspect of the solutions that are proposed and embedded in the search for the principle of individuation: namely the fact that the individual qua constituted individual is the interesting reality, i.e. the reality to be explained. The principle of individuation will be sought as a principle that is capable of accounting for the characteristics of the individual without a necessary relation with the other aspects of the being that could be correlative to the appearance of a real individuated entity. *Such a perspective of research grants an ontological privilege to the constituted individual.* Thus, it runs the risk of not actualizing a veritable ontogenesis that would put the individual back into the system of reality within which individuation takes place. *One of the postulates in the search for the principle of individuation is that individuation has a principle.* In the very notion of this principle, there is a certain characteristic that foreshadows the constituted individuality along with the properties that it

will have when it will be constituted; to a certain extent, the notion of a *principle of individuation* emerges from a genesis in reverse, an *inverted* ontogenesis: to account for the genesis of the individual with its definitive characteristics, we must suppose the existence of a first term, the principle, which contains within it the very explanation for what is individual in the individual, thereby accounting for its haecceity. But we would precisely have to show that ontogenesis can have a first term as an initial condition: a term is already an individual or at the very least something that can be individualized and can be a source of haecceity or fabricated into multiple haecceities; everything that can be a support of relation already shares the same mode of being as the individual, whether this be the atom, the eternal and indivisible particle, the first matter, or the form: the atom can enter into a relation with other atoms via the *clinamen*, thereby constituting an individual (be it viable or not) through the infinite void and endless becoming. Matter can receive a form and establish ontogenesis in this matter-form relation. If there were not a certain inherence of the haecceity to the atom, to matter, or even to form, there wouldn't be the possibility of finding a principle of individuation in these invoked realities. *To seek the principle of individuation in a reality that precedes individuation itself is to consider individuation strictly as ontogenesis.* The principle of individuation is then the source of haecceity. Both atomistic substantialism and the hylomorphic doctrine *de facto* avoid the direct description of ontogenesis itself; *atomism* describes the genesis of the composite, like the living body, which merely has a precarious and perishable unity that stems from a random encounter and will dissolve back into its elements when a force greater than the force of cohesion will attack it in its composite unity. The forces of cohesion themselves, which could be considered the composite individual's principle of individuation, are thrust back into the structure of the elementary particles that exist eternally and are the veritable individuals; in atomism, the principle of individuation is the very existence of the infinity of atoms: it is always already there the moment when thought can become conscious of its nature: individuation is a fact; individuation, for each atom, is the atom's own given existence and, for each composite, the fact that the composite is what it is by virtue of a random encounter. Conversely, according to *the hylomorphic schema*, when we consider the matter and form that will become the σύνολον [súnolon],<sup>1</sup> the individuated being is not already given: we do not observe ontogenesis because we are always situated ahead of this form-taking that ontogenesis is; the principle of individuation therefore is not grasped in the individuation

itself as an operation but in what this operation requires in order to exist, namely a matter and a form: the principle is supposed to be contained either in the matter or in the form, since the operation of individuation is not supposed to be capable of *supplying* the principle itself but only of *putting it to work*. The search for the principle of individuation is finished either after individuation or before individuation, depending on whether the model of the individual is physical (for substantialistic atomism) or technological (for the hylomorphic schema). But in both cases, there is a *dark zone* that conceals the operation of individuation. This operation should be considered as something to be explained and not that in which the explanation must be found: hence the notion of the principle of individuation is to be explained, because thought is taken towards the completed individuated being for which it is necessary to account by passing through the stage of individuation so as to end up with the individual after this operation. There is thus a supposition of the existence of a temporal succession: first the principle of individuation exists; then this principle operates in an operation of individuation; and then the constituted individual appears. If, on the contrary, we supposed that individuation doesn't just produce the individual, we would not seek to pass quickly through the stage of individuation to arrive at this ultimate reality that the individual is: we would try to grasp ontogenesis in the whole unfolding of its reality and *to know the individual through individuation rather than individuation starting from the individual*.

We would like to show that it is necessary to reverse the search for the principle of individuation by considering the operation of individuation as primordial, on the basis of which the individual comes to exist and whose unfolding regimes and modalities the individual reflects in its characteristics. The individual would then be grasped as a relative reality, a certain phase of being which supposes a pre-individual reality prior to it and which, even after individuation, does not fully exist all by itself, for individuation does not exhaust in a single stroke the potentials of pre-individual reality, and, moreover, what individuation manifests is not merely the individual but the individual-milieu coupling.<sup>2</sup> The individual is therefore relative in two senses: because it is not the entire being, and because it results from a state of the being in which it neither existed as individual nor as principle of individuation.

*Individuation is thus considered ontogenetic only insofar as it is an operation of the complete being.* Individuation must then be considered as a partial and relative resolution that manifests in a system which contains potentials

and includes a certain incompatibility with respect to itself, an incompatibility that consists of forces of tension and the impossibility of an interaction between the extreme terms of the dimensions.

The word *ontogenesis* takes on its full meaning if, instead of granting it the restricted and derived sense of the individual's genesis (in opposition to a vaster genesis, for example that of the species), it is made to designate the nature of the being's becoming, that through which the being becomes insofar as it is, qua being. It is possible that the opposition of being and becoming may be valid only within a certain doctrine that supposes that the very model of being is substance. But it is also possible to suppose that becoming is a dimension of the being and corresponds to the being's capacity to phase-shift with respect to itself, to resolve itself by phase-shifting; *pre-individual being is being in which no phase exists*; the being in which an individuation is completed is that in which a resolution appears through the division of the being into phases, i.e. becoming; becoming is not a framework in which the being exists; it is the being's dimension, the mode of resolution of an incompatibility that is rich in potentials.<sup>3</sup> *Individuation corresponds to the appearance of phases in the being that are the phases of the being*; it is not an isolated consequence deposited on the edge of becoming but this very operation as it is undergoing completion; individuation can only be understood on the basis of this initial and homogeneous supersaturation of the being without becoming that afterwards is structured and becomes, making the individual and milieu appear according to becoming, which is a resolution of the initial tensions and a conservation of these tensions as a structure; in a certain sense, it could be said that the sole principle based on which we can be guided is *that of the conservation of being through becoming*; this conservation exists throughout the exchanges between structure and operation, proceeding by way of quantum leaps via successive equilibria. In order to think individuation, we must consider being not as substance or matter or form, but as a tense, supersaturated system above the level of unity, as not merely consisting in itself, and as unable to be thought adequately by means of the principle of the excluded middle; the concrete being or complete being, i.e. pre-individual being, is a being that is more than a unity. Unity, which is characteristic of the individuated being, and identity, which authorizes the usage of the principle of the excluded middle, do not apply to pre-individual being, which explains why the world cannot be recomposed after the fact with monads, even by adding other principles like sufficient reason in order to organize these monads into a universe; unity and identity merely apply

to one of the phases of being, posterior to the operation of individuation; these notions cannot help us discover the principle of individuation; they do not apply to ontogenesis understood in the full sense of the term, i.e. to the becoming of the being qua being which splits and phase-shifts while individuating.

Individuation has not been able to be adequately thought and described because only a single form of equilibrium was known, namely stable equilibrium; what was unknown was precisely metastable equilibrium; being was implicitly supposed in a state of stable equilibrium; however, stable equilibrium excludes becoming because it corresponds with the lowest level of potential energy possible; a stable equilibrium is achieved in a system when all possible transformations have occurred and no propulsive force remains; all potentials have been actualized, and systems that have succumbed to their lowest energetic levels cannot transform again. The Ancients only knew stability and instability, rest and movement, but they did not know metastability clearly and objectively. In order to define metastability, it is necessary to establish the notion of the potential energy of a system, the notion of order, and the notion of the increase of entropy;<sup>4</sup> it is therefore possible to define this metastable state of being, which is quite different from stable equilibrium and rest and which the Ancients couldn't establish in their search for the principle of individuation because they lacked a clear physical paradigm that could clarify its utilization.<sup>5</sup> Consequently, we will begin by attempting to present *physical individuation as a case of the resolution of a metastable system* on the basis of a *system state*, like that of supercooling or supersaturation involved in the genesis of crystals. Examples of the process of crystallization have been carefully researched and can certainly serve as paradigms in other domains, but crystallization does not exhaust the reality of physical individuation. Thus, we must consider if we can interpret certain aspects of microphysics by means of this notion of the becoming of being in a metastable state, particularly the nature of the complementarity of the concepts utilized in microphysics as pairs (wave-corpuscle, matter-energy). Perhaps this duality stems from the fact that scientific conceptualism supposes the existence of a real that consists of terms between which there are relations, insofar as terms are not modified by relations in their internal structure.<sup>6</sup>

Yet, we can also suppose that reality is initially, in itself, similar to the supersaturated solution (and even more so in the pre-individual regime), *more than unity and more than identity*, and that it is capable of manifesting as wave or corpuscle, matter or energy, because every operation and every

relation within an operation is an individuation that splits and phase-shifts pre-individual being, all while correlating the extreme values and orders of magnitude, which are initially without mediation. Complementarity would then be the epistemological reverberation of the initial and original metastability of the real. Because they are theories of identity, neither *mechanism* nor *energeticism* fully account for reality. In addition to the theory of corpuscles, the theory of fields and the theory of the interaction between fields and corpuscles are still partially dualistic but *lean toward a theory of the pre-individual*. By way of another path, the theory of quanta grasps *this regime of the pre-individual* that surpasses unity: an exchange of energy occurs through elementary quantities, as if there were an individuation of energy in the relation between particles, whereby particles can somewhat be considered as physical individuals. Perhaps it would be in this sense that we could see the convergence of these two new theories, that of quanta and that of wave mechanics, which to this very day have remained impenetrable to one another: they could be envisioned as *two ways of expressing the pre-individual* through the different manifestations in which it intervenes as pre-individual. Below the continuous and the discontinuous, there is the quantic and the metastable complementary (the more than unity), which is the true pre-individual. The necessity of correcting and pairing basic concepts in physics perhaps translates the fact that *concepts are adequate only to individuated reality* and not to pre-individual reality.

We would then understand the paradigmatic value of the study of the genesis of crystals as processes of individuation: this would allow us to grasp on the macrophysical scale a phenomenon that depends on system states which belong to the microphysical domain and which are molecular and not molar; we would grasp activity that *is at the limit* of the crystal in its formation. Such an individuation is not the encounter of a preliminary form and a preliminary matter existing as previously constituted separate terms, but a resolution emerging within a metastable system rich in potentials: *form, matter, and energy preexist in the system*. Neither form nor matter is sufficient. The veritable principle of individuation is mediation, which generally supposes an original duality of orders of magnitude and an initial absence of interactive communication between them, and then a communication between orders of magnitude and stabilization.

While a potential energy (the condition of a *superior* order of magnitude) is actualized, a matter is organized and divided (the condition of an *inferior* order of magnitude) into structured individuals on an *intermediate* order of magnitude that develops through a mediate process of amplification.

What leads to crystallization and underpins it is the energetic regime of the metastable system, but the crystals' form expresses certain molecular or atomic characteristics of the constituting chemical species.

In the domain of the living, the notion of metastability can also be used to characterize individuation; but individuation no longer occurs in a strictly *instantaneous*, quantum, abrupt, and definitive way, as in the physical domain, which leaves after it a duality of the milieu and the individual, insofar as the milieu has been robbed of the individual (because the former and the latter no longer coincide) and insofar as the individual has lost the dimension of the milieu. Such an individuation also undoubtedly exists for the living being as an absolute origin; but it is doubled by an ongoing individuation, which is life itself, according to the fundamental mode of becoming: *the living being conserves within itself an ongoing activity of individuation*; it is not merely a result of individuation, like the crystal or molecule, but a theater of individuation. Furthermore, unlike that of the physical individual, the whole activity of the living being is not concentrated at its limit; in the living being there is a more complete regime of *internal resonance* that requires ongoing communication and that maintains a metastability, which is a condition of life. This is not the only characteristic of the living being, and the living being cannot be compared to an automaton that would maintain a certain number of equilibria or would seek compatibilities among several requirements based on a formula of a complex equilibrium composed of simpler equilibria; the living being is also a being that results from an initial individuation and amplifies this individuation, which is something that is not done by the technical object to which cybernetic mechanism would want to functionally compare it. In the living being there is *an individuation by the individual* and not merely an operation resulting from an individuation completed in a single stroke, as though it were a fabrication; the living being resolves problems, not just by adapting, i.e. by modifying its relation to the milieu (like a machine is capable of doing),<sup>7</sup> but by modifying itself, by inventing new internal structures, and by completely introducing itself into the axiomatic of vital problems.<sup>8</sup> *The living individual is a system of individuation, an individuating system, and a system that is in the midst of undergoing the process of individuating*; internal resonance and the translation of self-relation into information are in this system of the living being. In the physical domain, internal resonance characterizes the limit of the individual in the midst of undergoing the process of *individuating*; in the living domain, internal resonance becomes the criterion of the whole individual qua individual; internal resonance exists in the system of the individual and not merely

in what the individual forms with its milieu; unlike that of the crystal, the organism's internal structure does not merely result from the activity that is accomplished and from the modulation that takes place at the limit between the domain of interiority and the domain of exteriority; perpetually centered outside itself, perpetually peripheral relative to itself and active at the limit of its domain, the physical individual has no veritable interiority; on the contrary, the living individual has a veritable interiority, because individuation takes place from within; inside the living individual, the interior is also constitutive, whereas in the physical individual only the limit is constitutive, and what is topologically interior is genetically anterior. The living individual is contemporaneous with itself in all its elements, which is not the case for the physical individual, for the latter includes a past that has radically passed, even when it is still in the process of growing. At the interior of itself, the living being is a node of informative communication; it is a system within a system, involving *within itself* a mediation between two orders of magnitude<sup>9</sup>.

Indeed, a hypothesis can be made that is analogous to the hypothesis of quanta in physics and also to the hypothesis of the relativity of levels of potential energy: it can be supposed that individuation does not fully exhaust pre-individual reality and that a regime of metastability is not merely sustained by the individual but carried by it, such that the constituted individual transports along with it a certain associated charge of pre-individual reality that is animated by all the potentials which characterize it; an individuation is relative, like a structural change in a physical system; a certain level of potential remains, and further individuations are still possible. This pre-individual nature, which remains associated with the individual, is a source of future metastable states from whence new individuations will be able to emerge. According to this hypothesis, it would be possible *to consider every veritable relation as having the status of being and as developing from within a new individuation*; relation does not spring forth between two terms that would already be individuals; relation is an aspect of the *internal resonance of a system of individuation*; it belongs to a system state. This living being, which is both more and less than unity, conveys *an interior problematic and can enter as an element into a problematic that is vaster than its own being*. For the individual, participation is *the fact of being an element in a vaster individuation through the intermediary of the charge of pre-individual reality that the individual contains*, i.e. due to the potentials that it harbors.

It then becomes possible to think the relation interior and exterior to the individual as participation without invoking new substances. The psyche

and the collective are constituted by individuations that come after vital individuation. *The psyche continues vital individuation in a being that, in order to resolve its own problematic, is itself forced to intervene as an element of the problem through its action as subject*; the subject can be conceived as the unity of the being qua individuated living being and qua being that is the representative of its action through the world as an element and dimension of the world; vital problems are not self-enclosed; their open axiomatic can only be saturated by an indefinite sequence of successive individuations that always engage more pre-individual reality and incorporate it in the relation to the milieu; affectivity and perception are integrated in emotion and in science, both of which suppose a recourse to new *dimensions*. However, the psychical being cannot resolve its own problematic in itself; its charge of pre-individual reality, at the same time as it is individuating as a psychical being that surpasses the limits of the individuated being and incorporates the living being in a system of the world and the subject, makes participation possible as a condition of the individuation of the collective; insofar as it is collective, individuation turns the individual into a group individual that is associated with the *group* through the pre-individual reality that the individual bears, a pre-individual reality that, paired with the pre-individual reality of other individuals, *individuates into a collective unit*. The collective and psychical individuations are both reciprocal with respect to one another; they make it possible to define a category of the transindividual, which attempts to account for the systematic unity of interior (psychical) individuation and exterior (collective) individuation. The psycho-social world of the transindividual is neither the brute social nor the inter-individual; it supposes a veritable operation of individuation on the basis of a pre-individual reality that is associated with individuals and is able to constitute a new problematic which has its own metastability; it expresses a quantum condition that is correlative with a plurality of orders of magnitude. The living being is presented as a *problematic being*, both superior and inferior to unity. To call the living being problematic is to consider becoming as a dimension of the living being: the living being exists according to becoming, which operates a mediation. The living being is an agent and theater of individuation; its becoming is an ongoing individuation, or rather, *a sequence of the manifestation of individuation* advancing from metastability to metastability; thus, the individual is neither substance nor a simple part of the collective: the collective intervenes as a resolution of the individual problematic, and this means that the basis of collective reality is already partially contained within the individual in the form of the pre-individual reality that remains associated

with the individuated reality; what is generally considered as *relation* due to the improper hypothesis of the substantialization of individual reality is in fact a dimension of individuation through which the individual becomes: relation, to the world and to the collective, is a *dimension of individuation* in which the individual participates starting with *pre-individual reality*, which progressively individuates.

Thus, psychology and the theory of the collective are tied together: ontogenesis is that which indicates what participation in the collective is as well as what the psychical operation conceived as the resolution of a problematic is. The individuation that is life is conceived as the discovery in a conflictual situation of a new axiomatic that incorporates and unifies all the elements of this situation into a system that contains the individual. In order to understand what the psychical activity at the heart of the theory of individuation as a resolution of the conflictual nature of a metastable state is, the veritable ways in which metastable systems become established in life must be discovered; in this sense, both the notion of the *individual's adaptive relation to the milieu*<sup>10</sup> and the critical notion of the *knowing subject's relation to the object known* must be modified; knowledge is not constructed abstractly on the basis of sensation but problematically on the basis of *an initial tropistic and taxic unity, which is the coupling of tropism and sensation, an orientation of the living being in a polarized world*; even here it is necessary to detach ourselves from the hylomorphic schema; there is not a sensation that would be a matter constituting an *a posteriori* given for the *a priori* forms of sensibility; *a priori* forms are an initial resolution by the discovery of the axiomatic of tensions resulting from the encounter of *primitive tropistic and taxic unities*; the *a priori* forms of sensibility are neither *a prioris* nor *a posterioris* obtained via abstraction but the structures of an axiomatic that appears in an operation of individuation. In the tropistic and taxic unity, there is already the world and the living being, but the world merely appears there as a *direction*, as the polarity of a gradient that situates the individuated being in an *indefinite dyad*, the median point of which it occupies and which extends out from it. Perception and then science continue to resolve this problematic, not just through the invention of spatiotemporal frameworks, but through the constitution of the notion of the object, which becomes the *source* of the initial gradients and organizes them according to a *world*. The distinction between the *a priori* and the *a posteriori*—a byproduct of the hylomorphic schema in the theory of knowledge—obfuscates in its dark zone the veritable operation of individuation, which is the center of knowledge. The very notion of qualitative or intensive series should be thought according to the

theory of phases of being: it is *not relational* and subtended by a preexistence of extreme terms but develops on the basis of an initial intermediate state that localizes the living being and inserts it into the gradient that gives a directionality to the tropistic and taxic unity: the series is an abstract vision of the direction according to which the tropistic unity is oriented. We must start with individuation, with the being grasped in its center according to spatiality and becoming, and not with a substantialized *individual* facing a *world* that is foreign to it.<sup>11</sup>

The same method can be employed to explore affectivity and emotivity, which constitute the resonance of the being with respect to itself and connect the individuated being back to the pre-individual reality that is associated with it, just as tropistic and taxic unity and perception link it to the milieu. The psyche consists of successive individuations that allow for the being to resolve the problematic states that correspond to the ongoing establishment of communication of that which is larger than it and that which is smaller than it.

But the psyche cannot be resolved at the level of the individuated being alone; it is the basis of participation in a vaster individuation, that of the collective; calling itself into question, the individual being alone cannot go beyond the limits of anxiety, which is an operation without action, an ongoing emotion that does not manage to resolve affectivity, an obstacle through which the individuated being explores its dimensions of being without the ability to surpass them. *The notion of the transindividual corresponds to the collective taken as the axiomatic that resolves the psychical problematic.*

Such a set of reforms of notions is supported by the hypothesis that an information is never relative to a single and homogeneous reality but to two orders in a state of *disparation*: information, whether this be at the level of tropistic unity or at the level of the transindividual, is never deposited in a form that is able to be given; it is the tension between two disparate reals, it is *the signification that will emerge when an operation of individuation will discover the dimension according to which two disparate reals can become a system*; information is therefore an initiation of individuation, a *requirement for individuation*, for the passage from the metastable to the stable, it is never a given thing; there is no unity and identity of information, for information is not a *term*; it supposes the tension of a system of being in order for it to be adequately received; it can only be inherent to a problematic; information is *that through which the non-resolved system's incompatibility becomes an organizational dimension in the resolution*; information supposes a *phase change of a system*, for it supposes a first pre-individual state that individuates according

to the discovered organization; information is the formula of individuation, a formula that cannot exist before this individuation; it could be said that information is always in the present, actual, for it is the direction according to which a system individuates.<sup>12</sup>

This study is founded on the following conception of being: being does not possess a unity of identity, which is that of a stable state wherein no transformation is possible; being possesses a *transductive unity*, i.e. it can phase-shift with respect to itself, it can overflow itself on both sides from *its center*. What is taken as a *relation or duality of principles* is in fact this overflowing expanse of a being, insofar as a being is more than unity and more than identity; becoming is a dimension of a being, not what comes to it according to a succession that would be undergone by an initially given and substantial being. Individuation must be grasped as the being's becoming and not as a model of the being, which would exhaust its signification. The individuated being is neither the whole being nor the first being; *instead of grasping individuation on the basis of the individuated being, the individuated being must be grasped on the basis of individuation and individuation on the basis of pre-individual being*, which is distributed according to several orders of magnitude.

The intention of this study is therefore to examine the *forms, modes, and degrees of individuation* in order to put the individual back into being according to the three levels of the physical, the vital, and the psycho-social. Instead of supposing substances so as to account for individuation, we have chosen to take the different regimes of individuation as the basis of various domains, such as matter, life, mind, and society. The separation, layering, and relations of these domains appear as aspects of individuation according to its different modalities; the more fundamental notions of first information, metastability, internal resonance, energetic potential, and orders of magnitude are substituted for the notions of substance, form, and matter.

Yet, in order for this modification of notions to be possible, it is necessary to introduce both a new method and a new notion. The method consists in not trying to compose the essence of a reality via a *conceptual* relation between two preexisting extreme terms, and it also consists in considering every veritable relation as having the status of being. Relation is a modality of being; it is simultaneous with respect to the terms whose existence it guarantees. A relation must be grasped as a relation in being, a relation of being, a manner of being, and not a simple rapport between two terms that could be adequately known via concepts because they would have an effectively prior, separate existence. It is because terms are conceived as substances that

relation is a rapport of terms and that being is separated into terms, since being is initially, before any examination of individuation, conceived as substance. Conversely, if substance is no longer the model of being, it is possible to conceive relation as the being's non-identity vis-à-vis itself, the inclusion in the being of a reality which is not merely identical with it, such that being qua being, before any individuation, can be comprehended as more than unity and more than identity.<sup>13</sup> This kind of method supposes an ontological type of postulate: at the level of being grasped before any individuation, the principle of the excluded middle and the principle of identity are no longer applicable; these principles only apply to the already individuated being, and they define an impoverished being that is separated into milieu and individual; consequently, they do not apply to the being's whole, to the ensemble formed later on by the milieu and the individual, but merely to what of pre-individual being has become individual. In this sense, classical logic cannot be used to think individuation, for it forces us to think the operation of individuation with concepts and rapports among concepts that merely apply to the results of the operation of individuation considered partially.

The usage of this method, which considers the principle of identity and the principle of the excluded middle as too narrow, unlocks a notion that has a multitude of aspects and domains of application: that of *transduction*. By transduction we mean a physical, biological, mental, or social operation through which an activity propagates incrementally within a domain by basing this propagation on a structuration of the domain operated from one region to another: each structural region serves as a principle and model, as an initiator for constituting the following region, such that a modification thereby extends progressively throughout this structuring operation. The simplest image of the transductive operation is provided by the crystal, which, starting from a tiny germ, increases and extends following all the directions in its supersaturated mother liquor: each previously constituted molecular layer serves as the structuring basis for the layer in the process of forming; the result is an amplifying reticular structure. The transductive operation is an individuation in progress; within the physical domain, it can be effectuated in the simplest way via progressive iteration; but within more complex domains, like the domains of vital metastability or of the psychical problematic, it can advance with a constantly variable pace and extend into a domain of heterogeneity; there is transduction when there is an activity that starts from a being's structural and functional center and extends in various directions based on its center, as if multiple dimensions of the being appeared around this center; transduction is the correlative appearance of dimensions

and structures within a being in a state of pre-individual tension, i.e. in a being which is more than unity and more than identity and which has not yet phase-shifted with respect to itself in multiple dimensions. The extreme terms attained by the transductive operation do not exist before this operation; its dynamism stems from the initial tension of the system of the heterogeneous being that phase-shifts and develops dimensions according to which it will be structured; it does not come from a tension between terms that will be attained and deposited at the extreme limits of transduction.<sup>14</sup> Transduction can be a vital operation; in particular, it expresses the orientation of organic individuation; it can be a psychological operation and an effective logical procedure, although it is not at all limited to logical thought. In the domain of knowledge, it defines the veritable measure of invention, which is neither inductive nor deductive, but transductive, i.e. corresponds to a discovery of the dimensions according to which a problematic can be defined; it is an analogical operation, at least based on what is valid about the latter. This notion can be used to think the different domains of individuation: it applies to all cases wherein an individuation is realized, manifesting the genesis of a web of rapports founded on the being. The possibility of using an analogical transduction to think a domain of reality indicates that this domain is effectively the groundwork of a transductive structuration. Transduction corresponds to this existence of rapports that takes hold when pre-individual being individuates; it expresses individuation and allows for individuation to be thought; it is therefore a notion that is both metaphysical and logical; *it applies to ontogenesis and is ontogenesis itself*. Objectively, it makes it possible to understand the systematic conditions of individuation, internal resonance,<sup>15</sup> and the psychological problematic. Logically, it can be used as the basis of a new type of analogical paradigmaticism in order to pass from physical individuation to organic individuation, from organic individuation to psychological individuation, and from psychological individuation to the subjective and objective transindividual, all of which defines the plan of this research.

We could certainly assert that transduction would not be presented as a logical procedure having a proof value; furthermore, we don't mean to say that transduction is a logical procedure in the current sense of the term; it is a mental procedure, and even much more than a procedure, it is the mind's way of discovering. This way of discovering consists in *following the being in its genesis*, in accomplishing the genesis of thought at the same time as the genesis of the object is accomplished. In this research, it is called upon to play a role that dialectics could not play, for the study of the operation of individuation does not seem to correspond to the appearance of the negative

as a second stage, but to an immanence of the negative within the initial condition through the ambivalent form of tension *and* incompatibility; this is what is most positive in the state of pre-individual being, namely the existence of potentials, which is also the cause of the incompatibility and non-stability of this state; the negative appears initially as an ontogenetic incompatibility, but it is in actuality merely the other side of a wealth of potentials; therefore, it is not a substantial negative; it is never a stage or phase, and individuation is not a synthesis or return to unity but the phase-shift of the being based on its pre-individual center of potentialized incompatibility. From this ontogenetic perspective, time itself is considered as an expression of the *dimensionality of the being that is individuating*.

Transduction is therefore not merely the reasoning of the mind; it is also intuition, because it is that through which a structure appears in a domain of a problematic as providing the resolution to the problems posed. But contrary to *deduction*, transduction does not go elsewhere to seek a principle to resolve the problem of a domain: it extracts the resolving structure from the very tensions of this domain, just as the supersaturated solution crystallizes due to its own potentials and according to the chemical species that it holds, not with the contribution of some foreign form. It is also not comparable to *induction*, for induction truly conserves the characteristics of the terms of reality included in the studied domain, drawing the structures of the analysis from these terms themselves, but it only conserves what is positive in these terms, i.e. *what is common* to all terms, thereby eliminating what is singular from them; on the contrary, transduction is a discovery of dimensions whose system makes the dimensions of each of the terms communicate, such that the complete reality of each of the terms of the domain can become organized into newly discovered structures without loss or reduction; resolving transduction *operates the inversion of the negative into the positive*: that through which the terms are not identical to one another, that through which they are *disparate* (in the sense that this term assumes within the theory of three-dimensional vision) is integrated into the system of resolution and becomes a condition of signification; there is no impoverishment of information contained in the terms; transduction is characterized by the fact that the result of this operation is a concrete fabric including all the initial terms; the resulting system is made of that which has become concrete and includes the whole concrete; the transductive order conserves the concrete and is characterized by the *conservation of information*, whereas induction requires a loss of information; just like dialectics, transduction conserves and integrates the opposed aspects; unlike dialectics, transduction

does not suppose the existence of a preliminary time as the framework in which the genesis unfurls, since time itself is a solution, a dimension of the discovered systematic: *time emerges from the pre-individual just like the other dimensions according to which individuation effectuates itself.*<sup>16</sup>

However, in order to think the transductive operation, which is the basis of individuation in its various levels, the notion of form is insufficient. The notion of hylomorphic form is part of the same system of thought as that of substance, or that of rapport as a relation posterior to the existence of terms: these notions have been elaborated based on the results of individuation; they can only grasp an impoverished real without potentials, and consequently one that is incapable of individuating.

*The notion of form must be replaced with that of information*, which supposes the existence of a system in a state of metastable equilibrium that can individuate; unlike form, information is never a single term but the signification that emerges from a disparation. The ancient notion of form, such as the hylomorphic schema upholds, is too independent from any notion of system and metastability. The notion of form provided by Gestalt theory on the contrary conveys the notion of system and is defined as the state toward which the system tends when it finds its equilibrium: it is a resolution of tension. Sadly, an overly superficial physical paradigmaticism has led Gestalt theory to consider that the only state of equilibrium of a system that can resolve tensions is the state of stable equilibrium: Gestalt theory has ignored metastability. We would like to take up Gestalt theory again and, with the introduction of a quantum condition, show that the problems posed by Gestalt theory cannot be directly resolved via the notion of stable equilibrium but only via the notion of metastable equilibrium; good form is therefore no longer simple form, pregnant geometrical form, but *significant form*, i.e. that which establishes a transductive order within a system of reality bearing potentials. This good form is what maintains the energetic level of the system, conserves its potentials by making them compatible: it is the structure of compatibility and viability, it is the invented dimensionality according to which there is compatibility without degradation.<sup>17</sup> The notion of form then deserves to be replaced by that of information. During this replacement, the notion of information must never be reduced to signals or supports or vehicles of information, *as the technological theory of information tends to do when it is siphoned by abstraction from the technology of transmissions*. The pure notion of form must therefore be saved twice from an overly superficial technological paradigmaticism: first, relative to ancient culture due to the reductive usage of this notion in the *hylomorphic schema*; second,

relative to the state of the notion of information in modern culture, to save information as signification from the *technological theory* of information conceived by way of the experience of transmissions through a channel. For we actually uncover the same goal at work in the successive theories of hylo-morphism, good form, and then information: the goal that seeks to discover the inherence of significations to *being*; and it is precisely this inherence that we would like to discover in the operation of individuation.

Thus, a study of individuation can tend toward a reform of fundamental philosophical notions, for it is possible to consider individuation as what must be known beforehand about being. Even before wondering how it is legitimate or illegitimate to bear judgments on beings, it can be considered that being is said in two senses: in a first, fundamental sense, being is insofar as it is; but in a second sense, always superposed on the first sense in logical theory, being is being insofar as it is individuated. If it were true that logic bears on statements relative to being only after individuation, a theory of being anterior to all logic would have to be established; this theory could serve as the foundation to logic, for nothing proves in advance that being is individuated in a single possible way; if several types of individuation existed, several logics would also have to exist, each corresponding to a definite type of individuation. The classification of ontogeneses would make it possible to *pluralize logic* with a valid foundation of plurality. As for the axiomatization of the knowledge of pre-individual being, it cannot be contained in a preliminary logic, for no norm or system detached from its content can be defined: by being accomplished, only the individuation of thought can accompany the individuation of beings other than thought; we therefore cannot have an immediate knowledge or a mediated knowledge of individuation, but we can have a knowledge that is an operation parallel to the operation known; we cannot *know individuation* in the ordinary sense of the term; we can only individuate, be individuated, and individuate within ourselves; this apprehension is therefore, in the margin of knowledge properly speaking, an analogy between two operations, an analogy that is a certain mode of communication. The individuation of the real, exterior to the subject, is grasped by the subject due to the analogical individuation of knowledge within the subject; but it is *through the individuation of knowledge* and not through knowledge alone that the individuation of non-subject beings is grasped. Beings can be known through the knowledge of the subject, but the individuation of beings can only be grasped through the individuation of the subject's knowledge.



PART I

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# Physical Individuation



# Form and Matter

## I. FOUNDATIONS OF THE HYLOMORPHIC SCHEMA: TECHNOLOGY OF FORM-TAKING

### *1. The Conditions of Individuation*

The notions of form and matter cannot help us resolve the problem of individuation unless they are logically first relative to its position. Conversely, if we discovered that the hylomorphic system expresses and contains the problem of individuation, it would be necessary (lest we be forced into begging the question) to consider the search for the principle of individuation as logically anterior to the definition of matter and form.

It is difficult to consider the notions of matter and form as innate ideas. However, at the very moment when we would be tempted to assign them a technological origin, we are taken aback by the remarkable capacity for generalization these notions possess. Along with the brick or marble, clay and the statue aren't the only things that can be thought according to the hylomorphic schema, because very many events of formation, genesis, and composition in the living world and the psychical domain can also be thought in the same manner. The logical force of this schema is so great that Aristotle was able to utilize it in order to sustain a universal system of classification that is applicable to the real both according to the logical path and according to the physical path, thereby guaranteeing the harmony of the logical order and the physical order and making inductive knowledge possible. Even the rapport of the soul and the body can be thought according to the hylomorphic schema.

A basis as narrow as that of the technological operation only seems to be able to sustain a paradigm with a similar force of universality with great difficulty. Thus, in order to examine the foundation of the hylomorphic schema,

we need to acknowledge the meaning and the extent of the role played in its genesis by the technical experience.

The technological nature of the origin of a schema does not invalidate this schema, on condition, however, that the operation serving as the basis of formation for the utilized concepts fully passes into and is expressed in the abstract schema without alteration. Conversely, if the abstraction is carried out superficially and unfaithfully by masking one of the fundamental dynamisms of the technical operation, then the schema is false. Instead of having a veritable paradigmatic value, it would be nothing but a comparison, a more or less rigorous approximation according to the case.

However, in the technical operation that gives rise to an object with form and matter (like a brick of clay), the real dynamism of the operation is quite far from being able to be represented by the matter-form pair. The form and the matter of the hylomorphic schema are an abstract form and an abstract matter. The definite being that can be shown (this brick drying on this board) does not result from the combination of an unspecified matter and an unspecified form. If we take fine-grained sand, moisten it, and pack it into a brick mold, then we will get a heap of sand and not a brick after we take it out of the mold. If we take clay and put it through the rolling mill or the spinneret, then we will not get a plate or wire but a pile of broken layers and short cylindrical segments. Clay conceived as the support of an undefined plasticity is the abstract matter. The right-angled parallelepiped conceived as a brick form is an abstract form. The concrete brick does not result from the joining of the clay's plasticity and the parallelepiped. In order for there to be able to be *a* parallelepipedic brick, a really existing individual, an effective technical *operation* must institute a mediation between a determinate mass of clay and this notion of the parallelepiped. However, the technical operation of molding is not enough by itself: moreover, this operation does not institute a direct mediation between a determinate mass of clay and the abstract form of the parallelepiped;<sup>1</sup> the mediation is prepared by two chains of preliminary operations that make a matter and form converge toward a common operation. To give a form to the clay is not to impose the parallelepipedic form onto raw clay: it is to pack the prepared clay into a fabricated mold. If we start from the two ends of the technological chain, the parallelepiped and the clay in the quarry, then we can experience the impression of realizing in the technical operation an encounter between two realities of heterogeneous domains and of instituting a mediation through communication between an inter-elementary, macrophysical order larger than the individual and an intra-elementary, microphysical order smaller than the individual.

In the technical operation, what must be considered is precisely the mediation itself: in the chosen case, it consists in making a prepared block of clay completely fill a mold and drying it afterwards by conserving this defined contour without cracks or disintegration. However, the preparation of the clay and the construction of the mold are already an active mediation between the raw clay and the geometrical form that can be imposed. The mold is constructed so that it can be opened and closed without damaging its contents. Certain forms of geometrically conceivable solids have only become realizable with very complex and subtle devices. Even today, the art of constructing molds is one of the most delicate aspects of the foundry. Furthermore, the mold isn't just constructed; it is also prepared: a certain coating or a dry powdering will prevent the humid clay from sticking to the walls of the mold when it is removed, thus keeping it from forming cracks or disaggregating. In order to produce a form, one must construct a *certain defined* mold, prepared in a *certain* fashion with a *certain* type of matter. Thus, there is an initial pathway that goes from the geometrical form to the concrete material mold, parallel to the clay, which exists in the same manner as it and is posited alongside it in the order of magnitude of the manipulable. As for the clay, it is also submitted to a preparation; as a raw matter, it is what the shovel raises to the surface at the edge of the marsh with roots of rush and gravel grains. Dried, crushed, sifted, wetted, shaped, and kneaded at length, it becomes this consistent and homogeneous dough that is plastic enough to be able to embrace the contours of the mold in which it is pressed and firm enough to conserve this contour long enough for this plasticity to disappear. In addition to its purification, the preparation of the clay seeks to obtain homogeneity and the best degree of chosen humidity to reconcile plasticity and consistency. In the raw clay, there is the capacity to become a malleable mass with the dimension of the future brick due to the colloidal properties of aluminum hydrosilicates: these colloidal properties make it possible for the movements of the technical half-chain ending in the prepared clay to be effective; the molecular reality of the clay and of the water that it absorbs is organized by the preparation in such a way as to be able to behave during individuation as a homogeneous totality on the level of the brick that is about to appear. Prepared clay is a clay in which each molecule—despite its place relative to the walls of the mold—will be effectively put into communication with all the pressures exerted by these walls. Each molecule intervenes on the level of the future individual and thereby enters into interactive communication with the order of magnitude superior to the individual. On its side, the other technical half-chain descends toward the future

individual; the parallelepipedic form is not just any form; it already contains a certain schematism that can direct the construction of the mold, which is a set of coherent operations contained in the implicit state; the clay is not just passively deformable; it is actively plastic, since it is colloidal; its capacity to receive a form is not distinct from its capacity to keep it, because keeping and receiving amounts to the same thing: to undergo a flawless deformation with a coherence of molecular chains. The preparation of the clay is the constitution of this state of equal distribution of molecules and this arrangement into chains; the shaping has already begun the moment when the craftsman stirs the paste before introducing it into the mold. This is because the form is not just the fact of being parallelepipedic; it is also the fact of being flawless in the parallelepiped, without bubbles of air and without cracks: unblemished cohesion is the result of a formation, and this formation is merely the exploitation of the colloidal characteristics of the clay. Before any elaboration, the clay in the marsh is already in a form, since it is already colloidal. The craftsman's labor uses this elementary form, without which nothing would be possible and which is homogeneous relative to the form of the mold: there is merely a change of scale in the two technical half-chains. In the marsh, the clay indeed has colloidal properties, but these properties exist molecule by molecule or grain by grain in this state; this already involves form and is what will later maintain the homogeneous and well-molded brick. The quality of matter is the form's source, an element of the form whose scale is modified by the technical operation. In the other technical half-chain, the geometrical form becomes concretized and becomes the dimension of the mold, i.e. collected wood, sawdust, or damp wood.<sup>2</sup> The technical operation prepares two half-chains of transformation that encounter one another at a certain point when the two elaborated objects have compatible characteristics and are on the same scale; this putting into relation is not singular and unconditional; it can take place in stages; what we consider to be a single instance of shaping is often just the latest episode in a series of transformations; when the block of clay receives the final deformation that allows it to fill the mold, its molecules are not reorganized completely and in a single stroke; they are displaced slightly relative to one another; their topology is maintained, and what is involved is merely one last total deformation. However, this total deformation is not just a shaping of the clay by its contour. The clay yields a brick because this deformation operates on masses whose molecules are already arranged relative to one another, without air, without grains of sand, and with a good colloidal equilibrium; if the mold didn't guide all of this already constituted prior arrangement into

one last deformation, then it would never produce any form; it could be said that the form of the mold only operates on the form of the clay and not on the clay matter. The mold limits and stabilizes rather than imposing a form: it provides the goal of deformation and achieves it by interrupting it according to a definite contour: it *modulates* the ensemble of the already formed sections: the action of the worker who fills the mold and packs the clay continues the prior action of kneading, stretching, and shaping: the mold plays the role of a fixed set of modeling hands, acting like halted kneading hands. We could make a brick with our hands without a mold by prolonging the kneading through a fashioning that would continue it without interruption. Matter is matter because it contains a positive property that allows it to be modeled. To be modeled is not to undergo arbitrary displacements but to organize matter's plasticity according to definite forces that stabilize the deformation. The technical operation is a *mediation* between an inter-elementary ensemble and an intra-elementary ensemble. The pure form already contains actions, and the raw material is the capacity of becoming; the actions contained in the form encounter the becoming of the matter and modulate it. In order for the matter to be able to be modulated in its becoming, it must—like the clay at the moment when the worker packs it into the mold—have a deformable reality, i.e. a reality that does not have a definite form but all forms indefinitely and dynamically, since this reality, while it possesses inertia and consistency, is a depository of force (at least for an instant) and is identical point by point with this force; in order for the clay to fill the mold, it is not enough for it to have plasticity: it must transmit the pressure that the worker impresses on it, and each point of its mass must be a center of forces; the clay is pushed into the mold that it fills; it propagates the energy of the worker within its mass. While the mold is being filled, a potential energy becomes actualized.<sup>3</sup> The energy that pushes the clay must exist potentially in the mold-hand-clay system for the clay to fill all the empty space, and this energy develops in every direction and is halted only by the boundaries of the mold. The walls of the mold then intervene not on the whole as materialized geometrical structures but point by point as fixed places that do not allow the expanding clay to advance and oppose against the pressure developed by the clay an equal force in the opposite direction (principle of reaction) without carrying out any work, since they are not displaced. The walls of the mold relative to an element of the clay play the same role as an element of this clay relative to another nearby element: the pressure of one element relative to another within the mass is almost as strong as that of an element of the wall relative to an element of the

mass; the only difference is that the wall is not displaced, whereas the elements of the clay can be displaced relative to the others and relative to the walls.<sup>4</sup> A potential energy that is translated within the clay by the forces of pressure is actualized while the mold is being filled. The matter conveys with it the potential energy being actualized; the form, which is here represented by the mold, plays an informing role by exerting forces without work, forces that limit the actualization of the potential energy momentarily borne by the matter. This energy can be actualized in a given direction with a given rapidity: the form is the limit. The relation between matter and form thus does not take place between inert matter and a form coming from outside: there is a common operation that is on the same level of existence between matter and form; this common level of existence is that of *force*, which arises from an energy momentarily borne by the matter yet drawn from a state of the total inter-elementary system with a superior dimension that expresses the individuating limitations. The technical operation constitutes two half-chains that verge—starting from the raw matter and the pure form—toward one another and combine. This combination is made possible by the dimensional correspondence of the two ends of the chain; the successive links of the elaboration transfer characteristics without creating new ones: they merely establish changes in orders of magnitude, changes in level, and changes in state (for example, the passage from the molecular state to the molar state, from the dry state to the humid state); what is present at the material end of the half-chain is the capacity for matter to convey a potential energy point by point, which can provoke a movement in an undetermined direction; what is present at the end of the formal half-chain is the capacity for a structure to condition a movement without carrying out work through a play of forces that do not displace their point of application. This affirmation, however, is not rigorously true; in order for the mold to be able to limit the expansion of the modeling clay and statically direct this expansion, the walls of the mold must develop a force of reaction equal to the pressure of the clay; the clay recedes and becomes tightly packed (thereby filling out the empty space) when the reaction of the walls of the mold is slightly more elevated than the forces exerted in the opposite directions within the mass of the clay; conversely, when the mold is completely filled, the internal pressures are equal throughout to the walls' forces of reaction, so that there is no longer any movement taking place. The reaction of the walls is thus the static force that directs the clay during the filling of the mold by preventing expansion in certain directions. However, the forces of reaction can only exist due to a very slight elastic flexing of the walls; from the matter's point of view, it could

be said that the formal wall is the limit beginning from which a displacement in a determined direction is only possible at the expense of a very large increase in work; but in order for this condition of increased work to be effective, it must begin to be realized before the equilibrium is disrupted and before the matter takes on other directions in which it is not limited, since the matter is pushed by the energy that it carries with it and that it actualizes by advancing; thus, there must be a little work from the walls of the mold that corresponds to the slight displacement of the point of application of the forces of reaction. But this work *is not added* to the work that produces the actualization of the energy borne by the clay; it is no longer involved in the work of actualization; it does not interfere with the latter; we can also reduce it as much as we like; a thin wooden mold noticeably becomes deformed under the abrupt pressure of the clay and then progressively returns to its original position; a thick wooden mold displaces less; a cast-iron or flint mold hardly displaces at all. Furthermore, the positive work of the mold returning to its original position largely compensates for the negative work of deformation. The mold can have a certain elasticity; it simply must not have plasticity. Matter and form are brought together as *forces*. The only difference between the regime of these forces for matter and form is the fact that the forces of the matter stem from an energy borne by the matter that is readily available, whereas the forces of the form are forces that produce nothing but a small amount of work and intervene as limits of the actualization of the matter's energy. It is not in the infinitely short instant that matter and form are different, but in becoming; the form is not the bearer of potential energy; the matter is only informable matter because it can, point by point, be the bearer of an energy that becomes actualized;<sup>5</sup> the preliminary treatment of the raw matter aims to make the matter the homogeneous support of a definite potential energy; through this potential energy, the matter becomes; the form, however, does not become. In the instantaneous operation, the forces of the matter and the forces that arise from the form are not different; they are homogeneous relative to one another and belong to the same instantaneous physical system; but they do not belong to the same temporal ensemble. The work exerted by the forces of the elastic deformation of the mold no longer exist after the molding; they are nullified or degrade into heat and have not produced anything on the order of magnitude of the mold. Conversely, the potential energy of the matter is actualized on the order of magnitude of the clay mass by producing a distribution of the elementary masses. That is why the preliminary treatment of the clay prepares this actualization: it renders each molecule interdependent with the other

molecules and renders the ensemble deformable, so that each portion equally participates in the potential energy whose actualization is the molding; it is essential that all the portions (without discontinuity or privilege) have the same chances to deform in any direction whatsoever; a lump or a stone are domains of non-participation in this potentiality that is actualized by localizing its support; they are parasitic singularities.

The fact that there is a mold, i.e. limits of actualization, creates in the matter a state of reciprocity in the forces that lead to equilibrium; the mold does not act from the outside by imposing a form; its action reverberates within the whole mass through the action of molecule to molecule and portion to portion; the clay at the end of molding is the mass in which all the forces of deformation encounter in every direction forces that are equal and in opposite directions to those of which their equilibrium consists. *The mold translates its existence into the matter by making it tend towards a condition of equilibrium.* For this equilibrium to exist, there must be a certain quantity of potential energy that is not yet actualized in the whole system at the end of the operation. It would not be precise to say that the form plays a static role while the matter plays a dynamic role; in fact, in order for there to be a single system of forces, the matter and form both must play a dynamic role; but this dynamic equality is only true for a moment. The form does not evolve and is not modified because it does not contain any potentiality, whereas the matter evolves. The matter is the bearer of potentialities that expand and are distributed uniformly in it; the homogeneity of the matter is the homogeneity of its possible becoming. Each point has as many chances as all the others; the matter about to take form is in a state of complete *internal resonance*; what occurs at one point reverberates within all the others, the becoming of each molecule reverberates within all the others at all points and in all directions; the matter's elements are neither isolated from one another nor heterogeneous relative to one another; all heterogeneity is a condition of the non-transmission of forces and therefore a condition of internal non-resonance. The plasticity of the clay is its capacity to be in a state of internal resonance as soon as it is subjected to a pressure in an enclosure. The mold as a limit is that through which the state of internal resonance is provoked, but the mold is not that through which the internal resonance is realized; the mold is not what uniformly transmits in all directions the pressures and displacements within the malleable clay. It cannot be said that the mold gives form; it is the clay that takes form according to the mold because it communicates with the worker. The *positivity* of this form-taking is that of the clay and the worker; it is this internal resonance, the work of this internal

resonance.<sup>6</sup> The mold intervenes as a condition of enclosure, limit, halted expansion, and direction of mediation. The technical operation institutes internal resonance in the matter taking form by means of energetic conditions and topological conditions; the topological conditions can be called form, and the energetic conditions express the entire system. Internal resonance is a *system state* that requires this realization of energetic conditions, topological conditions, and material conditions; resonance is an exchange of energies and movements in a determined enclosure, a communication between a microphysical matter and a macrophysical energy based on a singularity whose dimension is intermediate and topologically defined.

*2. Validity of the Hylomorphic Schema; the Dark Zone of the  
Hylomorphic Schema; Generalization of the Notion of  
Form-Taking; Modeling, Molding, Modulation*

The technical operation of form-taking can therefore serve as a paradigm if we require this operation to indicate the veritable relations that it institutes. However, these relations are not established between the raw matter and the pure form but between the prepared matter and the materialized form: the operation of form-taking doesn't just suppose raw matter and form but also energy; the materialized form is a form that can act as a limit, as the topological boundary of a system. The prepared matter is one that can transmit energetic potentials, the technical manipulation of which charges it. In order to play a role in the technical operation, the pure form must become a system of points of application of the forces of reaction while the raw matter becomes a homogeneous bearer of potential energy. Form-taking is the mutual operation of the form and the matter in a system: the energetic condition is essential, and it is not contributed by the form alone; the whole system is the center of potential energy precisely because form-taking is an in-depth operation within the whole mass, the consequence of which is a state of energetic reciprocity of the matter relative to itself.<sup>7</sup> The distribution of energy is what is determinative in form-taking, and the mutual conformity of the matter and the form is relative to the possibility of the existence and characteristics of this energetic system. The matter is what bears this energy, and the form is what modulates the distribution of this very energy. At the moment of form-taking, the matter-form unity is in the energetic regime.

The hylomorphic schema only retains the extremes of these two half-chains elaborated by the technical operation; the schematism of the operation itself is obscured and ignored. There is a hole in hylomorphic representation that makes the true mediation disappear, i.e. the very operation that attaches the

two half-chains to each other by instituting an energetic system, a state that evolves and must effectively exist for an object to appear with its haecceity. The hylomorphic schema corresponds to the knowledge of someone who remains outside the workshop and considers nothing but what enters and exits it; in order to know the true hylomorphic relation, it is not even enough to enter the workshop and work with the craftsman: we would have to penetrate into the mold itself in order to follow the operation of form-taking on the different scales of magnitude of physical reality.

Grasped in itself, the operation of form-taking can be carried out in several ways and according to modalities that are seemingly very different from one another. The veritable technicity of the operation of form-taking greatly surpasses the conventional limits that separate the fields and domains of labor. Consequently, through the study of the energetic regime of form-taking, it becomes possible to approximate the molding of a brick with the functioning of an electronic relay. In an electronic tube like a triode, the “matter” (bearer of the potential energy that is actualized) is the cloud of electrons emanating from the cathode in the cathode-anode-effector-generator circuit. The “form” is what limits this actualization of reserve potential in the generator, i.e. the electrical field created by the difference in potential between the control grid and the cathode, which is opposed to the cathode-anode field created by the generator itself; this counter-field is a limit to the actualization of potential energy, just as the walls of the mold are a limit for the actualization of the potential energy of the clay-mold system carried by the clay in its displacement. The difference between the two cases resides in the fact that the operation of form-taking is finite in time for the clay: it tends fairly slowly (in several seconds) toward a state of equilibrium, and then the brick is removed from the mold; the state of equilibrium is utilized in the unmolding when this state is attained. In the electronic tube, we utilize a support of energy (an electron cloud in a field) with a very slight inertia, such that the state of equilibrium (equivalence between the distribution of electrons and the gradient of the electrical field) is obtained in an extremely short time relative to the example of the brick (several milliseconds in a large tube and several tenths of a millisecond in very small tubes). Under these conditions, the potential of the control grid is utilized as a *variable mold*; the distribution of the support of energy in proportion to this mold is so rapid that it is carried out without an appreciable delay for the majority of applications: the variable mold then serves to differentiate in time the actualization of a source’s potential energy; we do not stop when equilibrium is attained but continue by modifying the mold, i.e. the tension of the grid; the actualization is almost

instantaneous and there is never a halt for the unmolding, since the circulation of the support of energy is equivalent to a *perpetual unmolding*; a modulator is a *continuous temporal mold*. Here, the “matter” is almost uniquely the support of potential energy; it nevertheless always conserves a definite inertia that prevents the modulator from being infinitely fast. In the case of the clay mold, on the contrary, what is technically utilized is the state of equilibrium that can be conserved by unmolding: a sufficient amount of the clay’s viscosity is then accepted in order for the form to be conserved in the course of unmolding, even though this viscosity slows down the form-taking. Conversely, in a modulator the viscosity of the bearer of energy is reduced as much as possible, since we do not seek to conserve the state of equilibrium after the conditions of equilibrium have ended: it is easier to modulate the energy carried by compressed air than by pressurized water, and it is even easier to modulate the energy carried by electrons in transit than by compressed air. The mold and the modulator are the extreme cases, but the essential operation of form-taking is accomplished in the same way for both; it consists in the establishment of an energetic regime, whether or not it persists. To mold is to modulate in a definitive way; to modulate is to mold in a continuously and perpetually variable way.

Many technical operations utilize a form-taking that has intermediate characteristics between molding and modulation; thus, a spinneret and a rolling mill are molds with a continuous regime that create a definitive profile in successive stages (called passes); unmolding is continuous in this case, just like in a modulator. We could conceive a rolling mill that would really modulate matter and fabricate, for example, a crenellated or indented ingot; rolling mills that produce striated sheet metal *modulate* matter, whereas a smooth rolling mill merely *models* it. *Molding* and *modulation* are the two extreme cases of which *modeling* is the intermediate case.

We would like to show that the technological paradigm is not without value and that to a certain extent it allows us to think the genesis of the individuated being, but only on the express condition that we retain as an essential schema the relation of matter and form *through the energetic system* of form-taking. Matter and form must be grasped *during form-taking* at the moment when the unity of the becoming of an energetic system constitutes this relation on the level of the homogeneity of forces between matter and form. What is central and essential is the energetic operation, which supposes energetic potentiality and a limit of actualization. The initiative of the genesis of substance neither boils down to matter as passive nor to form as pure: what generates is the *complete system*, and it generates because it is a

system of the actualization of potential energy that combines in an active mediation two realities of two different orders of magnitude within an intermediate order.

In the classical sense of the term, individuation cannot have its principle in matter or in form; neither form nor matter are enough for form-taking. The veritable principle of individuation is genesis itself in the course of being carried out, i.e. the system in the course of becoming while energy is actualized. The veritable principle of individuation cannot be sought in what exists before individuation occurs or in what remains after individuation is completed; what is individuating is the energetic system, to the extent that it realizes within it this internal resonance of the matter about to take form and a mediation between orders of magnitude. The principle of individuation is the singular manner in which the internal resonance of *this* matter about to take *this* form is established. What makes it such that a being is itself, different from all others, is neither its matter nor its form but the operation through which its matter has taken form in a certain system of internal resonance. The principle of individuation of the brick is neither the clay nor the mold: other bricks than this will emerge from this pile of clay and this mold, and they will each have their own haecceity, but the principle of individuation is this operation through which the clay, at a given moment in an energetic system that consisted of the smallest details of the mold as well as the smallest pilings of this humid earth, has taken form under a certain pressure, distributed in a certain way, diffused in a certain way, and actualized in a certain way: there has been a moment when the energy of the pressure has been transmitted in all directions from each molecule to all the others, from the clay to the walls and from the walls to the clay: the principle of individuation is the operation that realizes an energetic exchange between the form and the matter up to the point that the ensemble ends in a state of equilibrium. It could be said that the principle of individuation is *the allagmatic operation common to matter and form through the actualization of potential energy*. This energy is the energy of a system; it can produce effects in all the points of the system equally, is available, and can be communicated. This operation depends on the singularity or singularities of the concrete *here and now*; it envelops them and amplifies them.<sup>8</sup>

### 3. Limits of the Hylomorphic Schema

Nevertheless, the technological paradigm cannot be extended in a purely analogical way to the genesis of all beings. The technical operation is completed in a limited time; after actualization, it leaves behind a partially individuated,

more or less stable being that inherits its haecceity from this operation of individuation that has constituted its genesis in a very short time; at the end of several years or several thousand years, the brick turns back into dust. The individuation is completed in a single stroke; the individuated being is never more perfectly individuated than when it leaves the hands of the craftsman. Thus, there is a certain exteriority of the operation of individuation relative to its result. Conversely, in the living being the individuation is not produced by a single operation that is limited in time; the living being is to itself partially its own principle of individuation; it continues its individuation, and, instead of merely being a result that progressively degrades, the result of an initial operation of individuation becomes the principle of a further individuation. The individuating operation and the individuated being are not in the same relation within the product of the technical effort. Instead of a becoming after individuation, the becoming of the living being is always a becoming between two individuations; the individuating and the individuated are in a prolonged allagmatic relation in the living being. In the technical object, this allagmatic relation only exists for a moment when the two half-chains are connected to one another, i.e. when the matter takes form: in this moment, the individuated and the individuating coincide; when this operation is finished, they become separate; the brick does not bring its mold along with it,<sup>9</sup> and it becomes detached from the worker or the machine that has pressed it. After being initiated, the living being continues individuating itself; it is simultaneously the individuating system and the partial result of individuation. A new regime of internal resonance is established in the living being, the paradigm of which technology does not provide: a resonance through time created by the recurrence of the result going back toward the principle and becoming principle in turn. Just like in the technical individuation, an ongoing internal resonance constitutes the organismic unit. But, in addition, a resonance of the successive, a temporal allagmatics, is superimposed onto this resonance of the simultaneous. The living being's principle of individuation is always an operation, just like form-taking, but this operation has two dimensions, that of simultaneity and that of succession through ontogenesis maintained by memory and instinct.

It can then be asked if the veritable principle of individuation is not better indicated by the living being than by the technical operation, and if the technical operation could be known as individuating without the implicit paradigm of life that exists in us, since we are the ones who know the technical operation and practice it with our bodily schema, our habits, and our memory. This question has a large philosophical scope, since it leads us to

ask if a true individuation can exist outside life. In order to know it, what should be studied is not the technical, anthropomorphic, and consequently zoomorphic operation, but the processes of the natural formation of the elementary units that nature presents outside the realm defined as living.

Thus, the hylomorphic schema outside technology is insufficient in its commonplace types because it ignores the very center of the technical operation of form-taking and leads in this sense to ignoring the role played by the energetic conditions in form-taking. Furthermore, even if it is reestablished and completed as a matter-form-energy triad, the hylomorphic schema runs the risk of improperly objectifying a contribution of the living in the technical operation; the intention of the fabricator is what constitutes the system thanks to which energetic exchange is established between matter and energy in form-taking; this system is not part of the individuated object; however, the individuated object is thought by the human being as having an individuality as a fabricated object relative to the fabrication. The haecceity of this brick as a brick is not an absolute haecceity and is not the haecceity of this preexisting object because it is a brick. It is the haecceity of the object as a brick: it brings with it a reference to the intention of its usage and, through it, a reference to the fabricating intention and therefore to the human activity that has constituted the two half-chains joined into a system for the operation of form-taking.<sup>10</sup> In this sense, the hylomorphic schema is perhaps only seemingly technological: it is the reflection of vital processes in an abstractly known operation that derives its consistency from what is made by a living being for other living beings. This is how the great paradigmatic capacity of the hylomorphic schema is explained: coming from life, it returns to life and is applied to life, but it has a deficiency that stems from the fact that the apprehension of consciousness that made it explicit has grasped it through the improperly simplified case of technical form-taking; it grasps types more so than individuals and examples of a model more so than realities. The matter-form duality, which grasps merely the extreme terms of what is larger and smaller than the individual, leaves in obscurity the reality that is of the same order of magnitude as the produced individual and without which the extreme terms would remain separate, i.e. an allagmatic operation that is deployed on the basis of a singularity.

Nevertheless, it is not enough to critique the hylomorphic schema and to reproduce a more exact relation in the unfolding of technical form-taking in order to discover the veritable principle of individuation. It is also not enough to suppose in the knowledge gained from the technical operation a primarily biological paradigm: even if the matter-form relation in technical

form-taking is easily (adequately or inadequately) known due to the fact that we are living beings, a reference to the technical domain still remains necessary for us to clarify, specify, and objectify this implicit notion that the subject brings with him. If an experience of the vital is the condition for a representation of the technical, the representation of the technical in turn becomes one of the conditions for the knowledge of the vital. Thus, we are sent back from one order to the other, such that the hylomorphic schema seems to owe its own universality mainly to the fact that it establishes a certain reciprocity between the vital domain and the technical domain. This schema is also not the only example of a similar correlation: automatism in its various forms has been used with more or less success in order to penetrate the functions of the living being by means of representations that originate with technology, from Descartes to contemporary cybernetics. Nevertheless, an important difficulty emerges in the utilization of the hylomorphic schema: it does not indicate what is the principle of individuation of the living being, precisely because it grants to the two terms an existence prior to the relation that joins them, or at the very least because it cannot allow us to think this relation clearly; it can only represent the mixture or the piecemeal combination; *the manner in which the form informs the matter is not sufficiently specified by the hylomorphic schema*. To utilize the hylomorphic schema is to suppose that the principle of individuation is in the form or even in the matter, but not in the relation of the two. The dualism of substances (soul and body) is rooted in the hylomorphic schema, and we should consider whether this dualism has indeed originated with the technical sphere.

In order to delve deeper into this examination, we need to consider all the conditions that surround a notional awareness. If there were nothing but the living individual being and the technical operation, then the hylomorphic schema perhaps could not be constituted. In fact, it indeed seems that the middle term between the living domain and the technical domain, at the origin of the hylomorphic schema, was social life. What the hylomorphic schema primarily reflects is a socialized representation of labor and an equally socialized representation of the individual living being; the coincidence between these two representations is the mutual foundation of the extension of the schema from one domain to the other and the guarantee of its validity in a determined culture. The technical operation that *imposes a form on a passive and undetermined matter* isn't just an operation considered abstractly by the spectator who sees what enters the workshop and what leaves it without knowing the elaboration properly speaking. This is essentially the operation controlled by the free man and executed by the slave; the

free man chooses the matter—which is undetermined because it suffices to designate it generically by the name substance—without seeing it, without manipulating it, and without preparing it: the object will be made of wood or iron or clay. The veritable passivity of the matter is its abstract availability behind the given order that other men will execute. The passivity is the passivity of the human mediation that will procure the matter. The form corresponds to what the man who commands has thought by himself and what he must express positively when he gives his orders: the form is therefore *of the order of the expressible*; it is prominently active because it is what is imposed on those who manipulate the matter; it is the very content of the order, that through which he governs. The active characteristic of the form and the passive characteristic of the matter correspond to the conditions of the transmission of the order, which supposes social hierarchy: it is in the content of the order that the indication of the matter is an indetermination, whereas the form is determination, i.e. expressible and logical. It is also through social conditioning that the soul is opposed to the body; it is not through the body that the individual is a citizen, participates in collective judgments and shared beliefs, and lives on in the memory of his fellow citizens: the soul is distinguished from the body just as the citizen is distinguished from the living human being. The distinction between matter and form, between the soul and the body, reflects a city that contains citizens in opposition to slaves. It should indeed be noted however that the two schemas, the technological and the civic, if they coincide with one another in their distinction of the two terms, do not assign them the same role in the two pairs: the soul is not pure activity, full determination, while the body would be passivity and indetermination. The citizen is individuated as a body, but he is also individuated as a soul.

The vicissitudes of the hylomorphic schema originate from the fact that it is neither directly technological nor directly vital: it stems from the technological operation and from the vital reality mediated by the social, i.e. by the already given conditions (in inter-individual communication) of an effective reception of information, with the order of fabrication as a case in point. This communication between two social realities, this operation of reception which is the condition of the technical operation, obscures in the technical operation what allows the two extreme terms (form and matter) to enter into interactive communication: information, the singularity of the “*here and now*” of the operation, a pure event in the dimension of the individual about to appear.

## II. PHYSICAL SIGNIFICATION OF TECHNICAL FORM-TAKING

### *1. Physical Conditions of Technical Form-Taking*

Nevertheless, if the psycho-social conditioning of thought can explain the vicissitudes of the hylomorphic schema, the former can hardly explain the permanence of the latter and its universality in reflection. This permanence throughout successive aspects and this universality that infinitely spans various domains seem to require a less easily modifiable foundation than social life. The discovery of this unconditional foundation requires the physical analysis of the conditions of possibility of form-taking. Form-taking itself requires matter, form and energy, and singularity. But, for a raw matter and a pure form to be able to divide two technical half-chains that will be rejoined by the grasping of singular information, it is necessary that raw matter already contain, before any elaboration, something that can forge a system leading to the terminal point of the half-chain whose origin is pure form. This condition must be sought *in the natural world* before any sort of human elaboration. Matter must be structured in a certain way for it to already have the properties that are the condition of form-taking. In a certain sense, we could say that matter contains the coherence of form before form-taking; yet this coherence is already a configuration with the function of form. Technical form-taking utilizes prior natural form-takings that have created what could be called a haecceity of raw matter. A tree trunk on the timber yard consists of abstract raw matter insofar as it is considered a volume of wood to be used; only the essence to which it belongs approximates the concrete by indicating that a certain behavior of matter will be encountered at the moment of form-taking: a pine tree trunk is not a fir tree trunk. But this aforementioned tree, this trunk, has a haecceity in its totality and in each of its parts, right up to a definite level of smallness; there is a haecceity in its totality in the sense in which the tree trunk is straight or curved, almost cylindrical or regularly conical, sectioned off more or less roundly or in a strictly flattened manner. This haecceity of the ensemble is truly how this trunk is distinguished from all others; it is not merely how the tree can be recognized perceptively but what is technically a principle of choice when the tree is utilized in its totality, for example in order to make a beam; this trunk is more suitable than another depending on the situation due to its particular features, which are already features of form, specifically a form worthy of the carpenter's technique, even though this form is presented by raw and natural matter. A tree in the forest can be recognized by looking for the trunk best suited to a certain precise usage: the carpenter merely needs

to go into the forest. Secondly, the existence of implicit forms becomes manifest the moment when the craftsman works on the raw matter: a second level of haecceity manifests therein. A trunk quartered or stripped by a circular saw leaves behind two regular beams, but these are less solid than those from the same trunk broken into wedges; however, the four blocks of wood are seemingly equal, despite the quartering procedure utilized. But the difference consists in how the mechanical saw cuts the wood *abstractly* along a geometrical plane, without respecting the slack undulations of the fibers or their expansively spiral winding: the saw cuts the fibers, whereas the wedge separates them merely into two halves: the crack proceeds by respecting the continuity of the fibers, curving around a knot, following the heart of the tree, and guided by the implicit form that the force of the wedges reveals.<sup>11</sup> Similarly, a lathed tree fragment acquires a revolving geometrical form from this operation: but the lathing cuts a certain amount of the fibers, such that the figure's geometrical envelopment acquired through revolution cannot coincide with the sectioning of the fibers; the true implicit forms are not geometrical but topological; the technical labor must respect these topological forms that constitute a parceled haecceity, a possible information without anything lacking. The extreme fragility of unrolled wood, which prevents their usage in a single non-laminated layer, results from the fact that this procedure, which combines linear sawing and lathing, veritably yields a sheet of wood but without respecting the orientation of the fibers above a sufficient length: in this case, the explicit form produced by the technical operation does not respect the implicit form. Knowing how to use a tool is not merely to have acquired the practice of the necessary gestures; it is also knowing how to recognize, by means of the signals that come to man through the tool, the implicit form of the matter being worked upon at the precise spot that the tool attacks. The plane is not merely what cuts out a more or less thick chip; it is also what makes it possible to feel if the chip is cut out finely without splinters, or even if it begins to be uneven, which signifies that the orientation of the lines of the wood is opposed by the movement of the hand. What makes certain simple tools simpler, like the drawknife, which does excellent work, is that, due to their non-automaticity and the non-geometrical character of their movement, which is entirely supported by the hand and not by an external system of reference (like the lathe), these tools allow for us to grasp continuous and precise signals that invite us to follow the implicit forms of workable matter.<sup>12</sup> The mechanical saw and the lathe violate the wood and misrecognize it: this feature of the technical operation (what could

be called the conflict of levels of forms) reduces the possible number of raw materials that can be used to produce an object; all wood can be worked with a drawknife; some types of wood are already difficult to polish; but very few types of wood are suitable for the lathe, a machine which chips away along an orientation that does not account for the wood's implicit form, the particular haecceity of each part; some types of wood that would be excellent for cutting tools, which can be oriented and modified during the labor process, become unusable for the lathe, which irregularly attacks them and gives them a rough, spongy surface by detaching bundles of fibers. The only types of wood suitable for the lathe are fine-grained or almost homogeneously grained with a system of fibers that is mirrored by a system of transversal or oblique bonds between bundles; however, these types of wood, which have a non-oriented structure, are not necessarily the ones that offer the greatest resistance and greatest elasticity to bending forces. Wood treated by the lather loses the benefits of its implicit information; it presents no advantage over a homogeneous matter, like a malleable mold matter; on the contrary, its implicit form runs the risk of conflicting with the explicit form one wants to give it, thereby frustrating the agent of the technical operation. Finally, at the third degree, there is an elementary haecceity of workable matter that intervenes absolutely in the elaboration by imposing implicit forms, which are limits that cannot be surpassed; this is not matter as an inert reality but matter that harbors implicit forms that impose preliminary limits to the technical operation. In wood, this elementary limit is the cell or sometimes the differentiated mass of cells, if the differentiation is fairly extensive; thus, a vesicle, which is the result of a cellular differentiation, is a formal limit that cannot be surpassed: a wooden object cannot be constructed if the wood's details would have an order of magnitude inferior to that of the cells or the masses of differentiated cells when they exist. For example, if we wanted to construct a filter made of a thin laminate of wood pierced with holes, we could not make holes smaller than the grooves that are already found in the wood naturally formed; the only forms that can be imposed by the technical operation are those of an order of magnitude superior to the elementary implicit forms of the matter utilized.<sup>13</sup> The discontinuity of matter intervenes as form, and what happens at the level of the element happens at the level of the haecceity of the ensembles: the carpenter looks in the forest for a tree that has the desired form, because he cannot significantly straighten or curve a tree, and he must guide himself toward spontaneous forms. Similarly, the chemist or bacteriologist who would like a filter of wood or earth will be

unable to pierce a slab of wood or clay: he will choose a fragment of wood or slab of clay whose natural pores have the dimension he desires; the elementary haecceity intervenes in this choice; no two porous slabs of wood are exactly alike, because each pore exists in itself; one cannot be certain of the caliber of a filter except after trying it out, since the pores are the results of a form-taking elaborated before the technical operation; the latter, which is an operation of modeling, molding, and sawing, functionally adapts the support of these elementary implicit forms but does not create the elementary implicit forms: one must cut wood perpendicularly to the fiber in order to have porous wood, whereas one must cut it longitudinally (parallel to the fibers) in order to have elastic and resistant wood. These exact implicit forms, i.e. the fibers, can be utilized either as pores (by transversal section) or as resistant elastic structures (by longitudinal section).

It could be said that the technical examples are still plagued by a certain zoomorphic relativism when the implicit forms are solely distinguished with respect to the use that can be made of them. Yet it should be noted that scientific instrumentation appeals to implicit forms in a completely similar way. The discovery that crystals can diffract X-rays and also gamma rays has objectively founded the existence of the implicit forms of raw matter wherein sensory intuition could grasp nothing but a homogeneous continuum. Molecular lattices act like a network that has been traced by hand on a slab of metal: but this natural network has an even greater elementary lattice that is much smaller than the finest networks that can be fabricated, even with micro-tools; thus, at the extremity of the scale of magnitudes, the physicist acts like the carpenter who goes out to look for a suitable tree in the forest: the physicist chooses to analyze the X-rays of a certain wavelength of the crystal that forms a network with an elementary lattice of the same order of magnitude as this wavelength; and the crystal will be cut according to a certain axis so that one can best use this natural network that it forms, or it will be assaulted by the bundle of rays according to the best direction. Science and technics are no longer distinguished at the level of the utilization of implicit forms; these forms are objective and can be studied by science, just as they can be used by technics; furthermore, the only means that science has to study them inductively is to implicate them in an operation that reveals them; given an unknown crystal, we can discover its elementary lattice by sending out bundles of X-rays or gamma rays with a known wavelength onto it in order to be able to observe the figures of diffraction. The technical operation and the scientific operation are joined together in the operative mode that they instigate.

## 2. *Qualities and Implicit Physical Forms*

The hylomorphic schema is insufficient to the extent that it does not account for implicit forms, since it distinguishes between the pure form (which is called form) and the implicit form, which is conflated with other features of matter under the name quality. In fact, quite a large number of qualities attributed to matter are in fact implicit forms; and this confusion does not merely imply an imprecise classification; it also conceals an error: veritable qualities do not possess a haecceity, whereas implicit forms contain a haecceity to the highest extent.<sup>14</sup> Porosity is merely a global quality that a piece of earth or wood could lose or gain without a relation of inherence to the matter that constitutes it; porosity is the aspect under which the functionality of all these elementary implicit forms, which include the pores of wood such as they in fact exist, present themselves to the order of magnitude of human manipulation; pores become dilated or condensed, obstructed or cleared. Implicit form is real and exists objectively; quality often results from the choice that the technical elaboration makes concerning implicit forms; the same wood will be permeable or impermeable according to the manner in which it has been cut, whether perpendicular or parallel to the fibers.

When it is used to describe or characterize a type of matter, quality just ends up as an approximate, somewhat statistical knowledge; the essential porosity of a tree is the greater or lesser chance one has to encounter a certain number of non-obstructed vesicles per square centimeter. Quite a few qualities—particularly those relative to superficial states, like smoothness, granulation, polish, coarseness, and softness—designate statistically predictable implicit forms: this qualification is merely a global evaluation linked to the magnitude of a certain implicit form generally presented by a certain matter. Descartes put a lot of effort into reducing qualities to elementary structures, because he did not dissociate matter and form and because he considered matter as capable of essentially conveying forms to all levels of magnitudes, not only to the level of the extreme smallness of the corpuscles of subtle matter but also to the level of the primordial vortices from which our galaxies emerged. The vortices of subtle matter, which constitute light or transmit magnetic forces, are on the small scale what cosmic vortices are on the large scale. The form is not attached to a determinate order of magnitude, like the technical elaboration would lead us to believe, insofar as the latter reduces to qualities of matter all the forms that constitute this matter as an already structured being before any elaboration.

It can thus be asserted that the technical operation reveals and utilizes already existing material forms and moreover constitutes them from other

forms on a scale larger than implicit natural forms work upon; the technical operation integrates implicit forms rather than imposing a totally new and foreign form on a matter that would remain passive vis-à-vis this form; technical form-taking is not an absolute genesis of haecceity; the haecceity of the technical object is preceded and supported by several layers of natural haecceity that it systematizes, reveals, and clarifies and that comodule the operation of form-taking. This is why it can be supposed that the first types of matter elaborated by humans were not absolutely raw matter but matter already structured on the scale of human tools and human hands: plant and animal products, already structured and specialized by their vital functions—like skin, bone, bark, the supple wood of the branch, and flexible vines—were certainly used rather than absolutely raw matter; these seemingly first matters are the vestiges of a living haecceity, and this is why they are already present themselves to the technical operation as elaborated, and whereby all that remains for the operation is to accommodate them. The Roman water skin is a goatskin sewn at the extremities of the legs and neck but still conserves the aspect of the animal's body; this also applies for the tortoise shell of the lyre or the skull of the bull still bearing horns, which is used to support the bar to which the strings of the primitive musical instrument are fastened. The tree could be modeled while it was still alive, while it would grow by developing according to a direction given to it; this can be seen with the bed of Ulysses, which is made from an olive tree whose branches Ulysses bends to the ground while the tree was still young; having become large, the tree dies, and Ulysses, without uprooting it, makes it into the frame for his bed, constructing the room around the place where the tree had grown. Here, the technical operation accommodates the living form and partially diverts the latter for its own benefit by leaving the care of completing the positive work of growth to the spontaneity of life. Furthermore, the distinction between form and matter certainly does not result from pastoral or agricultural techniques, but instead from certain limited artisanal operations, like those of ceramics and the fabrication of bricks from clay. Metallurgy does not fully allow us to think by means of the hylomorphic schema, since the raw material, which is rarely in the pure natural state, must pass through a series of intermediary states before receiving the form properly speaking; after it has received a definite contour, it is still submitted to series of transformations that add qualities to it (tempering, for example). In this case, the form-taking is not visibly carried out in a single instant but in several successive operations; we cannot strictly distinguish form-taking from qualitative transformation; the forging and tempering of a steel ingot are anterior for the former

and posterior for the latter to what could be called form-taking properly speaking; forging and tempering are nevertheless constitutions of objects. Only the dominance of techniques applied to types of matter made plastic through preparation can guarantee the hylomorphic schema a semblance of explanatory universality, since this plasticity suspends the action of the historical singularities carried by the matter. But this involves a borderline case that conceals the singular action of information in the genesis of the individual.

### *3. Hylomorphic Ambivalence*

Under these conditions, we can pose the question concerning what the attribution of the principle of individuation to matter rather than to form depends on. In the hylomorphic schema, individuation through matter corresponds to this characteristic of an obstacle or a limit, which is matter in its technical operation; what makes one object different from another is the set of particular limits—varying from one case to another—that guarantee that this object possesses its haecceity; the experience of the recommencement of the construction of objects coming out of the technical operation is what gives the impression of attributing to matter the differences that guarantee that one object is individually distinct from another. Matter is what is conserved in an object; what makes it such that the object is itself is the fact that the state of its matter at any moment summarizes all the events that this object has undergone; form, which is merely a fabricating intention, a voluntary arrangement, can neither age nor become; it is always the same, from one fabrication to another; it is at least the same qua intention for the consciousness of the one who thinks and gives the order of fabrication; it is the same abstractly for the one who controls the fabrication of a thousand bricks: he wants them all to be identical, of the same dimension, and according to the same geometrical figure. Whence results the fact that, when the one who thinks is not the one who works, there is in reality nothing in his thought except a single form for all the objects of the same collection: the form is generic not logically or physically but socially: a single order is given for all the bricks of the same type; this order consequently cannot differentiate the bricks effectively molded after fabrication into distinct individuals. The same does not apply when one thinks the operation from the point of view of the one who carries it out: a specific brick is different from another specific brick not just according to the matter required to make it (if the matter has been suitably prepared, it can be homogeneous enough not to spontaneously introduce notable differences between successive moldings), but also and above all according to

the unique nature of the unfolding of the molding operation: the worker's gestures are never exactly the same; the schema is perhaps a single schema, from the start of the labor until the end, but each molding is directed by a set of particular psychical, perceptive, and somatic events; the veritable form (the one that directs the arrangement of the mold), the paste, and the regime of successive gestures change from one copy to the other like so many possible variations on the same theme; fatigue as well as the overall state of perception and of representation intervene in this particular operation, which is equivalent to a singular existence of a particular form for each act of fabrication, thereby translating into the reality of the object; the singularity, the principle of individuation, would then be in the information.<sup>15</sup> One could say that in a civilization that divides humans into two groups (those who give orders and those who carry them out, the principle of individuation), the principle of individuation, in line with the technological example, is necessarily attributed either to the form or the matter but never to both together. The one who gives orders to be carried out but does not accomplish them and only controls the result is one who has a tendency to find the principle of individuation in the matter—the source of quantity and plurality—because this person does not experience the rebirth of a new and particular form in each fabricating operation; thus, Plato considers that when the weaver has broken a shuttle, he fabricates a new shuttle not by fixing the eyes of the body on the pieces of the broken shuttle but by contemplating with the mind's eye the form of the ideal shuttle that he already finds within himself. Archetypes are unique for each type of beings; there is a single ideal shuttle for all sensible shuttles, past, present, and future. On the contrary, the one who carries out the labor does not see in the matter a sufficient principle of individuation, because for him matter is prepared matter (whereas it is raw matter for the one who gives orders without working, since he does not prepare it himself); however, the prepared matter is precisely what is by definition homogeneous, since it must be capable of taking form. Therefore, the necessity of renewing the effort of labor in each new unit is what introduces a difference between successively prepared objects for the man who works; in the temporal series of the day's efforts, each unit is inscribed as its own instant: the brick is the fruit of this effort, of this trembling or resolute, hasty or weary action; the brick carries with it the imprint of a moment of the man's existence, it solidifies this activity exerted upon homogeneous, passive matter waiting to be worked; it emerges from this singularity.

Yet, there is a considerable amount of subjectivity in the point of view of the master as well as in that of the artisan; the haecceity of the object defined

in this way gets at nothing but the partial aspects; what the master perceives gets at the fact that objects are multiple; their number is proportionate to the quantity of matter employed; the number results from the fact that this very mass of matter has become this very object, this other mass of matter, this other object; the master rediscovers the matter in the object, like the tyrant who, with the help of Archimedes, uncovered the fraud of the goldsmith who mixed a certain mass of silver with the gold that would have been reserved to make a golden crown: for the tyrant, the crown is a crown made of this gold, of this particular gold; its haecceity is foreseen and awaited even before the action of fabrication, since the artisan, for the one who commands without laboring, is the man who possesses the techniques to transform the matter without modifying it, without changing the substance. For the tyrant, what individualizes the crown is not the form that the goldsmith gives it but the matter already having a quiddity before its transformation: this very gold, and not any metal whatsoever or even any gold whatsoever. Even today, the search for the haecceity in matter practically exists in the man who commands the artisan. For a landowner of the forest, the act of giving wood to a sawmill to chop up supposes that the wood will not be exchanged against that of another landowner, and that the products of the sawing operation will be made from the wood that has been provided. However, this substitution of matter would not be a fraud, like in the case of the goldsmith who mixed silver with gold in order to be able to conserve a certain quantity of fine gold. But the attachment of the landowner to the conservation of his matter depends on irrational motives, one of which no doubt is the fact that the haecceity does not simply recover an objective characteristic detached from the subject but has the value of a belonging and of an origin. Only a commercially abstract thought could fail to attach a price to the haecceity of the matter and fail to seek a principle of individuation in it. The man who gives the matter to be elaborated places value on what he knows, what is attached to him, what he has surveyed and seen grow; for him, the initial concrete is the matter insofar as it is his, belongs to him, and this matter must be extended into objects; due to its quantity, this matter is a principle of the number of objects that will result from form-taking. This tree will become this or that plank; all the trees taken individually one-by-one will become this heap of planks; there is a passage from the haecceity of the trees to the haecceity of the planks. What this passage expresses is the permanence of what the subject recognizes of himself in the objects; the expression of the self here is the concrete relation of property, the bond of belonging. By placing the haecceity in information, the artisan does not act otherwise; but

since he is not the landowner of the matter on which he works, he does not know this matter as a singular thing; it is foreign to him, it is not linked to his individual history, to his effort qua matter; it is merely that on which he works; he ignores the origin of the matter and elaborates it in a preparatory way until it no longer reflects its origin, until it is homogeneous, ready to take form, just like any other matter suitable for the same labor; the artisanal operation to a certain extent denies the historicity of the matter concerning what is human and subjective about it; conversely, this historicity is known to the one who has supplied the matter and valued it, because it is deposited with something subjective, because it expresses human existence. The haecceity sought in the matter depends on a lived attachment to a specific matter that has been associated with human effort and has become the reflection of this effort. The haecceity of the matter is not purely material; it is also a haecceity with respect to the subject. Conversely, the artisan expresses himself through his effort, and the workable matter is nothing but the support and occasion of this effort; it could be said that from the artisan's point of view the object's haecceity only begins to exist through the effort of shaping; since this effort of shaping temporally coincides with the beginning of the haecceity, it is natural that the artisan attributes the foundation of the haecceity to information, although form-taking is perhaps nothing but an event concurrent with the advent of the haecceity of the object, the veritable principle of which is the singularity of the *here and now* of the complete operation. Likewise, the haecceity begins to exist for the proprietor of the matter with the purchase or act of planting a tree. The fact that later this tree will be matter for a technical operation does not yet exist; this tree has a haecceity not as future matter but as an object or aim of an operation. Later, this tree will conserve the haecceity for the proprietor but not for the artisan, since he has not planted the tree and has not bought it as a tree. The artisan who signs and dates his work attaches to the haecceity of this work the meaning of his definite effort; for him, the historicity of this effort is the source of this haecceity; it is the initial origin and the principle of individuation of this object. The form has been a source of information through the work.

On the other hand, if the question of the foundation of individuation can be legitimately posed, and if this principle is sought somewhat in the form and somewhat in the matter according to the type of individuation taken as a model of intelligibility, it is probable that the technological cases of individuation in which form and matter have a meaning are still very particular cases, and nothing proves that the notions of form and matter are generalizable. By contrast, what brings forth the critique of the hylomorphic schema,

the existence of a middle and intermediate zone between form and matter (the zone of the singularities that are the initiators of the individual in the operation of individuation), certainly must be considered an essential feature of the operation of individuation. It is at the level of these singularities that matter and form encounter one another in technical individuation, and it is at this level that the principle of individuation is the initiator of the operation of individuation: it can therefore be wondered if individuation in general couldn't be understood starting from the technical paradigm obtained through a recasting of the hylomorphic schema, leaving a central place to the singularity that plays a role of active information between form and matter.

### III. THE TWO ASPECTS OF INDIVIDUATION

#### *1. Reality and Relativity of the Foundation of Individuation*

[The individuation of objects is not entirely independent from the existence of man; the individuated object is an individuated object for man: in man there is a need to individuate objects, which is one of the aspects of the need to recognize oneself and to rediscover oneself in things, and also to rediscover oneself therein as a being who has a definite identity that is stabilized by a role and an activity. The individuation of objects is not absolute; it is an expression of man's psycho-social existence. However, it cannot be arbitrary; there must be a support that justifies and receives it. Despite the relativity of the principle of individuation such as it is invoked, individuation is not arbitrary; it is indissociable from an aspect of the object that it considers, perhaps wrongly, as the only one possessing a signification: but this aspect nevertheless is truly recognized as having a signification; what does not conform to the real is the exclusion of the other points of view within which one could be placed to find other aspects of individuation. This is the unique and exclusive attribution of the principle of individuation to a given type of reality, which is subjective. But the very notion of individuation and the search for individuation, taken in itself as expressing a need, are not devoid of signification. The subjectivity of individuation for man and the tendency to individuate objects should not lead to the conclusion that individuation does not exist and does not correspond to anything. A critique of individuation should not necessarily lead to the disappearance of the notion of individuation but instead should prompt an epistemological analysis that should lead to a veritable apprehension of individuation.]<sup>16</sup>

Critique and epistemological analysis cannot be restricted to indicating a possible relativity of the search for the principle of individuation, and they

cannot be restricted to indicating its subjective, psycho-social signification. It is furthermore necessary to study the content of the notion of individuation in order to see if it expresses something subjective and if the duality between the conditions of the attribution of this principle to form or to matter is rediscovered in the very content of the notion. Without researching the principle of individuation, the following question can be posed: what is individuation? Yet here an important divergence appears between two groups of notions. It can be asked why an individual is what it is. It can also be asked why an individual is different from all other individuals and cannot be confused with them. Nothing proves that the two aspects of individuation are identical. To confuse these two aspects is to suppose that an individual is what it is (at the interior of itself, in itself, relative to itself) because it involves a definite relation with other individuals and not with another specific individual, but with all other individuals. In the first sense, individuation is a set of intrinsic characteristics; in the second sense, individuation is a set of extrinsic characteristics, i.e. relations. But how can these two series of characteristics accommodate one another? In what sense do the intrinsic and the extrinsic form a unity? Should intrinsic and extrinsic characteristics really be separated and considered as effectively intrinsic and extrinsic, or instead should they be considered as indicating a deeper, more essential mode of existence that is expressed in the two aspects of individuation? But then, can it still be said that the basic principle is indeed the principle of individuation with its usual content, i.e. supposing that there is reciprocity between the fact that a being is what it is and the fact that it is different from other beings? It seems that the veritable principle must be discovered at the level of the compatibility between the positive aspect and the negative aspect of the notion of individuation. Perhaps then the representation of the individual will have to be modified, just like the hylomorphic schema in its incorporation of information.

How can what is proper to an individual be bound to what this individual would be if it did not possess what it possesses on its own? We should question if an individual's singularity or singularities play a real role in individuation, or instead if these are secondary aspects of individuation that are added to it but do not play a positive role.

To place the principle of individuation in form or in matter is to suppose that the individual can be individuated by something that preexists its genesis and contains individuation in embryo. The principle of individuation precedes the genesis of the individual. When we search for a principle

of individuation that exists before the individual, we are forced to place it in matter or in form, since only form and matter preexist; because they are separated from one another and because their union is contingent, the principle of individuation cannot be made to reside in the system of form and matter qua system, since the latter is only constituted the moment when matter takes form. Any theory that wants to make the principle of individuation preexist individuation must necessarily attribute it to form or to matter, and exclusively to one or the other. In this case, the individual is merely the union of a form and a matter, and it is a complete reality. And yet, the examination of the operation of form-taking as incomplete as that realized by the technical operation shows us that, even if implicit forms already preexist, form-taking can only be effectuated if matter and form are joined in a single system by an energetic condition of metastability. We have called this condition the system's internal resonance, which institutes an allagmatic relation during the actualization of potential energy. In this case, the principle of individuation is the state of the individuating system, this state of allagmatic relation within an energetic complex that includes all the singularities; the veritable individual exists for a mere instant during the technical operation: it lasts as long as the form-taking.<sup>17</sup> After this operation, what remains is a result that will begin to degrade, and not a veritable individual; this is an individuated being rather than a real individual, i.e. an individuating individual, an individual undergoing individuation. The veritable individual is one that conserves its system of individuation with it, thereby amplifying singularities. The principle of individuation is in this energetic system of internal resonance; form is only the individual's form if it is form for the individual, i.e. if it is suitable for the singularity of this constituting system; matter is the individual's matter only if it is matter for the individual, i.e. if it is implicated in this system, if it enters into this system as the vehicle of energy and is distributed in accordance with the distribution of energy. However, the appearance of this reality of the energetic system no longer allows us to say that there is an extrinsic aspect and an intrinsic aspect of individuation; it is at the same time and through the same characteristics that the energetic system is what it is and is distinguished from other systems. Form and matter, which are realities anterior to the individual and separate from one another, can be defined without considering their relation to the rest of the world, since these are not realities that have any reference to energy. But the energetic system in which an individual is constituted is neither more intrinsic nor extrinsic to this individual: it is associated with

this individual, it is this individual's associated milieu. Through its energetic conditions of existence, the individual does not merely exist within its own limits; it emerges from a singularity. For the individual, relation has the value of being; the extrinsic cannot be distinguished from the intrinsic; what is truly and essentially the individual is the active relation, the exchange between the extrinsic and the intrinsic; there is extrinsic and intrinsic relative to what is first. What is first is this system of internal singular resonance, this system of the allagmatic relation between two orders of magnitude.<sup>18</sup> In terms of this relation, there is the intrinsic and the extrinsic, but the individual is truly this relation and not the intrinsic, which is merely one of the concomitant terms: the intrinsic, the interiority of the individual, would not exist without the ongoing relational operation that the ongoing individuation is. The individual is the reality of a constituting relation, not the interiority of a constituted term. It is only when the result of a completed (or supposed completed) individuation is considered that the individual can be defined as a being with an interiority relative to which an exteriority exists. The individual individuates and is individuated before any possible distinction of the extrinsic and the intrinsic. The third reality, which we call milieu or constituting energetic system, should not be conceived as a new term that would be added onto matter: the milieu is the very activity of relation, the reality of the relation between two orders that communicate across a singularity.

The hylomorphic schema is not merely inadequate for the knowledge of the principle of individuation; it also leads to a representation of individual reality that is incorrect: it turns the individual into the possible term of a relation, whereas the individual, on the contrary, is a theater and agent of a relation; the individual can only be a term in an ancillary way because it is essentially a theater or agent of an interactive communication. To want to characterize the individual in itself or relative to other realities is to turn it into a relational term, i.e. into a relation with itself or a relation with another reality; first, one must find the point of view from which the individual can be grasped as an activity of relation, not as a term of this relation; properly speaking, the individual is in relation neither with itself nor with other realities; it is the being *of* relation and not a being *in* relation, for relation is an intense operation, an active center.

Consequently, the act of researching if the principle of individuation is what makes it such that the individual is positively itself, or if it is what makes it such that the individual isn't other individuals, does not correspond to individual reality. The principle of the individual is the individual itself in its activity, which is relational in itself as a center and singular mediation.

2. *The Energetic Foundation of Individuation:  
Individuation and Milieu*

We would like to show that the principle of individuation is not an isolated reality, that it is not localized within itself, and that it does not preexist the individual like an already individualized embryo of the individual; that the principle of individuation, in the strict sense of the term, is the complete system in which the genesis of the individual takes place; that, moreover, this system outlasts itself within the living individual as a milieu associated with the individual in which individuation continues to take place; and that life is therefore an ongoing individuation, an individuation continued through time, extending a singularity. What the hylomorphic schema lacks is the indication of the condition of communication and of metastable equilibrium, i.e. the condition of internal resonance in a determined milieu, which can be designated by the physical term of system. The notion of system is necessary to define the energetic condition, for potential energy only exists relative to the possible transformations in a defined system. The limits of this system are not arbitrarily selected by the knowledge that the subject gains from them; these limits exist relative to the system itself.

According to this path of research, the constituted individual wouldn't be able to seem like an entirely detached, absolute being in conformity with the model of substance, like the pure σύνολον [súnolon]. Individuation would be nothing but one of the possible becomings of a system and would be able, moreover, to exist on several levels and more or less completely; the individual as a definite, isolated, consistent being would be merely one of the two parts of the complete reality; instead of the σύνολον [súnolon], it would be the result of a certain organizational event occurring within the σύνολον and dividing the latter into two complementary realities: the individual and the associated milieu after individuation; the associated milieu is the complement of the individual relative to the original whole. *The individual alone is therefore not exactly a type of being; for this reason, it cannot maintain a relation qua term with another symmetrical term.* The separate individual is an incomplete, partial being that can only be adequately known if it is put back into the σύνολον from whence it originates. The model of being is either the σύνολον before the genesis of the individual or the individual-associated milieu coupling after the genesis of the individual. Instead of conceiving individuation as a synthesis of form and matter or of body and mind, we shall represent it as a splitting, a resolution, a non-symmetrical distribution occurring in a totality starting from a singularity. For this reason, the individual is not a concrete being, a complete being, to the extent that it is

merely a part of the being after the resolving individuation. The individual cannot account for itself on the basis of itself, because it is not the being's whole to the extent that it is the expression of a resolution. It is simply the complementary symbol of another real, i.e. the associated milieu (here, as in Plato, the word symbol is taken in the original sense relating to the usage of relations of hospitality: a stone broken into two halves produces a pair of symbols; each fragment, conserved by the descendants of those who have bound together relations of hospitality, can be brought together with its complementary piece in a way so as to reconstitute the initial unity of the broken stone; each half is a symbol relative to the other; it is the complementary of the other relative to the initial whole. The symbol is not what each half is relative to the people who produced it, but each half relative to the other half with which it reconstitutes the whole. The possibility of the reconstitution of a whole is not a part of hospitality, but an expression of hospitality: it is a sign). Individuation will thus be presented as one of the possibilities of the being's becoming that responds to certain definite conditions. The method employed consists in not being given beforehand the realized individual that must be explained, but in grasping the complete reality before individuation. Indeed, if the individual is grasped after individuation, then we wind up with the hylomorphic schema, because nothing would remain in the individuated individual except these two visible aspects of form and matter; yet the individuated individual is not a complete reality, and individuation is not explainable by means of the mere elements that the analysis of the individual after individuation can discover. The role of the energetic condition (the condition of the state of the constituting system) cannot be grasped in the constituted individual. This is why it has been ignored even to this day; in fact, the different studies of individuation have wanted to grasp in the constituted individual an element capable of explaining the individuation of this individual: this would only be possible if the individual were and had always been a complete system unto itself. But individuation cannot be inducted on the basis of the individuated: the genesis of the individual in a system can only be followed step by step; at a certain point, every regressive step seeking to lead back to individuation—starting from individuated realities—discovers another reality, a supplementary reality that can be variously interpreted according to the presuppositions of the system of thought in which the research is carried out (for example, by resorting to the schema of creation, in order to put matter and form into relation, or instead, in the doctrines that want to avoid creationism, by the clinamen of atoms and the force of nature that pushes them to encounter one another with an implicit effort: *conata est nequiquam*,<sup>19</sup> which is what Lucretius says about Nature).

The essential difference between the classical study of individuation and what we are presenting here is the following: individuation will not be considered solely from the perspective of the explanation of the individuated individual; it will be grasped, or at the very least we will say that it should be grasped, before and during the genesis of the separate individual; individuation is an event and an operation within a reality that is richer than the individual that results from it.<sup>20</sup> Furthermore, the separation initiated by the individuation within the system cannot lead to the individual's isolation; individuation, then, is the structuration of a system without a separation of the individual and its complementary, such that individuation introduces a new regime of the system but does not break the system. In this case, the individual must be known, not abstractly, but by going back to individuation, i.e. by going back to the state starting from which it is possible to genetically grasp the entire reality of which the individual and its complement of being is composed. The principle of the method that we are proposing consists in supposing that there is a conservation of being and that thinking cannot occur except starting from a complete reality. This is why it is necessary to consider the transformation of a complete domain of being, all the way from the state that precedes individuation up to the state that follows or extends it.

This method does not seek to diminish the consistency of the individual being but merely to grasp it in the system of concrete being in which its genesis takes place. If the individual is not grasped in this complete systematic ensemble of being, it is treated according to equally improper and divergent paths: either it becomes an absolute and is conflated with the *σύνολον* [súnolon], or it is reduced to the being in its totality so much that it loses its consistency and is treated as an illusion. Indeed, the individual is not a complete reality; nor does the individual continue to have the entirety of nature as its complementary, in front of which it would become an inferior reality; the individual's complementary is a reality on the same order as its own, like the being of a pair relative to the other being with which it is paired; at the very least, it is through the intermediary of this associated milieu that the being is attached back to what is larger than it and to what is smaller than it.

[In a certain sense, there is a complete opposition between Leibniz's monad and Spinoza's individual, because Leibniz's world is composed of individuals, whereas Spinoza's world includes, properly speaking, only a single individual, nature; but this opposition in fact arises from the individual's lack of relativity with respect to a complementary reality of the same order as its own; Leibniz fragments individuation down to the extreme limits of smallness, thereby according even individuality to the smallest elements of a living

body; conversely, Spinoza expands individuation all the way to including the limits of the whole—that through which God is naturing nature—that is, individuation itself. There is no mention in either the work of Spinoza or Leibniz regarding a relation of the individual to an associated milieu, no mention of a system on the same order of magnitude within which the individual can receive a genesis. The individual is mistaken for the being and is considered as coextensive with the being. Under these conditions, the individual considered as coextensive with the being cannot be situated: all reality is simultaneously too small and too large to receive the status of individual. Everything can be individual, and nothing can be fully individual.]<sup>21</sup> On the contrary, if the individual is grasped, not as the term of a relation but as the result of an operation and as the theater of a relational activity that is perpetuated in it, it is defined with respect to the ensemble that it constitutes with its complement, which is of the same order of magnitude as it and on the same level as it after individuation. Nature in its entirety is not composed of individuals and is not itself an individual: it is composed of domains of being that can or cannot harbor individuation. In nature, there are two modes of reality that are not those of the individual: domains that have not been the theater of an individuation, and what remains of a concrete domain after individuation when the individual is subtracted. These two types of reality cannot be conflated, for the first designates a complete reality, whereas the second designates an incomplete reality that can only be explained by genesis, i.e. based on the system from which it emerges.

If we propose to know the individual relative to the systematic ensemble in which its genesis occurs, we discover that there is a function of the individual with respect to the concrete system envisioned according to its becoming; individuation expresses a phase change of the being of this system, thereby avoiding its degradation, incorporating the energetic potentials of this system as structures, making antagonisms compatible, and resolving the internal conflict of the system. Individuation perpetuates the system through a topological and energetic change; the veritable identity is not the identity of the individual relative to itself but the identity of the system's concrete permanence throughout its phases. The true haecceity is a functional haecceity, and the origin of finality lies in this underpinning of the haecceity that it translates into an oriented functionality, into an amplifying mediation between orders of magnitude initially without communication.

Thus, in terms of providing an adequate knowledge of the conditions and process of physical individuation, the insufficiency of the matter-form relation leads us to analyze the role played by potential energy in the operation of individuation, insofar as this energy is the condition of metastability.

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# Form and Energy

## I. STRUCTURES AND POTENTIAL ENERGY

### 1. *The Potential Energy and the Reality of the System; Equivalence of Potential Energies; Dissymmetry and Energetic Exchanges*

The notion of potential energy in physics is not absolutely clear and does not correspond to a rigorously defined extension; thus, it would be difficult to specify if the thermal energy stored in a heated body should be considered as potential energy; its potential nature is bound to a possibility of the system's transformation through the modification of its energetic state. A body whose every molecule would possess the same quantity of energy in the form of thermal agitation would not possess any quantity of thermal potential energy; indeed, the body would thus have attained *its most stable state*. Conversely, a body that would possess the same total quantity of heat—but in such a manner that this quantity would be in one region of molecules at a higher temperature and in another region of molecules at a lower temperature—would possess a certain quantity of thermal potential energy. Furthermore, this quantity of potential energy cannot be considered as eventually added to the non-potential energy contained in the body; this quantity is *a fraction of the total energy of the body that can give rise to a transformation, whether reversible or not*; this relativity of potential that characterizes energy becomes manifest clearly if it is supposed, for example, that a body heated homogeneously (and thus not possessing any thermal potential energy if it is the sole body constituting a system) can manage to make a potential energy appear if it is put into contact with another body of a different temperature. The capacity for an energy to be potential is strictly linked to the presence of a heterogeneity, i.e. of dissymmetry relative to another energetic support; by resuming the preceding example, we can indeed consider a particularly

demonstrative borderline case: if a body were heated in such a way that it contains certain molecules at a higher temperature and others at a lower temperature, and if these molecules are not grouped in two separate regions but mixed together randomly, for a microphysical observer the body would still contain the same quantity of potential energy when the molecules are grouped in a hot region as in a cold region, because the sum of potential energies presented by all the couplings formed by a hot molecule and a cold molecule would be numerically equal to the potential energy presented by the system formed by the group of all the hot molecules and the group of all the cold molecules; nevertheless, this sum of potential energies of the molecular pairs would not correspond to any physical reality, to any potential energy of the overall system; for this to happen, it would be necessary to organize the disorder by separating the hot molecules from the cold molecules; this is what the hypothesis of Maxwell's demon shows extremely well, which is taken back up and discussed by Norbert Wiener in his *Cybernetics*. The attentive consideration of the type of reality represented by potential energy is quite instructive for the determination of a method adapted to the discovery of individuation. Indeed, reflecting on potential energy teaches us that there is an order of reality that we can grasp neither through the consideration of a quantity nor through the consideration of a quality, nor by resorting to a simple formalism; potential energy is not a simple way of seeing, an arbitrary consideration of the mind; it instead corresponds to a capacity of *real* transformations in a system, and the very nature of the system is more than an arbitrary grouping of beings operated by thought because, for an object, the fact of belonging to a system defines for this object the possibility of mutual actions relative to the other objects that constitute the system, a possibility which ensures that the belonging to a system is defined by a virtual reciprocity of actions between the terms of the system. But the reality of potential energy is not that of an object or a substance consisting in itself and "having no need of anything else in order to exist"; indeed, it requires a system, i.e. at least another term. No doubt, we must struggle against the habit that leads us to grant the highest degree of being to substance conceived as absolute reality, i.e. reality without relation. Relation is not a pure epiphenomenon; it is *convertible into substantial terms*, and this conversion is reversible, like that of potential energy into actual energy.<sup>1</sup>

If a distinction of terms is useful for determining the results of the analysis of significations, relation can be called the arrangement of the elements of a system that has a scope surpassing a simple arbitrary view of the mind, and we can reserve the term of rapport for an arbitrary, fortuitous relation

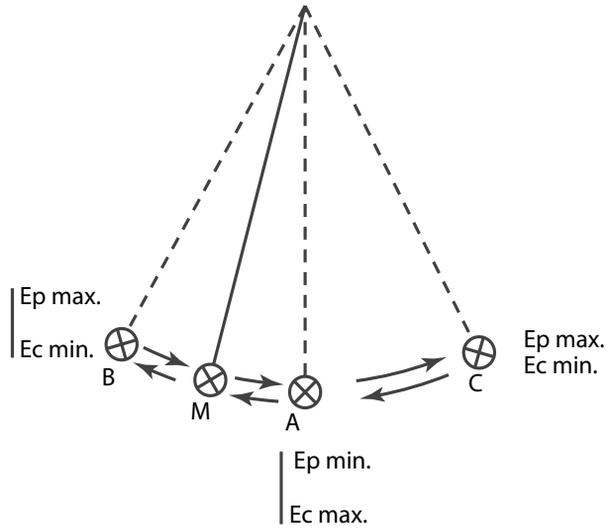


Figure 1

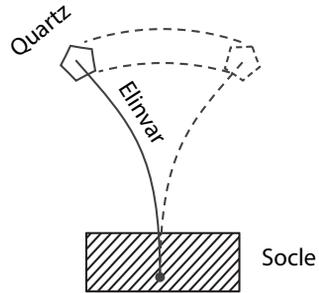


Figure 2

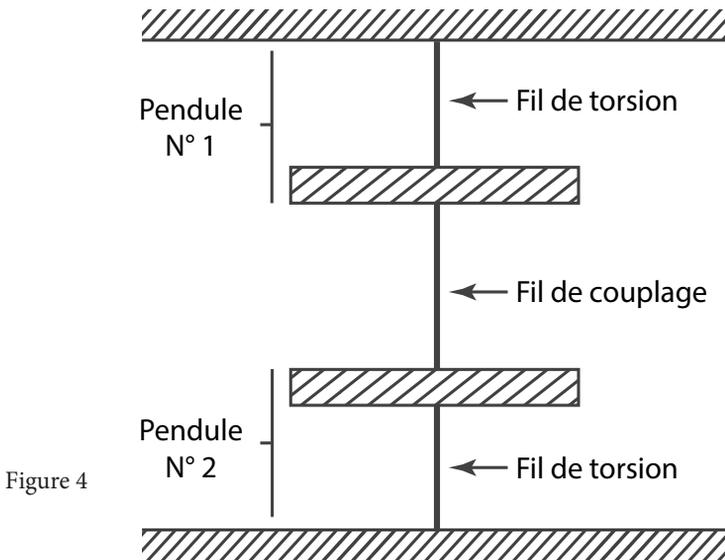
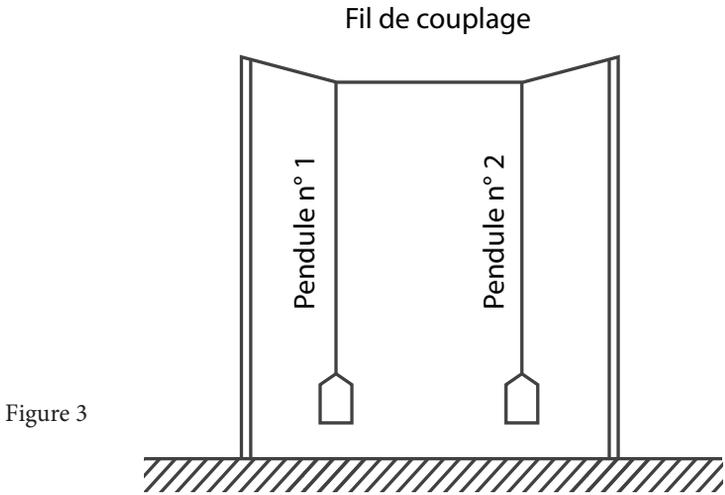
that is not convertible into substantial terms; relation would be a rapport just as real and important as the terms themselves; consequently, it could be said that a veritable relation between two terms is in fact equivalent to a rapport among three terms.

We shall begin with this postulate: *individuation requires a true relation*, a relation that can only be given in a system state that envelops a potential. The consideration of potential energy is not merely useful insofar as it teaches us to think the reality of relation; it also offers us a possibility of measure through the method of reciprocal convertibility; for example, let's consider a series of increasingly complicated pendulums, and let's attempt to note the transformations of energy of which they are the source during a period of oscillation: we shall see that we can confirm not only the convertibility of

potential energy into kinetic energy, then into potential energy, which is converted back into kinetic energy, but also the equivalence of two different forms of potential energy that are converted into one another through a determinate quantity of kinetic energy. First, take for example a simple pendulum labeled OM that oscillates in the earth's gravitational field (Figure 1); if A is the point of the trajectory closest to the center of the earth, and if B and C are the extreme symmetrical positions relative to the axis OA, the potential energy is at a minimum in A, and the kinetic energy is at a maximum; conversely, in B and C, the potential energy is maximum, while the kinetic energy is minimum. If the horizontal plane passing through point A is taken as an equipotential surface of reference and the axes of mobile coordinates with respect to point O are considered as a system of reference for measuring the displacement of the axes of immobile coordinates, it could be said that potential energy is null in A and kinetic energy null in B and C: these two forms of energy are thus transformed into one another completely, at least if we neglect the degradation of energy caused by friction. Now let's take the case of a pendulum like the one constructed by Holweck and Lejay that enabled the establishment of the gravimetric network in France (Figure 2). The lower part of this pendulum is made of an elastic wire of encased Elinvar, and the upper portion involves a chunk of quartz. The connected pieces are placed in a vacuum tube in order to reduce damping. The operative principle at work here is the following: when the pendulum is distanced from its position of equilibrium, the momentums of the elastic forces and of the forces of gravity act in opposite directions, and, through a suitable adjustment, we can bring these two momentums to being only slightly different; since the period is determined by the difference of these momentums, it can be said that what has been created is a system allowing for the conversion of one form of potential energy into another form of potential energy via a certain quantity of kinetic energy that is equivalent to the quantitative difference between these two potential energies; if the two potential energies (that which is expressed through the momentum of elastic forces and that which is expressed through the momentum of gravitational forces) were rigorously equal, the pendulum would have a period of infinite oscillation, i.e. would be in a state of indifferent equilibrium. Everything occurs as if the potential energy that is effectively converted into kinetic energy and then reconverted into potential energy during an oscillation were an energy resulting from the difference between two other potential energies. The same pendulum, brought back to  $180^\circ$ , would on the contrary bring about an addition

of two potential energies in the form of kinetic energy at the lowest point of the trajectory traversed by the chunk of quartz.

Ultimately, we could constitute a more complex system of pendulums coupled together without damping (weighted pendulums or torsion pendulums) (Figures 3 and 4). In this case, we would witness beats on each pendulum, and these beats would be more spaced out according to how weak the coupling would be. These beats themselves occur in a manner of quadrature,



i.e. because each of the pendulums seems to stop when the other reaches its maximum amplitude; the energy of the oscillations is transferred alternatively from one of the pendulums to the other. In a similar experiment, can we still estimate that the period of the resulting oscillation (of the transfer of energy) corresponds to a determinate potential energy? Yes, because if  $K$  designates the coefficient of the coupling between the oscillators that the two pendulums constitute, and  $\omega$  designates the pulsation of these two pendulums, which is supposed to be the same for both, the period of the beats on the two pendulums is given by the expression  $T = 2\pi / K\omega$ . Here, potential energy resides in the fact that initially one of the two pendulums is animated by a movement, whereas the other pendulum is immobile; this dissymmetry is what causes the passage of energy from one pendulum to the other. If pendulums with the same appropriate frequency (animated by synchronous oscillation and with the same phase) were coupled together, the appropriate resulting period would not be the same as the period of the oscillation of each of the separate pendulums, and yet no exchange of energy would have taken place. There is a beat in the case where the dissymmetry of the initial conditions of the exciter and of the resonator can be nullified and transformed into its inverse and then can return to the initial state.

We could multiply the increasingly complex cases of energetic exchanges; we would find that potential energy always seems to be *bound to a system's state of dissymmetry*; in this sense, a system contains potential energy when it is not in its state of greatest stability. When this initial dissymmetry produces an exchange of energy within the system, the modification produced can be transformed into another form of energy; in this case, the system does not immediately return to its initial state: for it to return there, the preceding transformation will need to be reversible; in such a case, the system oscillates. This oscillation establishes the equality of two forms of potential energy. Thus, we can already distinguish the identity of two energetic states from the equality of two energetic states in the case of potential energy: two potential energies are identical when they correspond to the same physical state of the system, with merely a difference of measurements that could be suppressed by a suitable displacement of the axes of reference; therefore, when the pendulum of Figure 1 oscillates, it establishes the reciprocal convertibility of the potential energy corresponding to position B and of the potential energy corresponding to position C; since the measurement of the potential energy of the earth-pendulum system only depends on the position of mass  $M$  with respect to the equipotential surfaces (which are in this case horizontal planes), the determination of position B or position C only

depends on the direction chosen for the measurement of elongation; the inversion of this direction makes it possible to identify the physical states corresponding to states B and C for the measurement of potential energy.

By contrast, let's consider the example of the Holweck-Lejay pendulum; it is no longer possible to identify (through a simple displacement of the conventions of measurement) the states of potential energy corresponding to the couplings of the forces of gravity and those corresponding to the elastic forces that stem from the bending of the Elinvar wire. The oscillation, however, establishes the reciprocal convertibility of these two forms of energy, and this leads us to consider them as equal when the pendulum's state of indifferent equilibrium is found to be realized: potential energy defines the real formal conditions of the state of a system.<sup>2</sup>

*2. Different Orders of Potential Energy; Notions of Phase Changes and of the Stable and Metastable Equilibrium of a State. Tammann's Theory*

The potential energies of the three physical systems we have contemplated can be said to belong to the same order, not merely because they are mutually convertible during one of the system's periods of oscillation, but also because this conversion occurs continuously; it is this very continuity of conversion that permits the latter to be an oscillation in the proper sense of the term, i.e. to be effectuated according to a sinusoidal law in terms of time. It is indeed necessary to rigorously distinguish between a veritable oscillation—during which there is a conversion of one form of energy into another form of energy (which defines a period depending on the potentials in question and on the system's inertia)—and a mere recurrent phenomenon, during which a phenomenon that is non-recurrent by itself, like the discharge of a capacitor through a resistance, unleashes in its occurrence another phenomenon that brings the system back to its initial state. The latter case is that of phenomena of relaxation, which are called, perhaps misleadingly, oscillations of relaxation, the most contemporary examples of which are found in electronics in “oscillator” assemblages utilizing thyratrons, or in multivibrators, or even in naturally occurring geysers.

Nevertheless, if the existence of veritable oscillations in physical systems can allow us to define those energies that can be submitted to reversible transformations and therefore can be equal by their quantity as potential energies that are equivalent in terms of their form, there are also systems in which an irreversibility of transformations manifests a difference of order between potential energies. The most well-known irreversibility is the one illustrated by the research of thermodynamics and what the second principle of this

science (Carnot's principle) states concerning the successive transformations of a closed system. According to this principle, the entropy of a system increases in the course of successive transformations.<sup>3</sup> The theory of the theoretical maximum efficiency of heat engines conforms to this principle and verifies it, to the extent that a theory can be validated by the fruitfulness of the consequences that can be drawn from it. But this irreversibility of the transformations of mechanical energy into caloric energy is perhaps not the only irreversibility that exists. Furthermore, the apparently hierarchical aspect implied in this rapport of a noble form to a degraded form of energy runs the risk of obscuring the very nature of this irreversibility. Here, we are dealing with a change in the order of magnitude and the number of systems in which this energy exists; in fact, energy may not change in nature, yet its order may change; this is what happens when the kinetic energy of a body in movement is transformed into heat, as in the example often cited in physics of a lead bullet colliding with an undeformable plane and transforming all of its energy into heat: the quantity of kinetic energy remains the same, but what the bullet's energy was in its entirety, considered with respect to the axes of reference for which the undeformable plane is immobile, becomes the energy of each traveling molecule relative to the other molecules within the bullet. What has changed is the structure of the physical system; if this structure could be transformed in the inverse direction, the transformation of energy would also become reversible. Here, irreversibility stems from the passage of a unified macroscopic structure to a fragmented and disorganized microscopic structure;<sup>4</sup> the notion of disorder further expresses microphysical fragmentation itself; if molecular displacements were truly organized, the system would in fact be unified; the macroscopic system formed by the bullet in movement relative to an undeformable plane and by this plane can be considered as an organized set of molecules animated by parallel movements; an organized microscopic system in fact has a macroscopic structure.

Yet, if we consider the exchanges of energy implicated in state changes (like melting, vaporization, and crystallization), we will notice the appearance of particular cases of irreversibility bound to the changes of the system's structure. When looking closely at a crystalline structure, for example, we can clearly see how the ancient notion of the *elements* has to give way to a theory that is both structural and energetic: the continuity of liquid and gaseous states allows us to unify these two states in the shared domain of fluid in the homogeneous state; by contrast, this domain of the homogeneous state is clearly separate (due to the frontier constituted by the curve of saturation) from non-homogeneous states.



Between the crystalline and amorphous states, there is an evident discontinuity that we can liken to what exists between an energy of the macroscopic order and an equal energy in absolute value but of the microscopic order, like the thermal energy in which the aforementioned example has been able to degrade during an irreversible transformation. Indeed, according to Tammann's hypothesis, the crystalline state would be characterized by the existence of privileged directions in crystallized substances. The properties of these substances present different values following the direction in question; such are the properties clarified by the study of the geometrical form of crystals and the various manifestations of crystalline anisotropy; the amorphous state, on the contrary, which includes gaseous, liquid, or (vitreous) amorphous solid states, is characterized by the absence of privileged directions; the properties of amorphous substances present values that do not depend on the considered direction. A body in the amorphous state does not possess a determined geometrical form and is isotropic. Only an external action—such as a non-uniform pressure, a pulling, a twisting or the existence of an electrical or magnetic field—can render a body amorphous, particularly a vitreous, temporarily anisotropic body. If an amorphous body is represented as a body in which the constitutive particles are arranged in a disorganized way, we could suppose that the crystal, on the contrary, is a body in which the elementary particles, atoms, or groups of atoms are arranged according to organized distributions called crystalline networks. Bravais acknowledges a distribution of the various elements or chemical groups of a crystal in terms of a system in which each point represents the center of gravity of these various elements or chemical groups. (This simplified expression supposes the element or chemical group to be immobile; if it is animated by a vibration, the regular point represents the average position around which the element vibrates; this is its position of equilibrium). All these systems of regular points can be obtained by the juxtaposition of parallelepipedic networks containing nothing but elements or chemical groups of the same nature that are ranked according to their symmetries in the thirty-two classical groups of crystals. The crystal's anisotropy is understood in this way, for these networks can be divided into systems of planes passing through the various regular points of the network in question, insofar as each system is constituted by a set of planes that are parallel with and equidistant to one another: these systems of planes correspond to privileged directions along which the crystals' limitative surfaces can be arranged. Accepting Bravais's theory, Tammann completes this representation of the differences between the states of matter by assimilating the amorphous solids with liquids that are endowed with a large

amount of viscosity and rigidity; this reveals that there is a veritable continuity between the solid and liquid states of a vitreous body; for example, at the normal temperature of its usage, glass presents an exceptional rigidity; when the glass blower raises the temperature, both the rigidity and the viscosity of the glass progressively diminishes until, at a very high temperature, what remains is a veritable liquid. The milky melting characteristic of amorphous solids never shows two distinct phases. Thus, Tammann considers the amorphous solid as a liquid whose rigidity and viscosity have been sufficiently reduced due to extremely high temperatures. The theoretical consequences of Tammann's hypothesis are quite important: a liquid that experiences a reduction of temperature without passing to the crystalline state is continually transformed into a vitreous body. It is therefore in a state of supercooling. Experiments on piperine,  $C_{17}H_{19}O_3N$ , and betol,  $C_{10}H_7CO_2C_6H_4OH$ , which are substances that melt at  $128^\circ C$  and  $95^\circ C$  respectively and easily remain in supercooling, have confirmed this hypothesis. But the mere consideration of the structures corresponding to the various states is incomplete and leaves behind an indetermination; this consideration must be completed by the study of the *different energetic levels* linked to each state and of the exchanges of energy that are produced during the state changes. Tammann's theory has an exemplary value because it leads to a study of the correlation between structural changes and energetic exchanges. In fact, it allows us to determine the conditions and the limits of the stability of crystalline and amorphous states. There are many bodies that can be present in the crystalline state or the amorphous state; yet, depending on temperature and pressure conditions, sometimes the crystalline state is stable while the amorphous state is metastable, and sometimes vice versa. The passage from the metastable state to the stable state gives rise to a determinate thermal effect and to a determinate volumetric effect. This important consequence of Tammann's theory can be represented by Figure 5. If we begin with a liquid substance in the state of stable equilibrium under a pressure  $P$ , and if we progressively lower the temperature by maintaining this constant pressure, the representative points will be displaced from right to left on  $F_1P$  parallel to the axis of temperatures. If the representative point enters into the domain of stability of the crystalline state, the liquid in question will be in the metastable state. In this state, the supercooled liquid can pass to the crystalline state, and this passage depends on two factors: the power of spontaneous crystallization that this liquid presents (defined by the number of crystalline germs that spontaneously appear in a set time within a given volume of liquid), and, on the other hand, the speed of crystallization, i.e. the speed at which a crystalline

germ develops. The state of supercooling is easy to bring about if the maxima of these two factors (depending on the temperature) are sufficiently distant from one another such that one of the factors corresponds to a practically null value of the other factor; at this point, since these two factors both tend toward zero when the temperature continues to decrease, it is possible to cross quite rapidly through region II, which corresponds to a small but non-null probability of crystallization, and to arrive at region III, for which the chances of crystallization are practically null (Figure 6). While the liquid is in the metastable state, we can initiate crystallization, which is brought about with an emission of heat. This crystallization makes it possible to measure a latent heat of crystallization, which is the difference between the caloric capacity of the mass considered in the amorphous state and that of the same mass considered in the crystallized state, multiplied by the variation of temperature:  $dL = (C_a - C_c)dt$ . However, since the specific heat of a substance held in the crystalline state is inferior to the specific heat of this same substance held in the liquid or amorphous state, the latent heat of crystallization varies in the same direction as the temperature. It diminishes when the temperature lowers; thus, for a sufficient lowering of temperature, what will happen is that the latent heat of crystallization is nullified and then changes sign. The line MS of Figure 5 represents the location of the representative points for which the latent heat of crystallization is null depending on the various values that the pressure (which is constant for the same experiment) can take. Now let's consider the same liquid substance in the stable state at temperature T, which is in the domain of stability of the liquid state; if the pressure increases, we enter the domain of stability of the crystalline state. Since the liquid is then in the metastable state, the possible crystallization will correspond, for each pressure considered, with a variation  $\Delta V$  of the volume that accompanies this transformation. If  $V_c$  and  $V_a$  are the respective volumes of the considered mass of the substance, whether in the crystallized state or in the amorphous state, then we get the formula:  $d\Delta V = dV_a - dV_c$ . If the variation of volume is affected in the direction of a contraction of the + sign, it will be found that, as in the case of the latent heat of melting,  $\Delta V$  diminishes when the pressure increases, because a substance held in the amorphous state is more compressible than in the crystallized state. For a sufficient increase of pressure,  $\Delta V$  can be nullified and then change sign. The curve LN of Figure 5 is the set of points for which the variation of volume is null. Below this curve,  $\Delta V$  is positive (contraction); above this curve,  $\Delta V$  is negative (dilatation). From the limits of the variation of the latent heat of crystallization and of the variation of volume, we can deduce the form of the crystallization-melting

curve: along this curve, there are two triple points,  $A_1$  and  $A_2$ , for which the crystal, the amorphous body, and the gas could coexist in mutual equilibrium. In  $A_1$ , the crystallization-melting curve encounters both the crystal's curve of sublimation  $A_2SA_1$  and the vitreous body's curve of vaporization  $A_1B$ ; this curve of vaporization extends the liquid's curve of vaporization  $A_1C$ . Furthermore, for each pressure, there would correspond two points of crystallization-melting in which the crystal could coexist either with the liquid or with the vitreous body (for pressure  $P$ , for example, these two points would be  $F_1$  and  $F_2$ ). At temperatures lower than this second point of crystallization, the representative point of the substance would again enter the domain of stability of the amorphous state. At this point, the vitreous state would be a stable state, and the crystalline state would be a metastable state with respect to the vitreous body. Undoubtedly, at these low temperatures, the speeds of transformation would be so low that they would be practically null; but this theoretical reversibility of stable and metastable states nevertheless keeps all of its importance; it has not been possible to further provide evidence experimentally for point  $L$  of the maximum of the melting temperature or point  $M$  of the maximum of the melting pressure, but the experiment has shown that all the melting curves have their concavity turned toward the decreasing temperatures, and that for water and several other substances this concavity is found, starting from the triple point  $A_1$ , in the portion of the ascending melting curve in the direction of the decreasing temperatures.

The interest of Tammann's hypothesis for the study of individuation is to establish the existence of conditions of indifferent equilibrium between two physical states, one of which is amorphous and the other of which is crystalline, i.e. states that are opposite in terms of their structures, the first of which is non-organized and the second of which is organized. The relation between two structural states thus takes on an energetic sense: indeed, the existence and the position of the triple points are determined based on considerations relative to the latent heat of crystallization and to the variation of volume according to pressure, i.e. to thermodynamic work. The limits of a structural type of domain of stability are determined by energetic considerations. This is why, in order to broach the study of physical individuation properly speaking, we wanted to define the energetic aspect of the relation between two physical structures. An energetic characteristic is linked to every structure, but, inversely, a modification of the structural characteristic of this system can correspond to any modification of the energetic conditions of this system.

For a physical system, the fact of having a given structure involves the possession of an energetic determination. This energetic determination can

be assimilated to a potential energy, for it only becomes manifest in a transformation of the system. But, unlike the potential energies studied above, which are capable of partial and progressive transformations according to an ongoing process, the potential energies linked to a structure can only be transformed and unleashed by a modification of the conditions of stability of the system that contains them; thus, they are linked to the very existence of the system's structure; this is why we shall say that potential energies corresponding to two different structures are of different orders. The only point at which they are continuous with respect to one another is the point at which they are nullified, as in points  $A_1$  and  $A_2$  and  $F_1$  and  $F_2$  of Figure 5. In the case of a pendulum, on the contrary, where two potential energies bring about a mutual ongoing conversion, as in the Holweck-Lejay pendulum (Figure 2), the sum of these two energies and of the kinetic energy remains constant during the course of a transformation. The same thing even applies in the more complex case that Figure 3 represents. Conversely, the state changes undergone by the system forces us to consider a certain energy linked to the structure, an energy which is indeed a potential energy, but which is not capable of an ongoing transformation; for this reason, it cannot be considered suitable for the case of identity or of equality defined above. This energy can only be measured in a state change of the system; while the state remains, it is conflated with the very conditions of stability of this state. This is why we will choose to name those energies that express the limits of stability of a structural state as structural potential energies. These potential energies constitute the real source of the formal conditions of possible geneses.

## II. INDIVIDUATION AND SYSTEM STATES

### *1. Individuation and Crystalline Allotropic Forms; Being and Relation*

We are attempting to show the validity of the notion of structural potential energy by using it as an instrument for the study of cases in which the notion of physical individuation requires a very delicate usage, and this is because these cases constitute quite a remarkable prefatory example: that of crystalline allotropic forms of the same substance. It will indeed be possible in a similar case to grasp individuation not only at the most primitive level but also at the level most exempt from any inessential logical inference. If it is possible to determine the characteristics of individuation at this level, these characteristics will be anterior to any idea of substance (since it is a question of the same body), of quality, and of quiddity. And yet, if we take up, for example, the study of the crystallization of sulfur, we shall see that it can

exist in the solid state in several allotropic forms, the main two of which are sulfur crystallized in the orthorhombic system (octahedral sulfur) and sulfur crystallized in the monoclinic system (prismatic sulfur). At room temperature, octahedral sulfur is in a stable state; octahedral crystals of natural sulfur can be found in certain Tertiary terrains; the crystals that we prepare remain clear indefinitely. Conversely, the prismatic form is metastable with respect to the octahedral form; a crystal of this form, albeit clear when it has been recently prepared, becomes opaque when it is left to itself; the crystal maintains its external form, but a microscopic examination reveals that fragments into a mosaic of juxtaposed octahedral crystals,<sup>5</sup> which is where the observed opacity comes from. The metastable state of prismatic sulfur is called crystalline supercooling. This relation between crystalline prismatic and octahedral states exists for temperatures below 95.4°C, but reverses starting from 95.4°C up to 115°C, which is the melting temperature. In this interval, prismatic sulfur is in stable equilibrium, and octahedral sulfur is in metastable equilibrium. Under atmospheric pressure, 95.4°C is the temperature of equilibrium between these two crystalline varieties.

With this in mind, it can be asked: what does the individuality of each of these two forms consist in? What ensures the stability of these forms, what makes it so that they can both exist at a determined temperature? When either of these two forms is found in a state of metastability, a crystalline germ is required, i.e. a point of departure for crystallization, so as to help it transform into the other stable form. Everything happens as if metastable equilibrium could only be disrupted by the local deposit of a singularity contained in a crystalline germ that can disrupt this metastable equilibrium; once it has been initiated, the transformation propagates, for the action that is exerted at the start between the crystalline germ and the metastable body is then exerted gradually between the transformed parts and the parts that are not yet transformed.<sup>6</sup> Physicists ordinarily use a word borrowed from the vocabulary of biology to designate the action of depositing a germ: they say that the substance is inseminated with a crystalline germ. A particularly demonstrative experiment consists in placing supercooled sulfur into a U-tube, then inseminating each of the branches of the U-tube with a crystalline germ that is octahedral on one side and prismatic on the other; the sulfur contained in each branch of the tube then crystallizes according to the crystalline system that is determined by the deposited germ; the two allotropic forms of crystallized sulfur are thus in perfect contact in the middle part of the tube. If the temperature is lower than 95.4°C, the sulfur remains transparent, and the branch containing the octahedral sulfur becomes opaque

starting with the line of contact between the two crystalline varieties. Opacity begins to manifest at the contact of these two allotropic varieties, and it gradually propagates to the point of taking over the whole branch containing the prismatic sulfur. Conversely, if the temperature is maintained between 95.4°C and 115°C, the direction of the transformation is inverted: the branch containing prismatic sulfur remains transparent, and the branch containing octahedral sulfur becomes opaque starting with the line of contact between the two crystalline varieties. Lastly, at a temperature of 95.4°C, the speed of propagation of these transformations is null. There is thus a temperature at which equilibrium is attained between these two crystalline varieties. From a certain perspective, this experiment entails the creation of a sort of competition for a finite quantity of substance between two systems. For all temperatures other than the temperature of equilibrium (and lower than the melting temperature of octahedral sulfur), one of the forms occupies the whole crystallizable substance, and the other completely disappears.<sup>7</sup>

And here, we begin to grasp one of the primary and fundamental aspects of physical individuation. Individuation as an operation is not linked to the identity of a matter but to a state modification. Sulfur conserves its crystalline system only if a singularity is not presented to make the less stable form disappear. A substance conserves its individuality when it is in the most stable state proportionate to its own energetic conditions. This state's stability becomes manifest due to the fact that, if the energetic conditions remain the same, this state cannot be modified by the introduction of a germ presenting an initiation of a different structure; relative to substances that are in a different state, this substance can on the contrary provide germs capable of involving a modification of the state of these substances. A stable individuality is thus formed when two conditions are met: a certain structure must correspond to a certain energetic state of the system. But this structure is not directly produced by the energetic state alone, for it is distinct from the latter; the initiation of structuration is critical; most often in crystallization germs are deposited from the exterior. Thus, there is a historical aspect to the manifestation of a structure in a substance, insofar as the structural germ must appear. Pure energetic determinism does not suffice for a substance to attain its state of stability. The beginning of structuring individuation is an event for the system in a metastable state. Thus, in general, even in the simplest process of individuation, a relation takes place between the body under consideration and the temporal existence of beings external to it that intervene as the eventual conditions of its structuration. The constituted individual holds within it the synthesis of energetic and material conditions and of

an informational condition, which is generally not immanent. If the encounter between these three conditions has not taken place, the substance has not attained its stable state; it then remains in a metastable state. However, let's note that this genetic definition of individuation through the encounter of the three necessary conditions leads to the notion of the hierarchical relativity of states of individuation. Indeed, when there is a very large hiatus between the energetic state of a substance<sup>8</sup> and its structural state (for example, sulfur in the state of supercooling), if a structural germ is presented, it can involve a change of the substance's structural state without however leading it to its state of absolute stability. If at a temperature of 90°C supercooled sulfur receives a prismatic germ, its structural state changes, and it becomes crystallized sulfur in the prismatic system. It has passed from an initial metastable state to a second metastable state; the second is more stable than the first. But if a second structural germ intervenes, i.e. a crystal of octahedral sulfur, the structural state still changes, and the whole mass becomes octahedral sulfur. In this sense, we understand why crystalline supercooling constitutes a less precarious state than liquid supercooling; a structural germ has already been encountered, but it has deposited a structure that is incapable of absorbing into the structuration all the potential energy represented by the state of supercooling. Complete individuation is the individuation that corresponds to a full deployment of the energy contained in the system before structuration; it leads to a stable state; conversely, incomplete individuation is that which corresponds to a structuration that has not absorbed all the potential energy of the initial non-structured state; it leads to a state that is still metastable. For the same substance, there are as many possible types of structures as there are hierarchical levels of metastability; for example, in phosphorous, we encounter three levels of metastability. Furthermore, it is important to note that the levels of individuation are perfectly discontinuous with respect to one another; the existence of energetic conditions of equilibrium between two levels immediately following one another in the hierarchical scale can neither obscure the structural discontinuity of these two levels, nor their energetic discontinuity; thus, going back to the example of sulfur, when octahedral sulfur is brought to 95.4°C under atmospheric pressure, it is necessary to provide 2.5 calories per gram in order for it to transform into prismatic sulfur; consequently, there is a specific latent heat of transformation of octahedral sulfur into prismatic sulfur. This energetic discontinuity is also discovered by the fact that the melting point of the metastable variety is always lower than that of the more stable variety for all chemical types.

Therefore, it would seem that it is possible for there to be several levels of individuation underway throughout the ongoing changes of the allotropic forms of an element; only one of them corresponds to a complete individuation; there are a finite number of these states, and they are discontinuous with respect to one another both due to their energetic conditions and their structural conditions. The effective existence of an individualized state results from the fact that two independent conditions are achieved simultaneously: an energetic and material condition resulting from an actual state of the system, and an eventual condition, which most often involves a relation to a series of events that arise from other systems. In this sense, the individuation of an allotropic form begins with a historical type of singularity. Two flows of volcanic lava of the same chemical composition can each be at different points of crystallization; these are local singularities of the eruption that are translated—through the particular genesis of this crystallization—into the individuation of the allotropic form involved. In light of this, all the characteristics for a substance that result from this double (energetic and historical) conditioning are part of its individuality. Due to the studies of physical chemistry, the geologist knows based on the history of rocks how to interpret the relative size of the crystals that constitute them. A paste that seems amorphous but is finely crystallized indicates a rapid cooling of the substance; large crystals, of which only the external form remains and whose entire matter is divided into microscopic crystals of another system, indicate that there have been successive crystallizations, the first form having become metastable with respect to the second. From the simple point of view of allotropic forms, an examination of metamorphic rocks is also fruitful for learning about the historical and energetic conditions of geological phenomena, like that of magma, whose source is eruptive: calcschist, quartzite, schist, gneiss, and mica schist correspond fragment by fragment to a certain particular modality of endometamorphism or exometamorphism for a determined pressure, temperature, and degree of humidity. Thus, we see that the consideration of the energetic conditions and of the singularities in the genesis of a physical individual does not in any way lead to recognizing mere types instead of individuals; on the contrary, it explains within the limits of a domain how the infinity of the particular values assumed by the magnitudes that express these conditions can lead to an infinity of different results (for example, the dimension of crystals) for the same structural type. Without borrowing anything from the domain of biology and without accepting the notions of common genus and specific difference, which would be too metaphorical here, it is possible based on the discontinuities of conditions to define types that

correspond to domains of stability or metastability; then, within these types, it is possible to define particular beings that differ from one another based on that which (within the limits of the type) is capable of a finer, sometimes continuous variation, like the speed of cooling. In this sense, the individuality of a particular being rigorously includes the type as well as the characteristics capable of varying within a type. We should never consider a certain particular being as belonging to a type. The type is what belongs to the particular being just as much as the details that singularize it the most, since the existence of the type in this particular being results from the same conditions as those at the origin of the details that singularize the being. There are types because these conditions vary discontinuously by delimiting domains of stability; but because within these domains of stability certain parameters, which are part of the conditions, vary more finely, each particular being is different from a certain number of others. The original particularity of a being is not different in nature from its typological reality. The particular being does not *possess* its most singular characteristics any more so than its typological characteristics. Both the former and the latter are *individual* because they result from the encounter of energetic conditions and singularities, the latter of which are historical and local. If, within the interior of the same domain of stability, conditions that are still variable are not capable of an infinity of values but merely a finite number of values, it will have to be acknowledged that the number of effectively different beings able to appear is finite. In a certain quantity of substance, there could then be several identical beings that seem indiscernible. Certainly, on the macrophysical level we hardly ever encounter several indiscernible individuals, even in crystallization; furthermore, a substance in crystalline supercooling ends up transforming into the stable form relative to which it is metastable; but we should not forget that if we find ourselves in the presence of a large quantity of elements, nothing can guarantee the absolute purity of an allotropic form. A certain number of germs of the stable allotropic form can exist within a substance that appears to have a single form. Particular local conditions can be equivalent to this structural germ (for example, a trace of chemical impurity). Ultimately, to consider simple substance, we must therefore take the microscopic point of view. At this level, it seems that there can be veritable indiscernibles.

At the level where individuality seems to be the least accentuated (in the allotropic forms of the same element), it is not merely linked to the identity of a substance, the singularity of a form, or the action of a force. A pure substantialism, a pure theory of form, or a pure dynamism would be equally

powerless facing the necessity of accounting for physicochemical individuation. To seek the principle of individuation in matter, form, or force is to be condemned to only explaining individuation in these seemingly simple particulars, like, for example, that of the molecule or the atom. Instead of constituting the individual's genesis, this would be to suppose this genesis as already formed in the formal, material, or energetic elements and, due to these elements already harboring individuation, to generate through composition an individuation that is in fact simpler. This is why we have not wanted to undertake the study of the individual by beginning with the elementary particle so as to mistake such a complex case as being simple. We have chosen the most precarious aspect of individuation as the first term of the examination. And from the very beginning, it has seemed to us that this individuation was an operation resulting from the encounter and compatibility between a singularity and energetic and material conditions. The name allagmatic could be given to such a genetic method that seeks to grasp individuated beings as the development of a singularity that unifies (on an intermediate order of magnitude) the overall energetic conditions and material conditions; in fact, we should note that this method does not involve a pure causal determinism through which a being would be explained when its genesis in the past would have to be accounted for. In fact, the being extends in time the meeting of the two groups of conditions that it expresses; it is not just the result but also the agent, both the milieu of this meeting and the extension of this realized compatibility. In terms of time, the individual is not in the past but in the present, for it only continues to conserve its individuality to the extent that this constitutive combination of conditions persists in and is extended by the individual itself. The individual exists such that the mixture of matter and energy that constitutes it is in the present.<sup>9</sup> This is what could be called the active consistency of the individual. This is why every individual can be a condition of becoming: a stable crystal can be the germ for a metastable substance in a state of crystalline or liquid supercooling. Dynamism alone cannot account for individuation, because dynamism wants to explain the individual through a single fundamental dynamism; yet the individual doesn't just harbor a hylomorphic encounter; it stems from a process of amplification unleashed in a hylomorphic situation by a singularity, and it extends this singularity. We can indeed just as legitimately call a hylomorphic situation that in which there is a certain quantity of matter grouped into subsets of a system isolated with respect to one another, or a certain quantity of matter in which the energetic conditions and spatial distribution are such that the system is in a metastable state. The state containing forces of tension

(a potential energy) can be called the system's form, insofar as its dimensions, its topology, and its internal isolations are what maintain these forces of tension; form is the system insofar as it is macrophysical and insofar as it is a reality that envelops a possible individuation; matter is the system envisioned at the microphysical, molecular level.

A hylomorphic situation is a situation in which there is nothing but form and matter and therefore two levels of reality without communication. The establishment of this communication between levels (with energetic transformations) is the initiation of individuation; it supposes the appearance of a singularity, which could be called information and which either comes from the outside or is subjacent.

[However,<sup>10</sup> the individual conceals two fundamental dynamisms, one of which is energetic and the other of which is structural. The individual's stability is the stability of their association. Right away, the following question can then be posed concerning the degree of reality such an investigation could lay claim to: should we consider such an investigation to be capable of attaining and grasping a real? Or is this sort of investigation not, on the contrary, subjected to this relativity of knowledge that seems to characterize the experimental sciences? In order to respond to this need for examination, it is necessary to distinguish the knowledge of phenomena from the knowledge of the relations between states. Relativistic phenomenalism is perfectly valid to the extent that it indicates our incapacity to absolutely know a physical being, at least without recreating its genesis and relative to the manner in which we know or believe to know the subject in the isolation of self-consciousness. But what remains at the basis of the critique of knowledge is this postulate that being is fundamentally substance, i.e. in-itself and for-itself. The critique of pure reason is essentially addressed to the substantialism of Leibniz and Wolff; through the latter, this postulate affects all substantialisms and those of Descartes and Spinoza in particular. The Kantian noumenon is not unrelated to the substance of rationalist and realist theories. But if we refuse to admit that being is fundamentally substance, the analysis of the phenomenon can no longer lead to the same relativism; the conditions of sensory experience indeed prevent a knowledge of physical reality through intuition alone. But we cannot deduce as definitively as Kant a relativism of the existence of *a priori* forms of sensibility. If noumena are indeed not pure substance but also consist of *relations* (like exchanges of energy or passages of structures from one domain of reality to another domain of reality), and *if relation has the same status of reality as the terms themselves*, as we have tried to show in the preceding examples—insofar as relation is not an *accident*

relative to a substance but a *constitutive, energetic and structural condition that is extended in the existence of constituted beings*—then the *a priori* forms of sensibility that allow us to grasp relations because they are a power of organizing according to *succession* or according to *simultaneity* do not create an irremediable relativity of knowledge. If relation effectively has the value of truth, then both the relation within the *subject* and the relation between the *subject* and the *object* can have the value of reality. True knowledge is a relation, not a simple formal rapport comparable to the rapport of two figures between them. True knowledge is knowledge that corresponds to the greatest possible stability in the given conditions of the *subject-object relation*. There can be different levels of knowledge, just as there can be different degrees of stability of a relation. There can be a type of knowledge that is the most stable possible for a certain subjective condition and a certain objective condition; if a later modification of subjective conditions (for example, the discovery of new mathematical relations) or objective conditions turns up, the old type of knowledge can become metastable with respect to a new type of knowledge. The rapport of the inadequate to the adequate is in fact that of the metastable relative to the stable. Truth and error are not opposed as two substances but are opposed as a relation enveloped in a *stable* state to a relation enveloped in a *metastable* state. Knowledge is not a rapport between an object substance and a subject substance, but a *relation between two relations*, one of which is in the domain of the object and the other of which is in the domain of the subject.

*The epistemological postulate of this study is that the relation between two relations is itself a relation.* Here we take the word relation in the sense defined above, which, opposing relation to the simple rapport, gives it the value of *being*, for relation persists in beings as a condition of stability and defines their individuality as resulting from an operation of individuation. If this postulate of the method of the study of constitutive relations is accepted, it then becomes possible to understand the existence and validity of an approximate knowledge. Approximate knowledge is not completely different from exact knowledge; it is merely less stable. Every scientific doctrine at any moment can become metastable with respect to a doctrine that has become possible due to a change in the conditions of knowledge. This however does not mean that the preceding doctrine should be considered false; it is also not *logically negated* by this new doctrine; its domain is merely submitted to a new structuration that leads it to stability. This doctrine is neither a form of *pragmatism* nor a new *logical empiricism*, for it does not suppose the usage of any criterion external to this relation that knowledge is, like intellectual

utility or vital motivation: no commodity is required to validate knowledge. It is neither *nominalist* nor *realist*, for nominalism or realism can only be understood in doctrines that suppose that the absolute is the highest form of being and in doctrines that attempt to conform all knowledge to the knowledge of the substantial absolute. This postulate that being is the absolute underpins the dispute over universals conceived as a critique of knowledge. However, Abelard has fully perceived the possibility of separating the knowledge of terms from the knowledge of relation; despite the unintelligent jokes to which he has been submitted, he has brought forth with this distinction an extremely fruitful principle that takes on its full meaning with the development of the experimental sciences: *nominalism* for the knowledge of terms, *realism* for the knowledge of relation: this is the method that we can gain from Abelard's teaching in order to apply it by universalizing it. This realism of relation can thus be grasped as the postulate of research. If this postulate is valid, it is legitimate to ask the analysis of a particular point of the experimental sciences to reveal to us what physical individuation is. The knowledge that these sciences give us is in fact valid as knowledge of relation and can only give to philosophical analysis a being consisting in relations. But if the individual is precisely such a being, this analysis can reveal it to us. One could object that we are seeking a particular case and that this reciprocity between the *epistemological postulate* and the *known object* prevents legitimizing this arbitrary choice from outside, but we specifically believe that every thought, precisely to the extent that it is real, is a *relation*, i.e. includes a historical aspect in its genesis. A real thought is *self-justifying* but not justified before being structured: it includes an individuation and is individuated, thereby possessing its own degree of stability. In order for a thought to exist, it requires not just a logical condition but also a relational postulate that allows for its genesis to be accomplished. If we can resolve other problems in other domains with the paradigm that the notion of physical individuation constitutes, we could consider this notion as stable; if not, it will merely be metastable, and we will define this metastability with respect to the more stable forms we could have discovered: it will then conserve the prominent value of an *elementary paradigm*.]

## 2. Individuation as the Genesis of Crystalline Forms Starting from an Amorphous State

Is this manner of envisioning individuality still valid for defining the difference of crystalline forms relative to the amorphous state? If energetic conditions were the only ones to be considered, the answer would be immediately

positive, for the passage from the amorphous state to the crystalline state is always accompanied by an energy exchange; at constant pressure and temperature, the passage from the crystalline state to the liquid state is always accompanied by an absorption of heat; there is presumably a latent heat of melting for the crystalline substance that is always positive. If, on the other hand, structural conditions alone were required, no new difficulty would be presented: the genesis of the crystalline form closest to the amorphous state could be assimilated to any passage whatsoever from one allotropic crystalline form to another. However, when we consider the difference between a substance in the amorphous state and the same substance in the crystalline state, it seems that the preceding definition of physical individuation is applicable only with a certain number of transformations or specifications. These modifications or specifications stem from the fact that the amorphous state cannot be treated as individual and that the absolute genesis of the individuated state is more difficult to define than its relative genesis through the passage from a metastable form to a stable form. The previously studied case then becomes a particular case vis-à-vis this more general case.

The passage to the crystalline state from an amorphous state can be formed in different ways: a solution that evaporates until saturation, vapors that condense on a cold wall (sublimation), or the slow cooling of a melted substance can lead to the formation of crystals. Can it be claimed that the discontinuity between the amorphous state and the crystalline state is sufficient for determining the individuated nature of this state? This would be to suppose that there is a certain symmetry and equivalence between the amorphous state and the crystalline state, which is not proven. In fact, we indeed observe a stage in the variation of physical conditions (temperature change, for example) while the crystals are forming, indicating that an energetic exchange occurs. But it is important to note that this discontinuity can be fragmented and not given *en masse* in certain cases, like those of organic substances with complex molecules, for example para-azoxyanisole; according to G. Friedel, these bodies (which are called liquid crystals by the physicist Lehmann who discovered them) present mesomorphic states that are intermediate between the amorphous state and the pure crystalline state. In their mesomorphic states, these substances are liquid but present properties of anisotropy, for example optical anisotropy, as M. Mauguin has shown. On the other hand, it is possible to obtain the same type of crystals starting from a concentrated solution of a melted liquid that is left to cool down or starting from a sublimation. It is therefore not with respect to the amorphous substance that the crystal consequently individualizes. The veritable genesis of

a crystal as an individual is instead to be sought in the dynamism of the relations between the hylomorphic situation and a singularity. For example, let's consider the property that is characteristic of the crystalline state: anisotropy. The crystal possesses two types of completely different anisotropy. The first is continuous anisotropy: certain vectoral properties of crystals vary continuously with direction; this is the case of electrical, magnetic, and elastic properties and properties related to thermal dilation, caloric conductivity, and the speed of the propagation of light. But alongside these properties, we note other properties that vary discontinuously with direction: they are expressed by the existence of linear directions or planar directions with particular properties, whereas the neighboring directions do not possess them to any degree. Thus, the crystal can only be limited externally by certain linear and planar directions, according to the law stated by Romé de l'Isle in 1783: the dihedral angles that make up the natural facets of a crystal are constant for the same type. Similarly, the cohesion, such as it is revealed by the planes of cleavages or the appearances of parting, manifests a discontinuous anisotropy. Ultimately, the most beautiful example of discontinuous anisotropy is the diffraction of X-rays. A bundle of X-rays that strikes a crystal is reflected in a limited number of planes with well-determined orientations. However, these properties of discontinuous anisotropy arise from the genesis of the crystal as an individual and not as exemplary of a type; each individual is structured in this way. In an aggregate of crystals assembled without any order, each crystal has defined its facets, its dihedral angles, and its corners according to a *direction* of the ensemble that is explained by *external* circumstances, whether mechanical or chemical, and yet according to rigorously determined *internal* rapports starting from the singular genesis. For the crystal, the fact of being an individual consists in the fact that it has *developed* in this way relative to *itself*. There is ultimately at the end of the genesis a crystal individual, because an organized ensemble has developed around a crystalline germ that incorporates an initially amorphous matter that is rich in potentials by structuring it according to a proper arrangement of all the parts with respect to one another. Here, there is a veritable interiority of the crystal that consists in the fact that the order of the elementary particles is universal within a determined crystal; the unicity of this structure for all the elements of the same individual designates the initial existence of a germ that not only has initiated the crystallization as a change of state but also has been the unique principle of the structuration of the crystal in its particularity. This structural germ has been the origin of an active orientation that is progressively imposed onto all the elements included in

the crystal as its growth continues; an internal historicity, which extends throughout the genesis starting from the microphysical germ all the way up to the ultimate limits of the macrophysical edifice, creates a completely particular homogeneity: the germ's initial structure cannot positively involve the crystallization of an amorphous body if the latter is not in a metastable equilibrium: a certain energy is required in the amorphous substance that receives the crystalline germ; but from the moment the germ is present, it possesses the value of a principle: its structure and its orientation take control of this energy of the metastable state; the crystalline germ, containing nothing more than an extremely small amount of energy, is nevertheless capable of guiding the structuration of a mass of matter several million times greater than its own. Undoubtedly, this modulation is possible because the crystal's successive stages during its development serve as relays for this initial structuring singularity. But it nevertheless remains true that the passage from the initial germ to the crystal resulting from the structuration of a single layer of molecules around this germ has indicated the capacity of the amplification of the ensemble constituted by the germ and the amorphous milieu. The phenomenon of growth is consequently automatic and indefinite, since all the successive layers of the crystal have the capacity to structure the amorphous milieu that surrounds them while this milieu remains metastable; in this sense, a crystal is endowed with an indefinite power of growth; a crystal can have its growth stopped, but it can never be considered complete, and it can always continue to grow if it is put back into a metastable milieu that it can structure. It is important to note quite particularly that the nature of the exteriority or interiority of the conditions is modified by the genesis itself. At the moment when the crystal is not yet constituted, the energetic conditions can be considered as exterior to the crystalline germ, whereas the structural conditions are carried by this germ itself. Conversely, when the crystal has grown, it has at least partially incorporated certain amounts of substance that constituted the support of the potential energy of the metastable state while they were amorphous. Thus, we cannot speak of energy external to the crystal, for this energy is carried by a substance that is incorporated within the crystal in its own growth. This energy is only provisionally exterior.<sup>11</sup> Furthermore, the interiority of the crystalline germ's structure is not absolute and does not autonomously regulate the structuration of the amorphous mass; in order for this modulating action to be able to be carried out, the structural germ must bring with it a structure corresponding to the crystalline system in which the amorphous substance can crystallize; the crystalline germ does not have to have the same chemical

nature as the amorphous crystallizable substance, but there must be an identity between the two crystalline systems in order for the apprehension of the potential energy contained in the amorphous substance to be carried out. The difference between the germ and the amorphous crystallizable milieu is therefore not constituted by the absolute presence or absence of a structure but by the state of actuality or virtuality of this structure. The individuation of a system essentially results from the meeting of a mainly structural condition and a mainly energetic condition. But this meeting is not necessarily fruitful. In order for it to have constitutive value, it is also necessary that the energy can be actualized by the structure in accordance with local material conditions. This possibility neither depends on the structural condition alone nor on the energetic condition alone but on the compatibility of the germ's crystalline systems and the substance that constitutes the milieu of this germ. Thus, a third condition is manifested that we have not been able to note in the preceding case because it was necessarily fulfilled, since the structural germ and the metastable substance were of the same chemical nature. Here it is no longer a question of the scalar quantity of potential energy nor of the pure vectoral properties of the structure carried by the germ, but a question of a third type of rapport (which can be called analogical) between the latent structures of the still amorphous substance and the germ's actual structure. This condition is required for there to be a veritable amplifying relation between this structure of the germ and this potential energy carried by an amorphous substance. This relation is neither purely quantitative nor purely qualitative; it is different than a rapport of qualities or a rapport of quantities; it defines the mutual *interiority* of a structure and of a potential energy within a singularity. This interiority is not spatial, for we are witnessing here the action of a structural germ on its environment; it is not an equivalence of terms, since the terms, statically and dynamically, are dissymmetrical. We use the word analogy to designate this relation, because the content of Platonic thought relative to paradigmaticism in its ontological foundations seems to us more fruitful in this sense for consecrating the introduction of a relation that includes energetic quantity and structural quality. This relation is information: the germ's singularity is effective when it arrives in a tensed hylomorphic situation. A precise analysis of the relation between a structural germ and the milieu that it structures shows that this relation requires the possibility of a polarization of the amorphous substance by the crystalline germ. The active range of this polarization can be very minuscule: from the moment that a first layer of amorphous substance has become a crystal around the germ, it plays the role of a germ for another layer, and the crystal can at that

point develop bit by bit. The relation of a structural germ to the potential energy of a metastable state is established in this polarization of amorphous matter. We must therefore seek the foundation of a genesis constituting the individual here. From the very beginning and from a macrophysical point of view, the individual always appears as the *bearer* of polarization; indeed, it is worth noting that polarization is a transitive property: it is simultaneously a consequence and a cause; a body constituted by a process of polarization exerts a series of polarizing functions, merely one of which is the crystal's capacity to grow.<sup>12</sup> Perhaps it would be possible to generalize the physical consequences of Pierre Curie's 1894 studies on symmetry. Curie's laws can be stated in two forms; the first utilizes current concepts: a phenomenon possesses all the elements of symmetry of the causes that produce it, and the dissymmetry of a phenomenon is found again in the causes. Furthermore, the produced effects can be more symmetrical than the causes, which means that the reciprocal of the first law is not true. This amounts to stating that if a phenomenon presents a dissymmetry, this dissymmetry should be found again in the causes; this dissymmetry is what creates the phenomenon. But, above all, the particular interest of Curie's laws resides in their precise statement: a phenomenon can exist in a milieu that possesses its characteristic symmetry or that of one of the subgroups of this symmetry. It will not be manifested in a more symmetrical milieu. The characteristic symmetry of a phenomenon is the maximum symmetry compatible with the existence of this phenomenon. This characteristic symmetry must be defined for each phenomenon, like the electrical field, the magnetic field, and the electromagnetic field characteristic of the propagation of a light wave. However, it is acknowledged that the number of symmetry groups presenting one or several axes of isotropy is limited, and crystallographers have determined the possibility of only seven groups: (1) the symmetry of the sphere; (2) the direct symmetry of the sphere (that of a sphere filled with a liquid endowed with a rotatory power); (3) the symmetry of the cylinder of revolution (which is that of an isotropic body compressed in one direction, that of the cylinder's axis); (4) the direct symmetry of the cylinder, i.e. that of a cylinder filled with a liquid endowed with a rotatory power; (5) the symmetry of the cone's frustum; (6) the symmetry of a cylinder turning on its axis; (7) the symmetry of the rotating frustum of the cone. The first two systems present more of an axis of isotropy, and the last five present a single axis. Due to these systems, it is acknowledged that the symmetry characteristic of the electrical field is that of a cone's frustum, while the symmetry characteristic of the magnetic field is that of the rotating cylinder. It can then be understood under

what conditions a physical individual, whose genesis has been determined by a polarization corresponding to a structure characterized by a certain type of symmetry, can produce a phenomenon that presents a determined polarization.

Thus, a phenomenon noted by Novalis and celebrated in the poetic invocation of the "tire-cendres" crystal (tourmaline) can be understood based on the system of the symmetry of the cone's frustum. The symmetry of the tourmaline is that of a triangular pyramid. A crystal of heated tourmaline reveals an electrical polarity in the direction of its ternary axis. The tourmaline is already polarized at ordinary temperatures, but a slow displacement of electrical charges compensates this polarization; the heating only modifies the state of polarization in a manner such that the compensation no longer takes place given a certain time; but the crystal's structure has not been modified. Similarly, magnetic rotatory polarization is linked to the symmetry characteristic of the magnetic field, that of the rotating cylinder. Ultimately, the interpretation becomes particularly interesting in the case of the phenomenon of piezoelectricity discovered by Jacques and Pierre Curie. It consists in the appearance of electrical charges through the compression or mechanical dilation of certain crystals; since the phenomenon consists in the appearance of an electrical field, the symmetry of the system that produces this field (the crystal and forces of compression) must be at best that of the frustum of the cone. Hence the fact that pyroelectric crystals can be piezoelectric; by compressing a crystal of tourmaline along the ternary pyroelectric axis, the appearance of electrical charges of the opposite sign are established. By contrast, crystals like those of quartz, which only have a ternary symmetry (the extremities of the binary axes are not equivalent), are not pyroelectric but piezoelectric, because, when a pressure is exerted along a binary axis, the only element of symmetry common to the crystal and the compression is this binary axis; this symmetry, a subgroup of the symmetry of the frustum of the cone, is compatible with the appearance of an electrical field along this axis. In such a crystal, the electrical polarization can also be determined by a compression perpendicular to the facets of the prism; the only element of symmetry common to the crystal's symmetry and to the cylindrical symmetry of compression is the binary axis perpendicular to the direction of the force of compression. The result is that crystals with no center of symmetry can be piezoelectric. This is the case of Rochelle salt (potassium sodium tartrate), which is orthorhombic and has an enantiomorphic hemihedry and whose chemical composition is indicated by the formula  $\text{CO}_2\text{K}-\text{CHOH}-\text{CHOH}-\text{CO}_2\text{Na}$ .

The habit that compels us to think according to common genera, specific differences, and distinctive features is so strong that we cannot avoid using terms that imply an implicit natural classification; with this reservation in mind, if we consent to subtract from the word property the meaning that it takes in a natural classification, we shall say that, according to the preceding analysis, the properties of a crystalline individual express and actualize the polarity or bundle of polarities that have presided over its genesis by prolonging this polarity. A crystal, which is a structured matter, can become a structuring being; it is both the consequence and the cause of this polarization of matter, without which it would not exist. Its structure is a received structure, since it has required a germ; but the germ is not substantially distinct from the crystal; it remains included in the crystal, which becomes like a more extensive germ. Here the *soma* is coextensive with the *germen*, and the *germen* is coextensive with the *soma*. The *germen* becomes *soma*; its function is coextensive with the *limit* of the crystal that develops. This power of structuring an amorphous milieu is in some sense a property of the crystal's limit;<sup>13</sup> it requires dissymmetry between the interior state of the crystal and the state of its milieu. The genetic properties of a crystal are prominently manifested on its surface; these are the limit's properties. Thus, if we want to be rigorous we cannot say the "properties of the crystal"; they are instead modalities of the relation between the crystal and the amorphous body. It is because the crystal is perpetually unfinished, in a maintained state of suspended genesis, that it possesses what can be uniquely called "properties"; these properties are in fact the ongoing disequilibrium manifested by the relations with the polarized fields or by the creation (at the limit of the crystal and around it) of a field that has a polarity determined by the crystal's structure. By generalizing Curie's laws, we would find that a purely amorphous substance would not create polarized fields if it weren't rendered anisotropic by particular polarizing conditions, like a compression according to a determined direction, or a magnetic field.<sup>14</sup> A singularity is polarized. The veritable properties of the individual are at the level of its genesis and, for this very reason, at the level of its relation with other beings, since, if the individual is the being that is always capable of continuing its genesis, this genetic dynamism resides in its relation to other beings. The ontogenetic operation of the crystal's individuation is accomplished on its surface. The interior layers represent a past activity, but the superficial layers are the deposits of this power of growing insofar as they are in relation with a structurable substance. The individual's limit is what is in the present; it is the limit that manifests the individual's dynamism and that makes this relation

exist between the structure and the hylomorphic situation. A being totally symmetrical in itself and symmetrical with respect to the beings that would limit it would be neutral and without properties. *Properties are not substantial but relational*; they only exist through the interruption of a becoming. Temporality, insofar as it expresses or constitutes the most perfect model of asymmetry (the present is not symmetrical with the past, because the flow of time is irreversible), is necessary to the individual's existence. Perhaps there is also a perfect reversibility between temporality and individuation, since time is always the time of a relation, which can only exist at the limit of an individual. According to this doctrine, it could be said that time is relation and that there is no veritable relation that is not asymmetrical. Physical time exists as a relation between an amorphous term and a structured term, the first being the carrier of potential energy and the second that of an asymmetrical structure. What also results from seeing things this way is that every structure is simultaneously structuring and structured; each structure can be grasped in its twofold aspect when it is manifested in the present of the relation between an amorphous potentialized state and a substance structured in the past. From that point, the relation between the future and the past would be the very thing that we witness between the amorphous milieu and the crystal; the present, the relation between the past and the future, is like the polarizing asymmetrical limit between the crystal and the amorphous milieu. This limit can neither be grasped as a potential nor as a structure; it is not interior to the crystal, but it no longer belongs to the amorphous milieu. However, in another sense, it is an integral part of both terms, since it is provided with all of their properties. The two preceding aspects (including the belonging and non-belonging of the limit to the limited terms), which are opposed like the thesis and the antithesis of a dialectical triad, would remain artificially distinguished and opposed without the characteristic of their constitutive principle: this dissymmetrical relation is indeed the principle of the genesis of the crystal, and the dissymmetry continues throughout the genesis; whence results the nature of the indefiniteness of the crystal's growth; *becoming is not opposed to being; it is the constitutive relation of being qua individual*. Consequently, we can say that the physicochemical individual constituted by a crystal is in becoming, qua individual. And it is indeed on this intermediate level (between the ensemble and the molecule) that the veritable physical individual exists. It can certainly be said in a derivative sense that a certain amount of sulfur is individualized by the fact that it is presented in a determined allotropic form. But this determined state of the overall ensemble does nothing but express on the macroscopic level the underlying and

most fundamental reality of existence in the mass of real individuals that have a community of origin. The individualized characteristic of the ensemble is merely the statistical expression of the existence of a certain number of real individuals. If an ensemble envelops many physical individuals from various origins and different structures, it is a mixture and remains poorly individualized. The veritable support of physical individuality is effectively the operation of elementary individuation, even if it only appears indirectly at the level of observation.

[The<sup>15</sup> quite remarkable meditation that Plato delivers in the *Parmenides* on the rapport of being and becoming, resuming or announcing the meditation of the *Philebus*, cannot lead to the discovery of a mixture of being and becoming; the dialectic remains antithetical, and the content of the τρίτον τι [trítion ti]<sup>16</sup> cannot seem to be anything but an unsatisfying postulation. This is because Plato cannot find in Greek science the notion of a suspended becoming that is asymmetrical and immutable. The alternative between static being and the inconsistent emanation of γένεσις [genesis] and φθορά [phthorá]<sup>17</sup> could not be avoided by the introduction of any mixture. Participation among ideas and even among the number-ideas, such as we find it in the *Eponymous* or as we reconstruct it based on books M and N of Aristotle's *Metaphysics* with the theory of the μέτριον [métrion],<sup>18</sup> still conserves the notion of the superiority of the one and the immobile over the multiple and the moving. Becoming remains conceived as movement, and movement remains conceived as imperfection. Nevertheless, through this infinite dawn that is Plato's thought in the decline of his life, we can sense the search for a real mixture of being and becoming, which is intuited rather than defined in the direction of ethics: *to be immortalized in the sensible*, and thus also in becoming. If the *Timaeus* were written at this moment, perhaps we would have had since the fourth century a doctrine of the mixture of being and becoming. After this effort remained fruitless, seemingly due to the esoteric nature of Plato's teaching, the philosophical meditation inspired by Plato with Speusippus and Xenocrates returns to the dualism founded by Parmenides, this father of the thought upon which Plato authorized himself to bear a sacrilegious hand in order to say in some way and in some relation that being is not and that non-being is. The accepted separation between physics and reflexive thought has become an avowed philosophical attitude starting with Socrates, who, disappointed by the physics of Anaxagoras, wanted to bring philosophy back "from the sky to the earth." Aristotle's work certainly marks a vast encyclopedic effort, and physics is reintroduced. But *this* physics, deprived

of mathematical formulation after the repudiation of archetype-structures and preoccupied with classification more than measures, is not what can provide paradigms for a reflection. The synthesis of being and becoming, failed at the level of inert being, could not be solidly carried out at the level of the living being, since it would have been necessary to know the genesis of the living being, which still to this day is an object of research. Furthermore, the Western philosophical tradition is almost entirely substantialistic. It has ignored the knowledge of the real individual because it could not grasp the latter in its genesis. Whether conceived as indivisible and eternal molecule or as richly organized living being, the individual was grasped as a given reality, useful for explaining the composition of beings or for discovering the finality of the cosmos, but not as a knowable reality itself.

We want to show through this work that the individual can now be an object of science and that the opposition declared by Socrates between physics and reflexive and normative thought must finally be done away with. This turning point implies that the relativity of scientific knowledge [*savoir*] is no longer conceived within an empiricist doctrine. And we should note that empiricism involves the theory of induction, for which the concrete is the sensible and the real is identical to the concrete. The theory of knowledge [*connaissance*] must be modified down to its roots, i.e. the theory of perception and sensation. Sensation must appear as the relation of a living individual with the milieu in which it is found. However, even if the content of this relation does not initially constitute a science, it already possesses a value insofar as it is relation. The fragility of sensation stems above all from that fact that it is asked to reveal substances, something it cannot do because of its fundamental function. If there is a certain number of discontinuities between sensation and science, this is not a discontinuity like the one that exists or is supposed to exist between genera and species but like the one that exists between different hierarchized metastable states. The presumption of empiricism, which is relative to the chosen point of departure, is only valid in a substantialistic doctrine. Since this epistemology of relation can only be expounded upon by supposing the individual being as defined, it was impossible for us to indicate it before utilizing it; this is why we began our study by way of a paradigm borrowed from physics: only later on did we *derive* the reflexive consequences resulting from this point of departure. This method can seem quite primitive: it is in fact similar to that of the Ionian “Physiologists”; but it is presented here as a postulate, for it seeks to found an epistemology that would be anterior to any logic.]

### 3. *Epistemological Consequences: Reality of Relation and the Notion of Substance*

What modification have we had to contribute to the conception of physical individuation by passing from the individuation of allotropic forms to the more fundamental individuation of the crystal with respect to the amorphous substance? The idea that individuation consists in an operation has remained unmodified, but we have been able to specify that the relation that this operation<sup>19</sup> establishes can sometimes be currently operative and sometimes in suspense, thereby assuming all the apparent characteristics of substantial stability. Here, relation is observable as an active limit, and its type of reality is that of a limit. In this sense, we can define the individual as a *limited* being, but only on condition of thereby understanding that a limited being is a polarizing being that possesses an indefinite dynamism of growth with respect to an amorphous milieu. The individual is not substance, for substance is not limited by anything other than itself (which is what leads Spinoza to conceive substance as infinite and unique). Every rigorous substantialism excludes the notion of the individual, as we can see in Descartes, who could not explain to Princess Elizabeth in what the union of the substances in Man consists, and even more so in Spinoza, who considers the individual as a semblance. The *finite* being is the exact contrary of the *limited* being, for *the finite being is self-limiting*, since it does not possess a sufficient quantity of being to grow endlessly; on the contrary, in this indefinite being that the individual is, the dynamism of growing does not stop, since the successive stages of growing are like a number of relays due to which increasingly large quantities of potential energy are captured in order to organize and incorporate increasingly considerable amounts of amorphous matter. Thus, relative to the initial germ, crystals visible to the naked eye are already considerable edifices: a cubic micrometer of diamond contains more than 177,000,000,000 atoms of carbon. It can therefore be thought that the crystalline germ has enlarged enormously when it attains the size of a crystal that is visible at the limit of the separative power of optical microscopes. But it is also known that it is possible to “nourish” an artificial crystal in a supersaturated solution quite carefully maintained in conditions of slow growth so as to obtain a crystalline individual weighing several kilograms. In this case, even if it were supposed that the crystalline germ is already an edifice of large dimensions relative to the atoms of which it is composed, we would find that a volume of a cubic decimeter has a mass one quadrillion times superior to that of a supposed crystalline germ at 1 cubic micrometer of volume. Crystals of an ordinary

size—which almost constitute the totality of the terrestrial surface, like those of quartz, feldspar, and mica, which make up the composition of granite—have a mass equal to several million times that of their germ. Thus, it is completely necessary to suppose the existence of a feedback mechanism that allows for the extremely small amount of energy contained in the germ's limit to structure a rather considerable mass of amorphous substance. In fact, the limit of the crystal is the germ during growth, and this limit is displaced to the degree that the crystal grows; it is composed of atoms that are always new, but it remains dynamically identical to itself and grows on the surface by conserving the same local characteristics of growth. This primordial role of the limit is particularly highlighted by phenomena such as figures of corrosion and especially of epitaxy, which constitute a remarkable counterproof. Figures of corrosion, which are obtained in the assault of a crystal by a reagent, manifest tiny depressions with regular contours that could be called negative crystals. However, these negative crystals have a different form depending on the facet of the crystal on which they appear; fluorine can be attacked by sulfuric acid; yet fluorine crystallizes in the form of cubes which, when struck, yield facets parallel to those of the regular octahedron. Through corrosion, quadrangular pyramids can be seen to appear on the facet of the cube, while little triangular pyramids appear on the facet of the octahedron. All the figures that appear on the same facet have the same orientation. Epitaxy is a phenomenon that occurs when a crystal is taken as the support of a substance during crystallization. Nascent crystals are oriented by the crystalline facet (of a different chemical substance) on which they are placed. The crystal's symmetry or dissymmetry appears in these two phenomena. Thus, when calcite and dolomite ( $\text{CO}_3\text{Ca}$  and  $(\text{CO}_3)_2\text{CaMg}$ ) are attacked by diluted nitric acid, calcite presents symmetrical figures of corrosion on a facet of cleavage, while dolomite presents dissymmetrical figures. These examples show that the characteristics of the limit of the physical individual can appear in each point of this individual, thereby again becoming a limit (for example, here, through cleavage). The individual can therefore play a role of information and end up, even locally, as an active singularity, capable of polarizing.

Nevertheless, we can wonder whether these properties (particularly the property of homogeneity, as we shall note) can still exist on the very small scale: is there an inferior limit of this crystalline individuation? In 1784, Haüy formulated the reticular theory of crystals, and this was confirmed in 1912 by Laue due to the discovery of the diffraction of X-rays by crystals, which behave as a network. Haüy studied calcite, which presents itself in extremely various forms; he discovered that all the crystals of calcite through

cleavage can yield the same rhombohedron, which is a parallelepiped whose six facets are equal diamond shapes and form together an angle of  $105^{\circ} 5'$ . Through the phenomenon of parting, we can make these rhombohedrons increasingly small and visible only through a microscope. But the form does not change. Häüy supposed a limit to these successive divisions, and he imagined the crystals of calcite as stacks of these elementary rhombohedrons. With Laue's method, it became possible to measure with X-rays the dimensions of this elementary rhombohedron, whose height is equal to  $3.029 \times 10^{-8}$  cm. Halite, which has three rectangular cleavages, consists of indivisible elementary cubes whose ultimate measure is  $5.628 \times 10^{-8}$  cm. We can therefore consider a halite crystal as constituted by material particles (molecules of sodium chloride) arranged in the nodes of a crystalline network constituted by three sets of reticular planes intersecting at a right angle. The elementary cube is called a crystalline lattice. Calcite will be constituted by three systems of reticular planes, which together form an angle of  $105^{\circ} 5'$  and are each separated by the constant interval of  $3.029 \times 10^{-8}$  cm. Each crystal can be considered as constituted by a network of parallelepipeds. This reticular structure not only accounts for the stratification parallel to the cleaves, but even more so for the various modes of stratification. Thus, in the cubic network, which explains the structure of halite, we can observe a stratification parallel to the diagonals of the cube. This stratification appears in zinc sulfide. The nodes of the cubic network can be arranged in reticular planes parallel to the facets of the regular octahedron: above we have seen the cleavage of fluorite, which corresponds to such a stratification. We ought to contemplate this notion of multiple stratification particularly, for it gives both an intelligible and a real content to the idea of limit. The limit is constitutive when it is no longer the material boundary of a being but is its structure, constituted by the ensemble of points, which are analogous to any other point of the crystalline milieu. The crystalline milieu is a periodic milieu. To know the crystalline milieu completely, all we need to know is the content of the crystalline elementary lattice, i.e. the position of the different atoms; by submitting the latter to translations according to the three axes of coordinates, we will find all the analogous points that correspond to them in the milieu. The crystalline milieu is a triply periodic milieu whose period is defined by the lattice parameters. According to Jean Wyart, "we can compose an image, at least in the plane, of the crystal's periodicity by comparing it to the indefinitely repeated *motif* of a wallpaper."<sup>20</sup> Wyart also adds: "We also find this motif in all the nodes of a network of parallelograms; just like the crystal's *elementary lattice*, the sides of the elementary parallelogram do not have any

existence.” Thus, the limit is not predetermined; it consists in structuration; the moment that an arbitrary point is chosen in this triply periodic milieu, both the elementary lattice and a set of spatial limits are determined. In fact, the shared source of the limit and the structuration is the milieu’s periodicity. Here, with a more rational content, we rediscover the already indicated notion of the indefinite possibility of growth; the crystal can grow while conserving all its characteristics because it possesses a periodic structure; the growth is therefore always identical to itself; a crystal has no center that allows us to measure the distance of one point of its exterior contour with respect to its center; relative to the crystal’s structure, its limit is no more distant from the center than the other points; the crystal’s limit is in virtually every point, and it can really appear in each point through a cleavage. The words interiority and exteriority cannot be applied with their usual meaning to this reality that the crystal is. On the contrary, let’s consider an amorphous substance: it must be bounded by a membrane, and its surface can have properties that belong exclusively to the surface. Thus, a drop of water produced by a water dropper takes on during its formation a certain number of successive aspects that can be studied by mechanics; these aspects depend on the diameter of the tube, the force of attraction due to gravity, and the superficial tension of the liquid; here, the phenomenon is extremely variable according to the order of magnitude adopted, since the envelope acts as an envelope and not as a limit. Furthermore, let us indeed remark that amorphous bodies can in certain cases take on regular forms, like that of mist formed by drops of water; but we cannot speak of the individuation of a water drop like we speak of the individuation of the crystal, because the former does not possess a periodic structure, at least not rigorously and in the totality of its mass. A drop of water with large dimensions is not exactly identical for all its properties to a drop of water with small dimensions.<sup>21</sup>

The individuation that we will characterize through the example of the crystal cannot exist without an elementary discontinuity on a more restricted scale; it takes an edifice of atoms to constitute a crystalline lattice, and this structuration would be very difficult to conceive without an elementary discontinuity. It’s true that when Descartes wanted to explain all physical effects through “figure and movement” he sought to found the existence of forms on something other than elementary discontinuity, which was inconceivable in a system where the absolute vacuum is excluded, insofar as extension is substantialized and becomes *res extensa*; thus, Descartes also considered crystals quite carefully, and he even attentively observed the genesis of artificial crystals in a supersaturated solution of sea salt by attempting to explain

it through figure and movement. But Descartes experiences great difficulty in discovering the foundation of structures; at the beginning of *Meteors*, he strives to show a genesis of spatial boundaries starting from the opposition of the direction of the rotation of two neighboring vortices; movement is what primordially individuates regions of space; in a mechanics without live forces, movement indeed can seem to be a purely geometrical determination. But movement by itself in a matter-space continuum cannot easily constitute an anisotropy of physical properties; that Descartes's attempt made to explain the magnetic field through figure and movement, starting from spirals generated by the poles of the magnet and pivoting around themselves, remains unfruitful: we can indeed use this hypothesis to explain how two poles of the same name repel one another, or how two poles of contrary names attract one another. But we cannot explain the coexistence of these two properties, because this coexistence requires an anisotropy, whereas Descartes's space-matter is isotropic. Substantialism can only explain phenomena of isotropy. Polarization, the most elementary condition of relation, remains incomprehensible in a rigorous substantialism. Thus, Descartes also strives to explain all the phenomena in which a field manifests vectorial magnitudes via the mechanism of subtle matter. He devoted a lot of attention to crystals because they presented him with a clear illustration of the reality of figures; they are substantialized geometrical forms; but, since his system excludes the vacuum, Descartes's system made it impossible to recognize what is fundamental in the crystalline state, namely the genetic individuation of periodic (and therefore discontinuous) structure, which is opposed to the continuous or to the disorder of the amorphous state.

However, to be fully rigorous, we should not claim that if the crystalline state is discontinuous, then the amorphous state is continuous; in fact, the same substance can present itself in the amorphous state or in the crystalline state without a modification of its elementary particles. But, even if it is composed of discontinuous elements like molecules, a substance can behave as continuous from the moment that enough elementary particles are implicated in the production of the phenomenon. Indeed, a multitude of disorganized actions, i.e. those that obey neither a polarization nor a periodic distribution in time, have average sums that are distributed in an isotropic field. These include, for example, the pressures in a compressed gas. The example of Brownian motion, which sheds light on the thermal agitation of large molecules, also illustrates this condition of isotropic milieu; if, in order to observe this movement, we consider increasingly large visible particles, the movements of these particles end up becoming imperceptible; this is

because the instantaneous sum of the energies received on each facet of the portion of molecules in a state of agitation is increasingly low with respect to the mass of the observable particle; the more voluminous the particle, the more elevated the number of collisions on each facet per unit of time; since the distribution of these collisions occurs at random, the forces per unit of surface are more constant in time as the surfaces considered are increasingly large, and an observable particle that is voluminous enough remains practically at rest. For sufficient durations and orders of dimensions, the disorganized discontinuous is equivalent to the continuous; it is functionally continuous. The discontinuous can therefore manifest sometimes as continuous and sometimes as discontinuous according to whether it is organized or disorganized. But the continuous cannot functionally present itself as discontinuous, since it is isotropic.

Continuing down this path, we shall find that the aspect of continuity can present itself as a particular case of discontinuous reality, whereas the reciprocal of this proposition is not true. The discontinuous is first with respect to the continuous. This is why the study of individuation, which grasps the discontinuous qua discontinuous, has a very profound ontological and epistemological value: it invites us to ask how ontogenesis is accomplished based on a system bearing energetic potentials and structural germs; there is individuation not of a *substance* but of a system, and this individuation is what generates what we call substance starting from an initial singularity.

Nevertheless, to arrive at an ontological primacy of the individual from these remarks would be to lose sight of the full nature of the fruitfulness of relation. The physical individual that is the crystal is a periodic-structured being that results from a genesis in which a structural condition and a hylo-morphic condition containing matter and energy encounter one another in a relation of compatibility. However, in order for the possibility of energy to be captured by a structure, it would have to be given in a potential form, i.e. distributed in an initially *non-polarized* milieu behaving as a continuum. The genesis of the individual requires the discontinuous of the structural germ and the functional continuum of the preliminary amorphous milieu. A potential energy, which is measurable by a scalar magnitude, can be captured by a structure, a bundle of polarities that can be represented vectorially. The genesis of the individual is effectuated by the relation of these vectoral magnitudes and these scalar magnitudes. It is therefore unnecessary to replace substantialism with a monism of the constituted individual. A monadological pluralism would still be a substantialism. However, every substantialism is a monism, whether unified or diversified, in the sense that it merely retains

one of the two aspects of being: terms without operative relation. The physical individual integrates in its genesis the mutual operation of the continuous and the discontinuous, and its existence is the becoming of this ongoing genesis, prolonged in activity, or in waiting.

This supposes that individuation exists on an intermediate level between the order of magnitude of the particulate elements and that of the molar ensemble of the complete system; on this intermediate level, individuation is an operation of amplifying structuration that makes the active properties of initially microphysical discontinuity pass to the macrophysical level; individuation is initiated on the level at which the discontinuous of the singular molecule is capable (in a milieu in a “hylomorphic situation” of metastability) of modulating an energy whose support is already a part of the continuum in the population of randomly arranged molecules, i.e. in a superior order of magnitude relative to the molar system. The polarizing singularity initiates in the amorphous milieu a cumulative structuration that spans the initially separated orders of magnitude: the singularity, or information, is that in which there is communication between orders of magnitude; as the initiator of the individual, it is conserved in the latter.

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## Form and Substance<sup>1</sup>

### I. CONTINUOUS AND DISCONTINUOUS

#### 1. *Functional Role of Discontinuity*

The Socratic injunction whereby reflexive thought was asked to return to heed the call of ethics instead of physics has not been accepted in all philosophical traditions. According to Plato's expression, the "sons of the Earth" have remained stubborn in their search through the knowledge of physical nature to find the unique solid principles for individual ethics. Leucippus and Democritus had already shown the way. Epicurus establishes his moral doctrine on the basis of a physics, and this same approach can already be seen at work in Lucretius's magnificent didactic and epic poem. But it is worth noting that one of the primary characteristics in the relation between philosophy and physics for the Ancients is that the ethical conclusion is already presupposed in the physical principle. Physics is already ethics. The atomists necessarily define their ethics within their physics when they turn the atom into a substantial and limited being that passes through different combinations without changing. The composite has a level of reality inferior to the simple, and this composite that man is will be wise if he knows and accepts his own temporal, spatial, and energetic limitation. It has been said that the atomists minted Eleatic being: and in fact, as Parmenides reveals in his poem, which is a narrative of its initiation into Being, the rounded and coined Σφαῖρος [Sphairos],<sup>2</sup> happy in its circular plenitude, fragments *ad infinitum* into the atoms: but it is always immutable matter, whether one or multiple, that confines being. The relation between the atoms of being, made possible due to the introduction of the void, which is substituted for the negativity of Parmenidean becoming, has no veritable interiority. Lawlessly emerging from countless dice throws, relation conserves throughout its existence the

essential precariousness of its constitutive conditions. For the atomists, relation depends on being, and nothing substantially grounds it in being. Emerging from a “clinamen” without finality, relation remains pure accident, and only the infinite number of encounters in the infinity of elapsed time has been able to lead to many viable forms. Consequently, there is no case in which the human composite can attain substantiality; but he can avoid relations, which, due to their groundlessness, are necessarily destructive and snatch for him the little time he has to exist by bringing him to think on death, which has no substantial reality. The state of *ataraxia* is a state in which the human composite concentrates on himself as much as possible and leads him to the closest state of substantiality that he can possibly attain. The “*templa serena philosophiae*”<sup>3</sup> make it possible to construct not a veritable individuality, but the state of the composite conceivably closest to the simple.

There is a symmetrical postulate in Stoic doctrine. There, man is no longer a true individual. The only true individual is unique and universal: it is the cosmos. Only the cosmos is substantial, one, perfectly bound by the internal tension of the πῦρ τεχνικὸν ὃ διέχει πάντα [pur technikòn ho diéχει pánta].<sup>4</sup> This creative fire (also called “seminal fire,” πῦρ σπερματικόν [pur spermatikón]) is the principle of the immense pulsation that animates the world. Man, an organ of this great body, can only find a truly individual life in harmony with the rhythm of the whole. This harmony, which is conceived as the resonance that harp makers create through the equality of tension of two chords of equal weight and length, is a participation of the activity of the part in the activity of the whole. Although rejected by the atomists, finality plays an essential role in the system of the Stoics. This is because relation is essential for the Stoics, since it elevates the part that is man all the way up to the whole that is the cosmos-individual; conversely, for the atomists, relation can only distance man from the individual (i.e. the element) by engaging him in a participation that is in fact disproportionate with the individual’s dimensions.

In this sense, the ethical intention needed to turn to physics in two opposite directions. For the atomists, the veritable individual is infinitely below man’s order of magnitude; for the Stoics, it is infinitely above. The individual is not sought in the order of magnitude of the human being but at the extremities of the scale of conceivable magnitudes. In both cases the physical individual is sought with a rigor and a force that indicate how much man feels his life engaged in this search. And it is perhaps this very intention that led the Epicureans and the Stoics to not want to take up a common and everyday being as the model for the individual. The atom and the cosmos

are absolute in their consistency because they are the extreme limits of what man can conceive. The atom is absolute as non-relative to the degree attained by the process of division; the cosmos is absolute as non-relative to the process of addition and the search for definition through inclusion, since it is the term that includes all others. The only difference, which is quite important due to its consequences, is that the absolute of the whole envelops relation, whereas the absolute of the indivisible excludes it.

Perhaps we need to see in this search for an absolute individual outside the human order a desire to seek that does not submit to the prejudices that arise with the integration of man into the social group; the walled city is repudiated in these two discoveries of the absolute physical individual: through a self-folding in Epicureanism, through surpassing and universalization in the Stoicism of cosmic citizenship. This is precisely why neither of the two doctrines manages to think relation in its general form. The relation between atoms is precarious and amounts to the instability of the composite; the relation of part to whole absorbs the part in the whole. Thus, the relation of man to man is approximately similar in the two doctrines; the Stoic sage remains αὐτάρκης καὶ ἀπαθής [autárkes kai apathés].<sup>5</sup> He considers his relations with others as part of the τὰ οὐκ ἐφ' ἡμῖν [tà ouk eph hemin].<sup>6</sup> The *Enchiridion* of Epictetus compares familial relations to the occasional gathering of a hyacinth bulb that a mariner encounters while taking a short stroll on an island; if the boatswain shouts that it is time to leave, there is no longer a moment to be delayed by this gathering; the mariner would risk being pitilessly abandoned on the island, for the captain does not wait. Book IV of Lucretius's *On the Nature of Things* similarly treats the human passions based on yearnings, and it partially reduces their meaning to a rapport of possession. In Epicureanism, the only veritable relation is that of man with himself, and in Stoicism, the only veritable relation is that of man with the cosmos.

Thus, the search for the fundamental physical individual remained fruitless in the Ancients because it was too often diverted for ethical motives toward the discovery of a substantial absolute. In this sense, the moral thought of Christianity no doubt has indirectly and sufficiently provided a service for the research of the individual in physics; by having given a non-physical foundation to ethics, it has unleashed the research of the individual in physics from its moral principle, thereby liberating it.

Since the end of the eighteenth century, a functional role has been given to a discontinuity of matter: Haüy's hypothesis on the reticular constitution of crystals is an example of this. Furthermore, in chemistry the molecule becomes the center of relations and no longer merely a depository of materiality. The

nineteenth century did not invent the elementary particle, but it continued to enrich it with relations to the extent that it robbed the particle of substance. This path has led to the consideration of the particle as bound to a field. The final step of this research was accomplished when it was possible to measure, in terms of the variation of energetic levels, a change of the structure of the edifice constituted by particles in mutual relation. The variation of mass linked to a liberation or an absorption of energy, and thus to a change of structure, profoundly solidifies what relation is as equivalent to being. Such an exchange, which allows to state the rapport that measures the equivalence of a quantity of matter and a quantity of energy and thus the equivalence of a change in structure, demolishes any doctrine that connects the modifications of substance back to substance as pure contingent accidents, without which substance remains unmodified. In the physical individual, substance and modes are on the same level of being. Substance consists in the stability of the modes, and the modes consist in the changes in level of the energy of substance.

Relation was raised to the status of being the moment the notion of discontinuous quantity was associated with the notion of the particle; a discontinuity of matter that would merely consist in a granular structure would still fail to deal with the majority of problems raised by the conception of the physical individual in Antiquity.

The notion of discontinuity must become essential to the representation of phenomena in order for a theory of relation to be possible: it must not only apply to masses but also to charges, to the positions of stability particles can occupy, and to the quantities of energy absorbed or expended in a change of structure. The quantum of action is the correlative of a structure that changes through abrupt leaps without intermediary states.

## *2. The Antinomy of the Continuous and the Discontinuous*

It could nevertheless be objected that the advent of a quantum physics would be unable to nullify the need to maintain a wave associated with each corpuscle, which is only understood in a hypothesis of the continuity of propagation and in a hypothesis of the continuity of the energy exchanges implicated in the phenomenon. It seems that the photoelectric effect alone summarizes this antinomy of the necessity of discontinuous quantities and the equal necessity of a continuous distribution of energy: there is a threshold for the frequency of "photons," as if each photon had to convey a quantity of energy at least equal to the energy of the escape of an electron from metal. But, moreover, there is no threshold for intensity, as if each photon could be considered as

a wave covering a surface of indeterminate dimension and could nevertheless put all its energy into a perfectly localized point.

Perhaps this antinomy would appear less accentuated if the results from the previous analyses could be retained in order to apply them to this even more general case. Here, unlike the case of the crystal, we no longer have the distinction between a discontinuous, structured, periodic region and an amorphous continuous region that is the support of scalar magnitudes. But, synthesized in the same being and carried by the same support, we still have a structured parameter and an amorphous parameter that is pure potential. The discontinuous is in the mode of relation, which is effectuated by abrupt leaps, like the leap between a periodic milieu and an amorphous milieu or between two milieus with a periodic structure; here, the structure is the simplest, that of the particle's unicity. A particle is a particle not insofar as it occupies a certain place spatially, but insofar as it only exchanges its energy with other supports of energy in a quantum manner. Discontinuity is a modality of *relation*. Here, it is possible to grasp what is called the "two complementary representations of the real," and these representations are perhaps not merely complementary but really one. This necessity of unifying two complementary notions perhaps stems from the fact that these two aspects of individuated being have been separated by substantialism, and because we have to make an intellectual effort to unify them due to a certain imaginative habit. For a particle, what is the associated field that we must join with it in order to account for phenomena? For the particle, it is the possibility of being in a structural and energetic relation with other particles, even if these particles behave as a continuum. When a plate of alkaline metal is illuminated by a beam of light, there is a relation between the free electrons contained in the metal and the luminous energy; here, the free electrons behave as equivalent beings to the continuum insofar as they are distributed at random in the plate, as long as they do not receive enough energy to be able to escape from the plate; this energy corresponds to the potential of escape and varies with the chemical composition of the metal utilized. Here, electrons intervene as supports of a continuous scalar magnitude and do not correspond to a polarized field. They are like the molecules of an amorphous body in a state of thermal agitation. Supposing that they were localizable, their place would not have any importance. The same thing applies for the particles of the light source: their position at the instant when the luminous energy has been emitted does not matter. Photoelectric effects can be produced by the light of a star that no longer exists. On the contrary, electrons behave as structured beings insofar as they are susceptible to escape from

the plate. A quantity of energy that is measurable by a certain number of quanta corresponds to this change in their relation with the other particles that constitute the metallic milieu. Similarly, the state changes of each particle that constitutes the source of light intervene in the relation by means of the photon's frequency. The individuality of the structural changes that have taken place in the source is conserved as the energy of the "photon," i.e. as the capacity of luminous energy to carry out a structural change requiring a determinate quantity of energy in a precise point. It is indeed known that the threshold of the frequency of the photoelectric effect corresponds to the necessity for each electron to receive a quantity of energy at least equal to its energy of escape. We are led to posit the notion of "photon" to explain not only this rule of the threshold of frequency, but also the very important fact of the distribution or rather the availability of luminous energy in each of the points of the illuminated plate: there is no threshold of intensity; however, if the electron behaves as a particle in the sense that each electron requires the supply of a determinate quantity of energy to escape from the plate, it could be thought that it will behave as a particle also in the sense that it will receive a quantity of luminous energy proportionate to the opening of the angle under which it is seen from the light source (according to Gauss's law). This is however what the experiment contradicts; when the quantity of light received by the plate on each unit of surface decreases, there should come a moment when the quantity of light would be too small for each electron to receive a quantity of light equivalent to its escape energy. Yet this moment never arrives; only the number of electrons extracted per unit of time diminishes proportionate to the quantity of light. All the energy received by the alkaline metal plate acts on this particle that is 50,000 times smaller than the hydrogen atom. This is why we are led to consider that all the energy conveyed by the light wave is concentrated in one point, as if there were a corpuscle of light.

### 3. *The Analogical Method*

However, should the value of reality be granted to the notion of the photon? It is no doubt fully valid in a *physics of the as if*, but we should ask if it constitutes a real physical individual. It is required by the manner in which the relation between electrons and luminous energy is effectuated, i.e. ultimately between the state changes of the particles of the light source and the state changes of the particles of the alkaline metal. In fact, perhaps it is risky to consider luminous energy without considering the source from which it originates. Conversely, if we merely want to describe the relation between

the light source and the free electrons of the alkaline metal, we will see that it is not absolutely necessary to involve individuals of light and that it is even less necessary to resort to a “probability wave” to account for the distribution of the luminous energy conveyed by these photons onto the surface of the metal plate. It even seems that the hypothesis of the photon is difficult to conserve in cases where an extremely small quantity of light arrives on a large enough surface of alkaline metal. The escape of electrons is then sensibly discontinuous, which can be translated into a “background noise” or shot noise characterized when the currents produced in a circuit by electrons escaping from the metal are amplified and transformed into sound waves as they are collected on an anode due to the difference of potential created between this anode and the plate of photo-emitting metal, which becomes a cathode. If the intensity of the luminous flux is reduced further while the surface of the alkaline metal plate is increased, the number of electrons escaping per unit of time remains constant when the two variations are compensated, i.e. when the product of the surface illuminated by the intensity of light remains constant. However, the probability of an encounter between a photon and a free electron diminishes when the surface of the plate increases and the intensity of the light decreases. Indeed, by acknowledging that the number of free electrons per unit of surface remains constant for every surface, we find that the number of photons diminishes when the surface increases and when the total quantity of light received per unit of time on the whole surface remains constant. We are therefore led to consider the photon as being able to be present everywhere at each instant on the surface of the alkaline metal plate, since the effect only depends on the number of photons received per unit of time and not on the concentration or diffusion of light on a larger or smaller surface. The photon encounters an electron *as if* it had a surface of several square centimeters but exchanges energy with the electron *as if* it were a corpuscle on the electron's order of magnitude, i.e. 50,000 times smaller than the hydrogen atom. And the photon can do all of this while remaining capable of appearing in another effect happening at the same time and under the same conditions as linked to a transmission of energy in a wave form: some bands of interference on the cathode of the photoelectric cell can be obtained without disrupting the photoelectric phenomenon. It would then perhaps be preferable to account for the contradictory aspects of the photoelectric effect through another method. Indeed, if the phenomenon is considered from the aspect of temporal discontinuity that it presents when the quantity of energy received per unit of surface is extremely low, we will observe that the escape of electrons occurs when the

illumination of the photo-emitting plate has lasted a certain length of time: everything happens here as if a certain amount of luminous energy were summed in the plate. Consequently, it could be supposed that luminous energy transforms in the plate into a potential energy that makes possible the modification of the state of relation of an electron with the particles that constitute the metal. This would make it possible to understand that the place of free electrons does not intervene in the determination of the phenomenon, no more so than the density of "photons" per unit of surface of the metallic plate. We will then be referred back to the case of the relation between a structure and an amorphous substance, which manifests as a continuum even if it is not continuous in its composition. Here, the electrons manifest as a continuous substance because they submit to a distribution that conforms with the law of large numbers in the metal plate. This ensemble constituted by the electrons and the metallic plate in which they are randomly distributed can be structured by the addition of a sufficient quantity of energy that will allow the electrons to escape from the plate. The disorganized ensemble will have been organized. Nevertheless, this hastily presented thesis should be critiqued. There are in fact other ways of increasing the metallic plate's potential energy, for example by heating it; then, starting at temperatures between 700°C and 1250°C, we witness a phenomenon called the thermionic effect taking place, and it is more appropriate to call it the thermoelectric effect: electrons spontaneously escape from a piece of heated metal. When this metal is covered with crystallized oxides, the phenomenon takes place at a lower temperature. Here, the change in distribution occurs without the intervention of any condition besides the elevation of temperature, at least in appearance. However, the energetic condition, namely the temperature of the metal that constitutes a "hot cathode," is not fully sufficient by itself; the structure of the metal surface is also involved: in this sense, we presume that a cathode can be "activated" by the addition of metal traces, for example those of strontium or barium; thus, even in the thermoelectric effect, there are structural conditions for the emission of electrons. However, as in the case of an amorphous substance that passes to the crystalline state through the spontaneous (and even today unexplained) appearance of crystalline germs in its mass, the structural conditions of the thermoelectric effect are always present in ordinary conditions when these conditions are energetic. They are present at least on a large scale for a "hot cathode" with enough emitting surface; but they are present in a much more discontinuous manner on a small scale. If, by means of a focusing apparatus (an electrostatic or electromagnetic lens), we project onto a fluorescent screen electrons emitted at the

same instant by the different points of a hot cathode so as to obtain an enlarged optical image of the cathode, what we will see is that the emission of electrons by each point is extremely variable according to the successive instants. The emission takes shape like successive craters of intense activity, and these craters are highly unstable: if an anode is set up in proximity to the cathode in an empty enclosure, with enough difference of potential to collect all the emitted electrons (saturation current) between the anode and cathode, the total current gathered shows fluctuations that arise from these intense local variations of the intensity of the thermoelectric phenomenon. The larger the cathode's surface, the weaker these local variations are with respect to the total intensity; this phenomenon is perceptible in an electronic tube with a very small cathode. It has been sufficiently studied recently under the name of scintillation or "flicker." However, all the points of a cathode are under the same thermal energetic conditions in approximation with very small differences as a result of the metals' elevated thermal conductivity. Even if we supposed slight differences of temperature between the different points of the surface of a cathode, we could not thereby explain the abrupt and important changes of intensity of the emission of electrons between two neighboring points. This is why the thermoelectric effect depends at least on another condition besides the energetic condition, which is always present. The bright and fleeting craters observed in the electrical optic apparatus described above correspond to the appearance or disappearance of this condition of activity on the cathode's surface in a certain determinate point. The study of this phenomenon is not sufficiently advanced for us to specify the nature of these *germs of activity*. But it is important to note that they are functionally comparable to the crystalline germs that appear in a supersaturated amorphous solution. The nature of these germs is still mysterious; but their existence is certain. Nevertheless, we should ask if, in the photoelectric effect, light merely acts by increasing the energy of the electrons. It is interesting to note that electrons escape perpendicularly to the surface of the alkaline metal plate. It is rather regrettable that the elevated temperatures necessary to obtain the thermoelectric effect are not compatible with the conservation of zinc, cesium, or cadmium cathodes; for temperatures barely lower than those in which the thermoelectric effect begins to manifest, we could attempt to see if the minimum frequency of light producing the photoelectric effect would be lowered, which would show that the escape energy had lessened. If this were the case, it could be concluded from this that there are two terms in the electron's escape energy: a structural term and in fact a term representing a potential. However, even in the absence of more precise experiments,

it is possible to glean from this example a certain number of provisional conclusions relative to the study of physical individuation. Indeed, we see a very remarkable type of relation in the photoelectric effect: from an energetic point of view, all the free electrons that are in the illuminated metal plate are *like a single substance*. Otherwise, we would be unable to understand how there could be an effect of the accumulation of luminous energy arriving on the plate up to the quantity of energy necessary for the escape of an electron to be received. There are cases where the phenomenon cannot be considered as instantaneous; thus, in this case the luminous energy must have been stored in reserve beforehand; on the other hand, this energy supposes a communication between all the free electrons, for it can be conceived with great difficulty that the energy has been supplied by a photon that would have taken longer to act on the electron than the speed of light would allow us to calculate. If the relation between light and an electron occurs more slowly than the speed of light allows, this is because there is no direct relation between light and the electron but a relation through the intermediary of a third term. If the interaction between the “photon” and light is direct, it must be short enough for the photon, between the beginning and the end of the interaction, to still be practically in the same place. Here, for the displacement of the photon, we are limited to rehashing the reasoning that has led to the adoption of the idea that the photon can manifest in any illuminated point. But if it is acknowledged that the photon can manifest its presence everywhere at the same instant on a plane perpendicular to the direction of displacement, it cannot be acknowledged that the photon can stay in the same place during the entire duration of a transformation. If, for example, a transformation lasts 1/100,000th of a second, the photon would have had enough time to travel 3,000 meters between the beginning and the end of this transformation. This difficulty is avoided if we suppose that, between the light and the electron, energy is summated in the milieu in which the electrons are. This summation could occur, for example, as an increase in the amplitude of an oscillation or in the frequency of a rotation. In the latter case, for example, the frequency of light would intervene directly as a frequency and not as a scalar quantity. If a direct role of frequency is admitted, we no longer have to represent a photon whose energy would be represented by the measure of a frequency: frequency is the structural condition without which the phenomenon of structuration cannot take place. But the energy intervenes as a scalar quantity in the number of electrons extracted per unit of time. According to this representation, it would be necessary to consider an electromagnetic field as possessing a structural element and a purely energetic element: frequency represents this

structural element, while the intensity of the field represents its energetic element. We are saying that frequency *represents* the structural element, but not that it constitutes the latter, for in other circumstances this element will intervene as a wavelength during a propagation in a determined milieu or in a vacuum. A diffraction by the crystalline network involves this structure as a wavelength relative to the geometrical length of the crystalline lattice.

The interest in a representation of structure linked to frequency is not merely that of a greater realism but also that of a much broader universality that avoids creating arbitrary categories of electromagnetic fields (something that seemingly ends in quite a paralyzing substantialism). The continuity between the different manifestations of electromagnetic fields of varied frequencies is established not just in theory but also by scientific and technical experimentation. If, as Louis de Broglie does in *Ondes, Corpuscules, Mécanique ondulatoire* in figure I (between pages 16 and 17), we inscribe via a logarithmic scale of frequencies the different discoveries and experiments that have made the measurement of an electromagnetic frequency possible, we see that there is a fully established continuity between the six domains initially considered to be distinct: Hertzian waves, infrared, the visible spectrum, ultraviolet, X-rays, and gamma rays. As technicians were going lower in frequency with the domain of waves theoretically discovered by Maxwell and effectively produced by Hertz in 1886 with a decimetric oscillator, Righi, an Italian physicist from Bologna, establishes the existence of waves measuring 2.5 cm. In a work published in 1897, he showed that these waves are intermediary between visible light and Hertzian waves; they possess all the characteristics of visible light. The title of this work, *Optique des oscillations électriques*, is quite important, for it shows an attempt to unify two domains that were at that time experimentally separate, although they had been conceptually joined together in Maxwell's remarkable electromagnetic theory of light: optics and electricity. Following the path opened up by Righi, Bose and Lebedev endeavored, with the aid of the apparatus Bose constructed in 1897, to repeat Hertz's experiments on the refraction, diffraction, and polarization of electromagnetic waves; these two researchers manage to produce electromagnetic waves 6 millimeters long. In 1923, Nickols manages to produce waves 0.29 millimeters long. One year later, Glagoleva-Arkadeva attains 0.124 millimeters. And yet, through optical methods, Rubens and Bayer in 1913 had already been able to isolate and measure a radiation of 0.343-millimeter wavelengths in infrared radiations. Surpassing the simple analogy of the properties of propagation, the two forms of energy previously isolated as two *genera* or at least two *species* would partially overlap in extension (from 0.343

to 0.124 millimeters of wavelength) and would be identical in comprehension, as much for the genesis as for the study of “properties,” thus showing the fragility of the thought that proceeds via common genus and specific difference. Common genus and specific differences here are on the same level of being: they both consist as frequencies. Extension and comprehension also overlap, for the statement of the limits of extension utilizes the same characteristics as definition through comprehension. The intellectual course that the progressive discovery of the continuity between Hertzian waves and the visible spectrum manifests is neither inductive nor deductive: it is *transductive*; indeed, visible light and Hertzian waves are not two species of a common genus that would be a genus of *electromagnetic waves*. No specific difference can be indicated to allow us to pass from the definition of electromagnetic waves to that of Hertzian waves or visible light; there is nothing additional in the definition of Hertzian waves or of light than in that of electromagnetic waves. Extension and comprehension do not vary in the inverse direction, as in induction. Furthermore, it can no longer be said that this thought proceeds like deduction through a “transfer of evidence”: the properties of luminous electromagnetic radiations are not deduced from the properties of Hertzian electromagnetic waves. They are constituted based on the very measure that allows for both a distinction and a continuity to be established: that of frequency. It’s because their only distinction is between the frequency and its inverse wavelength that these two physical realities are neither *identical* nor *heterogeneous* but *contiguous*: this method of *transduction* allows for the establishment of a *topology* of physical beings that neither studies genera nor species. The criterion that allows us to establish limits for each domain also allows us to define in inductive language what the sub-species would become without the addition of any *new* distinctive characteristics and simply through a specification given to the universal nature of comprehension; thus, in the previous example, if we want to account for the differences that exist between centimetric electromagnetic waves and decametric electromagnetic waves, we will have to resort to this characteristic that will also allow us to say why the separative power of an optical microscope is greater in violet light than in red light: it will be revealed that the reflection, refraction, and diffraction of an electromagnetic wave depends on the rapport between the order of magnitude of the wavelength and that of the elements of the matter constituting the mirror, diopter, or network. If we take the example of reflection, for instance, the condition for this phenomenon to occur is that the mirror irregularities must be smaller compared to the wavelength of the electromagnetic

emission to be reflected. The “optical luster” of silver or mercury is necessary for reflecting the violet light of short wavelengths. On the other hand, red light is already suitably reflected by a less highly polished metallic surface; infrared radiations can be reflected by a plate of lightly oxidized copper; centimetric radar waves reflect off a non-polished metallic surface. Decimetric radar waves reflect off a finely netted metallic lattice. Metric waves reflect off a trellis of metallic bars. A trellis with broad links made of cables suspended from pylons, or even a row of pylons, suffices for the reflection of decametric or hectometric waves. Similarly, it takes the minuscule structure of a crystalline network to diffract X-rays, whereas a network made of lines delicately hand carved on a plate of metal is enough to guarantee the diffraction of visible light. The metric waves of television diffract off the crenelated peaks of the Sierra Mountains, which is a natural network of very large cells. More complex properties, like the rapport between the quantity of energy reflected and the quantity of energy refracted for each wavelength that encounters a semi-conductive obstacle, like the complexly structured Kennelly-Heaviside layer, can be interpreted using a similar method that is neither inductive nor deductive. The word analogy seems to have taken on a pejorative meaning in epistemological thought. However, veritable analogical reasoning should not be confused with the completely sophisticated method that consists in inferring identity from the properties of two beings that have any characteristic in common whatsoever. The veritable analogical method is rational to the extent that the method of *resemblance* can be confused and untrustworthy. According to the definition of Bruno de Solages, veritable analogy is an identity of rapports and not a rapport of identity. The transductive progress of thought effectively consists in establishing the identities of rapports. These identities of rapports strictly are not at all based on resemblances but are instead based on differences, and their goal is to explain the latter: they tend toward logical differentiation and do not at all tend toward assimilation or identification; thus, the properties of light seem quite different from those of Hertzian waves, even in a limited and specific case like that of reflection on a mirror; a trellis does not reflect light and reflects Hertzian waves, whereas a small, perfectly polished mirror reflects light and almost does not reflect a metric or decametric Hertzian wave at all, and certainly not a hectometric wave. To account for these resemblances or differences is to resort to the existing identity of rapports between all the phenomena of reflection; the quantity of energy is large when an obstacle, constituted by a substance whose singularities are small with respect to the wavelength of electromagnetic

energy, is interposed into the trajectory of the electromagnetic wave. There is identity of rapport between, on the one hand, the light wavelength and the dimension of irregularities of the mirror surface and, on the other hand, the Hertzian wavelength and the length of the elementary lattice of the trellis off which it reflects. The transductive method is therefore the application of veritable analogical reasoning; it excludes the notions of genus and species. Conversely, an illegitimate use of reasoning through resemblances is noticeable in the attempts to *assimilate* the propagation of light to that of sound based on several resemblances, like their reflection on the same mirrors (a watch is placed in the middle of a parabolic mirror; a second, similar mirror would allow us to obtain an auditory “image” of the watch in the middle of the second mirror). It took Fresnel’s strength of mind to stop this improper identification by demonstrating that there is a stark difference between the propagation of sound and the propagation of light: light’s elongations are always transversal, whereas those of sound propagating in a gas are always longitudinal; the differences between sound and light in phenomena of polarization were misunderstood due to an identification founded on the most external but also most striking resemblances. This facility that brings us to reason through identification according to resemblances stems from substantialistic habits that lead us to discover not yet known common genera through a random transference of properties. Thus, the notion of ether, which was invented to further perfect the resemblance between the propagation of sound and that of electromagnetic waves, survived well after the experiment of Michelson and Morley and the quite illogical synthesis of the physical properties it conveyed. It was preferable to suppose the existence of a weightless fluid without viscosity with even more elasticity than steel to be able to conserve the identity of light and sound. Scientific thought is not a pure induction achieved by a classification founded on differences; but it is also not an identification at all costs; it is instead the *distribution* of the real according to a measure, a mutual criterion of extension and comprehension.

It would be easy to complete this analysis by showing how the same application of transductive reasoning allowed us to unify the entire domain of electromagnetic radiations by establishing experimental continuities between the other domains following a complete concatenation. Schumann, Lyman, and then Millikan established the continuity between the visible spectrum and X-rays (from 0.4 to 0.0438 thousandths of a millimeter, or from 4,000 to 438 angstroms). In this manner, we began to understand the intermediate X-rays, since they are too long to be diffracted by natural networks like

crystals, whose elementary lattice normally measures only several angstroms. And finally, the domains of X-rays and gamma rays were found in a state of continuity and a quite important overlap, since polonium gamma rays have a wavelength of 2.5 angstroms, which identifies them with ordinary weak X-rays. They constitute the same physical reality, and, if a particular name is kept for them, this is only to relay their mode of production. But they could just as correctly be called X-rays. The general chart of electromagnetic radiations, such as the one created by Louis de Broglie, extends from  $10^{-3}$  angstroms to  $3 \times 10^{14}$  angstroms, i.e. from  $10^{-10}$  millimeters to around 30,000 meters. Without any solution of continuity, it is possible to pass from the most penetrating gamma rays to the longest waves of wireless telegraphy. The knowledge of the unity and diversity of this phenomenon, which is thoroughly spread out on a numerical scale, is one of the most noteworthy successes of this transductive method, which is the foundation for progress in physics. Moreover, this immense monument of logic is also strictly coincident with the real, including in the most refined techniques: MIT's electromagnetic thermometer, which receives, like a radioelectric receiver of extremely short waves, electromagnetic perturbations emitted by the stars, has made it possible to measure the temperatures of the Sun ( $10,000^{\circ}\text{K}$ ), of the moon ( $292^{\circ}\text{K}$ ) and of outer space (less than  $10^{\circ}\text{K}$ ). The radioelectric theodolite allows us to map out the position of the Sun under cloudy conditions. Radar, which is ten to twenty times more sensitive than the eye, can detect the passage of invisible meteorites with the instruments of optics.

Nevertheless, we should ask if this intellectual edifice, as a condition of stability, does not require an absolute transductivity of all properties and all terms. Without this perfect coherence, the notion of genus would reappear in all its latent obscurity. A notion cannot be created to account for one phenomenon, for example, relative to a determined frequency, and then abandoned for other frequencies. Within a domain of transductivity, there must be a continuity between all properties with variations relative only to the variation of the physical parameters that make the organization of transductivity possible. In the case of the domain of electromagnetic radiations, the reality of the photon cannot be accepted for a determined band of frequency and then abandoned for other frequencies. However, the notion of the photon, this quantum of energy that propagates at the speed of light, is remarkably useful when the photoelectric effect must be interpreted. But it is no longer as interesting when it is a question of infrared or Hertzian waves. It should nevertheless be usable in this domain of large wavelengths.

## II. PARTICLE AND ENERGY

### 1. *Substantialism and Energeticism*

This impossibility of directly and exclusively positing the corpuscular nature of light was admirably posited by Louis de Broglie in the theory of wave mechanics, a theory which was eventually completed by Bohr with the notion of complementarity between the wave aspect and the corpuscle aspect. We would like to show that this manner of conceiving the physical individual can be integrated quite well into the general theory of the individual as a being that is genetically constituted by a relation between an energetic condition and a structural condition that extend their existence in the individual, which can at any moment behave as a germ of structuration or as an energetic continuum; its relation is different depending on whether it enters into relation with a milieu that is equivalent to a continuum or whether it enters into relation with an already structured milieu. The principle of complementarity, which indicates that the physical individual sometimes behaves as a wave and sometimes as a corpuscle but not in both ways simultaneously in the same phenomenon, would be interpreted, in the doctrine we are presenting, as the result of the asymmetry of every relation: the individual can sometimes play one role and sometimes the other of two possible roles in relation, but not both at the same time. We shall therefore suppose that when a physical individual behaves as a corpuscle, the being with which it is in relation behaves as a wave, and when it behaves as a wave, the being with which it is in relation behaves as a corpuscle. More generally, in every relation there would always be a continuous term and a discontinuous term. This requires that each being integrate a continuous condition and a discontinuous condition into itself.

The substantialism of the particle and the energeticism of the wave developed quite independently from one another during the nineteenth century, because in the beginning they corresponded to domains of research distant enough from one another to authorize the theoretical independence of the principles of explanation. The historical conditions for the discovery of wave mechanics are extremely important for an *allagmatic* epistemology whose goal is to study the modalities of transductive thought as truly adequate for the knowledge of the development of a scientific thought that wants to know the individuation of the real that it studies. This epistemological study of the formation of wave mechanics and Bohr's complementarity would like to show (to the extent that it is a question of thinking the problem of the physical individual) that pure deductive thought and pure inductive thought have

been rendered in effective, and that, from the introduction of the quantum of action up to Bohr's principle of complementarity, only a transductive logic has made the development of the physical sciences possible.

In this sense, we are going to show that the "synthesis" of the complementary notions of wave and corpuscle is not in fact a pure logical synthesis but the epistemological encounter of a notion obtained through induction and a notion obtained through deduction; the two notions are not truly synthesized, like those of thesis and antithesis at the end of a dialectical movement, but instead are put into *relation* due to a transductive movement of thought; they conserve their own functional characteristic in this relation. In order for them to be able to be synthesized, they would need to be symmetrical and homogeneous. In dialectics with a ternary rhythm, the synthesis more or less *envelops* the thesis and antithesis by *overcoming* contradiction; the synthesis is therefore *hierarchically, logically, and ontologically* superior to the terms it joins together. Conversely, the relation obtained at the end of a rigorous transduction maintains the characteristic asymmetry of the terms. This is due to the fact that scientific thought relative to the (at first physical, then biological) individual, as we are attempting to show, cannot proceed according to the ternary rhythm of dialectics where the synthesis is the thesis of a higher triad: scientific thought advances not through the elevation of successive planes according to a ternary rhythm but through the extension of transductivity. Due to the principle of complementarity, *relation*, having become functionally symmetrical, cannot with respect to another term present an asymmetry that can be the motor for a further dialectical progression. In terms of reflexive thought, after the exercise of transductive thought, contradiction has become internal to the result of synthesis (since it is relation to the extent that it is asymmetrical). There cannot be a new contradiction between the result of this synthesis and another term that would be its antithesis. In transductive thought, *there is no result of synthesis but merely a complementary synthetic relation*; synthesis is not effectuated; it is never achieved; there is no synthetic rhythm, because, insofar as the operation of synthesis is never effectuated, it cannot become a new thesis.

According to the epistemological thesis we are defending, the relation between the different domains of thought is horizontal. It allows for transduction, i.e. not identification or hierarchization but a continuous distribution according to an indefinite scale.

The principles that we are going to try to elicit from epistemological examination will therefore have to be considered as valid if they are transductible to other domains, like that of technical objects and living beings.

Ethics itself will have to seem like a study of relation proper to living beings (here we are using the expression “proper to living beings,” whereas in reality there is no rigorous direct relation to living beings: to be more precise, it would be better to say: “commensurate with living beings” in order to indicate that these characteristics, without them being proper to living beings, appear much more significantly in the latter than in any other being, given that they correspond to variables whose values or systems of values pass through a maximum for these beings). Certainly, in a perfect doctrine the problems relative to the frontiers between the “kingdoms” of Nature, and therefore between species, are much less important than in a theory that uses the notions of genus and species. Indeed, sometimes we can conceive of a continuous transition between two domains that could only be separated by the sufficiently arbitrary choice of average parameters, and sometimes we can conceive of thresholds (like the threshold of frequency of the photoelectric effect) that manifest not a distinction between two species but simply a quantum condition of the production of a determined effect. The limit is no longer endowed with singular and mysterious properties; it is quantifiable and merely constitutes a critical point whose determination remains perfectly immanent to the phenomenon studied and to the group of beings analyzed.

## 2. *The Deductive Process*

This is the thesis that we are going to try to demonstrate or at least illustrate through the analysis of the conditions under which physical science has been led to define the physical individual as a complementary association of the wave and the corpuscle.

The notion of waves seems to have appeared at the end of a remarkable deductive effort, particularly concerning the elucidation of energetic problems, to which it contributes a remarkably rational means of calculation. It extends and renews the tradition of a deductive physics, one that since Descartes has resorted to the classical representations of analytical geometry. Furthermore, it is linked at least historically to the study of macroscopic phenomena. Finally, it has an eminent *theoretical* role that allows us to think (under common principles) extremely vast sets of facts that were previously separated into distinct categories. Conversely, the notion of corpuscle presents the opposite characteristics.

The notion of waves has approximately played identical roles in the interpretation of luminous phenomena and phenomena relative to the displacements of electrified particles (or electric charges); the latter is what allowed Maxwell to hatch the electromagnetic theory of light. The first work solidified

around the studies of Fresnel. The second solidified around Maxwell's discovery, which was later experimentally verified by Hertz. Beginning his study of phenomena of diffraction in 1814, Fresnel inherited at least two centuries of experimental and theoretical research. Huyghens had already studied the phenomenon of the double refraction of spar discovered by Bartholin, and he also knew that quartz possesses the same property of birefringence or birefraction. Huyghens had already expounded rational methods and a theory accompanied by geometrical constructions that have remained in esteem; he had observed phenomena of polarization. This thinker of astronomy and geometry brought a theoretician's mind to the problems of physics, which is particularly apparent in his *Cosmotheoros* and his *Dioptrique*. He put forth the idea that light is constituted not by corpuscles in movement but by waves propagating through space. However, this theory was not as satisfying for Huyghens as the solution he gave to the problem of the catenary curve or the Tautochrone curve: it could not explain the phenomenon of the propagation of light rays in a straight line. The problem posed by nature was more difficult to solve than those proposed by Galileo and Leibniz. Descartes's work in its statement of the laws of propagation always manifested the interest of a corpuscular optics in the explanation of the propagation of light rays in a straight line. However, Huyghens's theory could not be abandoned, for Newton himself, even though he was partisan to the corpuscular theory after having discovered a new phenomenon (interferences), was forced to complete the corpuscular theory with a theory of *access*: light corpuscles would pass periodically when they cross material milieus through the access of unimpeded reflection and unimpeded transmission, which would allow for the explanation of colored rings. Let us furthermore note that the hypothesis according to which light would convey periodic elements, even if it were corpuscular in nature, was already explained in Descartes's work: the *Dioptrique* explains that the prism disperses white (polychromatic) light, because each corpuscle of light increasingly deviates as its movement of rotation around itself becomes less rapid. This idea of the rotation of light corpuscles, which stems from the cosmological hypothesis of primordial vortices, leads Descartes into an error, for it forces him to attribute to the vortices of subtle matter constitutive of red light a frequency of rotation higher than that of violet light corpuscles; according to Descartes, this would be due to the fact that the corpuscles of which red light is composed would be vortices of subtle matter that have a diameter less than that of the corpuscles of which violet light is composed. Despite the error relative to the compared frequencies of red and violet, Descartes had the merit of unifying two asymmetrical notions

in a very fruitful association. Moreover, it would be false to suppose that Descartes represented light exactly as composed of corpuscles; there is no vacuum in his system, and consequently there is neither atoms nor corpuscles, properly speaking; there are only vortices of *res extensa* in movement. Faced with this confrontation of two traditions, Fresnel steered his researches in such a way as to extend the field of application of a theory that since Huyghens had served merely to explain a handful of phenomena, namely wave theory. Double refraction was known only for two crystalline species: Fresnel examined if this property was encountered in other crystals; after creating experimental apparatuses for shedding light on double refraction in all the crystals in which it could exist, he observed that it existed in almost all crystals, and he explained it by the unequal composition that their linear elements should present taken in various directions, which conforms with Haüy's theory about crystalline networks. Afterwards, Fresnel extended this theoretical explanation to cases where an amorphous body is polarized by an external cause: he discovered that a glass prism becomes birefringent when it is compressed. This extension of the scientific object, i.e. of a theory's domain of validity, perfectly illustrates what can be called the transductive method. Moreover, in collaboration with Arago, Fresnel studied the polarization of light. Arago discovered chromatic polarization; Fresnel completed this discovery with the discovery of circular polarization, which is produced by means of a suitably cut birefringent crystal. However, it would be impossible to explain this phenomenon of polarization if we invoked a representation that assimilates the light wave to a sound wave propagating in a gas; Fresnel supposed that the vibrations in light waves are transversal, i.e. occur perpendicularly to the direction of propagation. Polarization and double refraction are both explained with this insight. Fresnel had already demonstrated that the hypothesis of waves, just as much as the theory of corpuscles, allows us to explain the phenomenon of the rectilinear propagation of light rays. The results of the works of Malus and Arago managed to confirm this theory. Malus discovered that reflected light is always partially polarized and that simple refraction through glass also partially polarized light. This discovery can be found in a treatise entitled *Sur une propriété de la lumière réfléchie par les corps diaphanes*. Fresnel's theory was verified, and its experimental bases received confirmation when they were expanded upon through the works of Arago, who constructed a photometer allowing for experimental confirmation of the principle deductively discovered by Fresnel (complementarity of reflected light and refracted light). After constructing the polariscope, Arago was able to control all the characteristics of chromatic polarization in

a very precise fashion. And hence we see how Huyghens's thought becomes largely justified in his treatise on light, *Traité de la lumière*, from 1690: "In true philosophy, the cause of all natural effects are conceived via reasons of mechanics. This is what must be done in my opinion, or we must give up all hope of ever understanding anything in physics."<sup>7</sup>

Furthermore, Maxwell secured a new step for deductive rationalism founded on the hypothesis of the continuous and corresponding to an energetic preoccupation. To be able to explain the principle of the conservation of energy in the unitary system formed by the unification of the different laws that were discovered separately in the domains of electricity, Maxwell formed the notion of "displacement currents," which is perhaps poorly named but which is the forerunner of the current notion of electromagnetic waves and is extensively unifying for the physical reality called light.

Before the communication of Maxwell's great treatise on electromagnetic theory, four laws gathered together all the previous discoveries relative to "static" and "dynamic" electricity, magnetism, and the relation between fields and currents. Maxwell substituted the following system for the four laws that would express these results:

If we take:

B = magnetic induction

b = electric induction

H = magnetic field

h = electric field

i = current density

$\rho$  = charge density

Then we can write:

$$\text{I) } \frac{-1}{c} \frac{\delta \vec{B}}{\delta t} = \text{rot } \vec{h} \text{ — Faraday's law of induction}$$

$$\text{II) } \vec{\text{B}} = 0 \text{ — Inexistence of the isolated magnetic poles}$$

$$\text{III) } \frac{1}{c} \frac{\delta \vec{b}}{\delta t} = \text{rot } \vec{H} - \frac{4\pi \vec{i}}{c} \text{ — Ampère's theorem on the relations between magnetic fields and currents}$$

$$\text{IV) } \vec{b} = 4 \pi \rho \text{ — Law of electrostatic actions (Gauss's theorem)}$$

The third equation expresses Ampère's theorem on the relations between currents and magnetic fields; but, to be able to write that there is conservation of energy (here, conservation of electricity), Maxwell completed this theorem with the introduction of the displacement current, which is represented

by the expression  $\frac{1\delta\vec{b}}{c\delta t}$  and which is added to the conduction current  $i$ . Then, we can deduce from these equations  $\frac{\delta\rho}{\delta t} + \text{div } \vec{I} = 0$ , which expresses the conservation of electricity.

This expression of conservation would be impossible without the term in  $\delta\vec{b} / \delta t$ . Another extremely important theoretical consequence of this equation system is that, when magnetic induction can be conflated with the magnetic field and electrical induction can be conflated with the electrical field (which is the case of the vacuum), the electromagnetic fields always propagate with the speed of light (speed  $c$ ); this expression (which measures the rapport of the electromagnetic charge unit to the electrostatic charge unit of the electric charge when magnetic fields and inductions are expressed in electromagnetic units, whereas electrical fields and inductions, charges, and currents are expressed in electrostatic units) has a finite value: it allows for the theoretical calculation of the speed of light in vacuum. This propagation can be analyzed as resulting from the propagation of a set of flat monochromatic waves.

This is when the second stage of the transductive method's fruitful application appeared: Maxwell in fact noted the real analogy, i.e. the identity of rapports, between the propagation of light in a vacuum and the propagation of electromagnetic fields; he then supposed that light is constituted by perturbations of an electromagnetic nature and corresponds only to a certain interval of wavelengths (that of the visible spectrum) of electromagnetic vibrations. The constant  $c$ , which was discovered based on considerations contemplating the conservation of energy in electricity, is *transductible* into the measure of the speed of light in vacuum, just as the speed of light in vacuum is transductible into the constant  $c$ . This affirmation of a transductivity goes quite further than the discovery of a simple equality between two measures, an equality that could arise from an arbitrary choice of units: *it supposes the physical identity of the measured phenomenon*, an identity that can be obscured by the difference of the aspects according to the particular values chosen in the vast known range. Let us indeed note that here we are not dealing with a generalization or a subsumption: visible light is not a particular "species" of electromagnetic perturbations, since the "specific difference" that we could attempt to invoke to distinguish this species from its nearest genus—namely the wavelength of its propagation in a vacuum or more precisely the superior and inferior limits of the measure of this wavelength—involves the definition of the nearest genus itself; an electromagnetic field that would have no wavelength of propagation in a vacuum is inconceivable. As an electromagnetic

field, it is already “specified” and can only exist and be thought as gamma ray, X-ray, ultraviolet ray, visible light, infrared ray, and Hertzian wave. The number of species or subspecies that could be discovered in a domain of transductivity like electromagnetic waves has the *power of the continuous*. From long Hertzian waves to the most penetrating gamma rays, there is an infinity of electromagnetic fields of different wavelengths, each of whose properties vary with these wavelengths; between red visible light and violet visible light, there is still an infinity of wavelengths; we can differentiate violet light as much as we like; then the criteria of subspecies are homogeneous with respect to the criteria of the species, and the criterion of a species is contained in the comprehension of the nearest genus; discontinuities, the limits of pseudo-species, can only be introduced due to vital or technical usages; we can talk about red and violet and we can even talk about visible light; but this is because we introduce the consideration of a living being that perceives; the apparent discontinuity does not stem from the known scale of electromagnetic wavelengths but from the rapport between the physiological functions of the living being and these wavelengths: an eye without a crystalline lens perceives an ultraviolet more remote than what the normal eye perceives as the glimpse of a gray glimmer: the bee perceives ultraviolet. The Greeks and Romans did not divide up the visible spectrum like we do, and it seems that human perception has been modified towards the extremity of the spectrum situated on the side of short wavelengths, as the usage of the adjective ἀλιπόρφυρος [halipórfyros]<sup>8</sup> in the Homeric writings reveals; we distinguish among several colors where the companions of Ulysses saw only one, something that persists today in certain peoples of the Far East. Several technical necessities have led to dividing up Hertzian waves into bands of 9000 Hz (called channels), because these bandwidths correspond to a useful compromise between the necessities of a transmission that is suitably faithful in its modulation of amplification and the total number of transmitters distinct in functioning that are simultaneously able to be received with a sufficient selectivity. If we can distinguish between long, medium, small, short, and very short waves, this is due to the noticeably important differences between the apparatuses capable of producing them or capable of receiving them and the conditions of propagation that characterize them; thus, all things considered, this distinction is made in accordance with the characteristics belonging not to these electromagnetic fields taken in themselves but in accordance with the limits within which their rapports vary with the technical conditions of production or the atmospheric and stratospheric

conditions of propagation. In this sense, waves that range from 20,000 meters to 800 meters will be called long Hertzian waves because they always reflect off one of the Kennelly-Heaviside layers, which present for them an index of negative refraction, something that makes it so that they undergo a veritable metallic reflection off the first ionized layer that they encounter, a phenomenon highlighted by ionospheric sounding discovered by Sir Edward Appleton. Waves will be called medium when they range from 800 to 80 meters and when they penetrate more deeply into the Kennelly-Heaviside layer, thus reflecting well by night but partially absorbed by day due to variations in the ionized layer, whose altitude and degree of ionization is relative to the variable altitude and activity of the sun. These differences therefore arise from a rapport between Hertzian waves and something other than themselves, for example the ionized layer of the upper atmosphere or the practical means of producing or conveying them, either via simple electronic tubes or velocity modulation tubes, a coaxial line, or a waveguide. These distinctions are never founded on the very nature of the phenomenon considered; they do not exist properly speaking according to physical science but only according to technics. This is why there seems to be a dependence of all these technical distinctions with respect to each type of technology: the constructors of electronic apparatuses separate waves whose length is greater than ten meters from those that are shorter, because below ten meters the extreme brevity of time to transmit electrons between a cathode and an anode forces the constructors to predict special assemblages in the internal architecture of an electronic tube; furthermore, the *Service de prévision ionosphérique*,<sup>9</sup> whose goal is to ensure the best performance for transmissions, does not establish the same distinctions. Finally, a certain number of *industrial* concepts have been created, since they arose from a more or less precarious concordance among the “special domains” of all the types of technologies organized in the same industry. These industrial concepts end up becoming *commercial* and *administrative*, increasingly losing their scientific nature, since they are relative to a *usage* and no longer have anything but a *pragmatic sense*; here a *complete specificity* is constituted via the encounter (which has become habitual and collective, i.e. recognized by law or by an administrative regulation) of the limits of the specialty of numerous types of technology, and this specificity is deprived of *scientific signification* and yet possesses an essentially qualitative, emotive, and institutional *psycho-social value*. In this sense, the domain of television is *specific*; it only corresponds to a concrete being through its psycho-social existence. This institution has its technicians (who are animated by an *esprit de corps*), its artists, its budget, its friends, and its enemies; *in the*

*same way*, it has its band of frequencies. Yet there is a mutual contamination of their own different characteristics following a delimitation that results from a competition with other institutions. The determination of television's wavelengths is the result of an expulsion outside the domain already occupied by radio broadcasting and the telecommunications of a technology that is new and quite cumbersome due to the bandwidth necessary for the richness of the quantity of information to be transmitted per unit of time. Constrained to a very high frequency range, the transmission of television is reduced to an initial domain of specialty relative to the properties of the ionospheric layers; the propagation of television waves is straightforward in a direct line from the transmitting antenna to the receiving antenna because there will be no reflection off the Kennelly-Heaviside layer. This means that the transmitter and the receiver will have to belong to the same national spirit, i.e. to a dense and homogeneous conglomeration; since it can't be required to convey a veritable information very far, television arrives in a population center that is already saturated with information and artistic spectacles; it can therefore merely become a means of distraction. Furthermore, this constraint and limitation of the parameters of television broadcasts to extremely high frequencies—which frees up the field for a large bandwidth of transmission and is met with the quality of a capital's urban provincialism, its first consequence—forces the transmitted image down a path of research for a perfection oriented toward technical quality, i.e. toward the adoption of a high definition. Favored by the initial circumstances, this adoption of a certain *code of values* creates a normativity that reinforces the conditions that have contributed to it and that legitimizes them after the fact: high definition will make the correct transmission at a great distance even more haphazard. Broadcasting in high definition will lead to the production of expensive apparatuses, and those who build them will have to be that much more careful in how they produce and sell this technology. High definition technology resides at the extreme limit of what can be commercialized and requires an enormous amount of direct advertising to a specific public wealthy enough to purchase living in an urban area rather than a rural one. This then leads to a psycho-social morphology and dynamic that summarize and stabilize the *concept* and *institution* of television; from the capital toward the large populated centers, guided bundles (modulated by frequency and on decimetric waves) are sent forth that transmit programs of distraction over the countryside and towns of a secondary order, which are powerless to participate in this star-shaped network radiating from Paris. The veritable limits of the *concept* of television are thus psycho-social; they are defined by the *closure* of a cycle

of *recurrent causalities* that create a type of psycho-social interior milieu endowed with homeostasis due to a certain internal regulation by the assimilation and disassimilation of technologies, procedures, and artists who are recruited through commandeering and bound together by a mechanism of self-defense comparable to that of various closed societies. Particular self-justifying myths are put forth: the research of the sharpness of the image is proclaimed to be more valuable than the research of color attempted by other nations, and in order for this research to justify itself, the distinctive traits of the French people are invoked, who are enamored with clarity and precision and detest the poor taste of color prints, considered only to be suitable for primitives or children. Logical contradiction is accepted here, for this thought is guided by affective and emotive themes; the superiority of sharpness over color is therefore invoked in the name of technical perfection, whereas a simple calculation of the quantity of information required to transmit a colored image and a colorless image and an examination of the degree of complication of the apparatuses used in both cases lead to the inverse result. Thus, the television wave can be thought in two absolutely different ways; if we accept a mode of thought founded on the validity of the species-genus schema, the television wave becomes a *species* of the electromagnetic wave genus whose specific difference is not its wavelength but its *belonging* to the institution that is television; what will create this attribution and found this link of participation will then be an administrative decree (Hague Conference). On the contrary, according to a transductive thought, the wavelengths of television will end up being inserted between numerical limits that do not correspond to clear physical characteristics; they will not be a *species* but a section, a greater or lesser band of a domain of transductivity, that of electromagnetic waves. An important consequence (one that is perhaps paramount for epistemology) of this difference between a transductive thought and a thought that proceeds through genera, species, and relations of inclusion is that generic characteristics are not transductible. In this sense, there are currently two bands in France exploited by television (one toward 46 MHz and the other toward 180 MHz): between these two bands, aviation and police have particular or shared bands; we cannot infer from a property characterizing television waves in the “low” band the existence of the same property in the “high” band; the common link of subsumption does not create any veritable mutual physical property. The only link is this domain’s administrative property. This is why this relation of participation creates a certain regime of property (with possible cessions and resumptions), as if it were a matter of a terrain that does not bear its proprietor’s imprint but creates a bond of

obligation or fealty in the eventual developer: French Television, which is currently unable to exploit the full width of its “low band”, has provided a certain extension of this band (toward 47.2 megahertz) to the Scouts de France, who use it for telephone and telegraph transmissions. This sub-band has the characteristics of an object with a precarious entitlement, since it can be immediately retracted without advance warning; due to its physical characteristics, it has properties transductible into those of bands with wavelengths that are immediately superior or inferior.

Thus, we have the appearance of a type of physical reality that can be called the domain or field of transductivity, is distinct from every psychosocial being, is knowable through concepts, and can justify the usage of thought that employs notions of genus and species through their application on the relation of participation, which may or may not solidify into a relation of property or kinship. Veritable transductive thought utilizes reasoning through *analogy* but never reasoning through *resemblance*, i.e. affective and emotive partial identity. It would be dangerous or misleading to use the same word domain here, for the relation of possession seems to lead back to thought through participation; it would be necessary to say: “a track or path of transductivity” divided up into “bands” and “sub-bands” of transductivity (instead of species and sub-species). Transductive thought establishes a topology of the real, and this typology is not identical to a hierarchization into genera and species.

To determine the criteria of the physical individual, it therefore does not require us to resort to an examination of the relations between genus and species, and then between the species and the individual. The play of transductive thought, whose fruitfulness we have witnessed in the discovery of an immense domain of transductivity, prohibits the usage of this method.

However, if the transductive method is necessary, nothing guarantees that it is sufficient and allows for the apprehension of the physical individual. It could be that the physical individual can only be grasped at the point of encounter and compatibility of two opposite and complementary methods, both of which are incapable of grasping this reality on their own. An electromagnetic wave cannot be considered as a physical individual, since it has no consistency or limit of its own to characterize it; the pure continuum of the transductive domain does not allow us to conceive the individual; obtained at the end of a deductive process based on energetic considerations, it is perfectly rational and can be fully compenetrated by the geometrical intellection of figure and movement. But it does not provide a criterion for isolating this continuous virtuality; it cannot provide the concrete of complete

existence. It alone cannot lead to the grasping of the physical individual. Nevertheless, if the physical individual can only be grasped by two complementary types of knowledge, the critical question will be that of the validity of the *relation* between these two types of knowledge and that of its ontological foundation in the individual itself.

### *The Inductive Process*

The second path of research that led to the position of wave mechanics and to the principle of complementarity is that which, at the end of an inductive process, has asserted the *discontinuous* nature of physical reality. It provides us with a very different definition of the physical individual from one that could be derived from deductive research in terms of waves.

What type of necessity is encountered at the origin of the corpuscular or discontinuist conceptions of the same physical realities as those we will examine, namely light and electricity? It is essentially the necessity of a structural representation that can provide the foundation for an inductive research.

The notion of a discontinuous structure of electricity appeared in 1833 when Faraday, while studying electrolysis, discovered that, despite which hydrogen compound was used, during the process of breaking it down, for example, the production of a given quantity of hydrogen to the cathode was always linked to the passage of a given quantity of electricity in the solution. Moreover, the quantity of electricity necessary for releasing one gram of hydrogen always deposited 107.1 grams of silver. In this sense, the condition for the discovery of the discontinuity of electricity is its *participation* in discontinuous *actions*; it *plays a role* in the domain of the discontinuous, and particularly in the structural changes of matter. If the validity of the atomic conception of matter is accepted, we will have to accept that electricity itself, which participates in the discontinuous actions that characterize the atomic properties of matter, has a discontinuous structure. Indeed, Faraday discovers that all the chemists' univalent atoms, i.e. those that combine with an atom of hydrogen, seem to be *associated* with the same quantity of electricity; furthermore, all bivalent atoms and trivalent atoms are associated with a quantity that is respectively double and triple that of the univalent atoms. Thus, we hit upon the conclusion that electricity (whether positive or negative) decomposes into elementary particles that behave like veritable electrical atoms. This is the conclusion Helmholtz will come to in 1881. The word "electron," which was first used by G. J. Stoney, designates the natural unit of electricity, i.e. the quantity of electricity that must travel through an

electrolytic solution in order to deposit an atom of a univalent element in one of the electrodes. Electricity is grasped in its discontinuity due to its association with the atom, and the charge of the electron has also been calculated based on this association. Indeed, if we know that a determined quantity of electricity is necessary for the electrolysis of a mole (or gram-molecule) of a determined body, and if we also know how many atoms this mole contains (according to Avogadro's number), we will be able to calculate the charge associated with each atom by taking into account the valence of the elements.

This initial inductive discovery was followed by a second discovery that reveals the same method and ends in the same result. After 1895, which is the date of the discovery of X-rays, it will be shown that these rays can make gases conductive by creating a conductivity identical to electrolytic conductivity in which electrical charges are transported by ions, this time not based on the decomposition of a molecule but on that of the atoms themselves, since these ions exist even in a monoatomic gas like argon or neon. This decomposition allows for induction to progress one step further in the research of structures: Stoney's electron remained a quantity of electricity associated with an indivisible physical particle; it now becomes more substantial, because the ionization of gases requires a structural representation in which the negative electrical charge is freed from this heavy support of the electrolytic ion. Ultimately, the discovery of structures was able to reach a new stage two years later. If we are restricted to measuring quantities of electricity that pass through a column of ionized gas, we can conceive the independence of the electron with respect to any heavy material particle. But this independence remains abstract; the experimental principle is what allows us to safeguard the phenomena. If, on the contrary, we push the experimental research further by attempting to physically analyze the content of the discharge tube when the pressure of the gas reduces, we obtain the Crookes dark space that pervades the whole tube when the pressure falls to 1/100th of a millimeter of mercury; this space, which develops very progressively from the cathode while pressure decreases, in some sense makes palpable the physical analysis of the initially continuous ensemble that was the ionized gas in which free electrons could not be discerned from the other electrical charges (namely the positive charges) carried by the ions. At that point, we were able to suppose that the Crookes dark space contained free electrons in transit. The experiments on "cathodic rays" were considered experiments on free electrons. It could certainly be said that in this latter experiment the discontinuity of electrons disappears at the same time as their association

with a phenomenon, such as the ionization of a liquid or a gas in which they appear as charges of a determinate magnitude associated with the particles. All the experiments conducted at this time on cathodic rays were macrophysical and revealed the existence of electrical charges in transit in the tube without indicating a discontinuous microphysical structure; the experiment cannot be carried out on a single electron; the luminescence of the glass tube, the perpendicularity of the rays with respect to the cathode, their rectilinear propagation, their chemical and caloric effects, the fact that they transfer negative electric charges, and their deviation under the influence of an electrical field and a magnetic field are just a few of the macrophysical effects with a continuous appearance. However, due to the inductive path at the end of which this discovery was obtained, it was necessary to suppose that these cathodic rays were composed of discontinuous particles of electricity, because in this way the structure of the experiment was taken into account: the electrons of ionized yet still undifferentiated gas in the disruptive discharge, according to the experiment's structure, are *identical* to those occupying the Crookes dark space; the latter are *identical* to the electrons of which the cathodic rays consist. The electrons of the ionization of a gas at the moment of disruptive or non-disruptive discharge are identical to those transmitted by the negative ions in the electrolysis of a body.

Can we consider the inductive method followed in these three interpretations of the experiment as transductive? It is not identical to what appears in the formation of the notion of waves. Indeed, the notion of waves was developed to allow for the introduction of a deductive thought into an increasingly broad domain through an expansion of the object; it corresponds to a primacy of theoretical representation; it allows for the synthesis of several results that were separate beforehand: on the contrary, the notion of corpuscles of electricity was introduced to allow for the *representation* of an experimentally observed phenomenon by means of an intelligible structure; at the start, it does not surpass the numerically formulable law but gives it a *representative substructure* due to which an intelligible schema can be paired with the phenomenon. When we move from one experiment to the other, for example from electrolysis to the ionization of a monoatomic gas, we transfer the *same schema*; we discover a new case for the application of the previously discovered schema; but the case is only new *experimentally* and not due to an extension of the object; the electron is always the same, and it is because the electron is the same that induction is possible. On the contrary, when the continuity between visible light and Hertzian waves is established, it cannot be said that light is made of Hertzian waves; instead, we

define the limit that separates and joins these two bands of the domain of transductivity that we explore.

The thought that led from Faraday's laws to the calculation of the mass and charge of the electron carried out a *transfer of identity*. The thought that led from the laws of electricity and from Fresnel's formulas to Maxwell's electromagnetic theory carried out the *development of a domain* that opens up into a continuous infinity of values. Now we can better separate in Maxwell's effort between what is merely deductive from what is really transductive; Maxwell did deductive work when he wrote the formula of the displacement current in order to be able to account for the conservation of electricity and join together in a single system of equations the four laws that summarize the whole science of electrical phenomena. But he needed a veritable transduction when he joined the theory of displacement currents with that of the wave propagation of light. The necessity of the continuous is a direct consequence of the application of the deductive method. Yet since a deductive invention is necessary for a transductive progression to be realized, we in fact have in the examination of the birth of wave theory a mixture of the deductive method and the transductive method, rather than an absolutely pure example of the transductive method. Likewise, it is possible to find several traces of the transductive method in the development of the notion of electrified corpuscles: the discovery of rays formed by negative corpuscles of electricity has also led to the search for rays formed by positive particles or positively charged material particles: with a cathodic ray tube that has a cathode pierced with holes, we have obtained not positive electrons but positive rays formed by ions originating from the gas contained in the tube; this is what forms the basis of the study of isotopes with Aston's mass spectrograph. This research leads to a veritable discovery of a vast domain of transductivity when, remarkably, the interpretation of isotopy managed to confirm and complete the periodic classification of elements established by Mendeleev in 1869. This classification itself was the result of a vast induction founded on the consideration of atomic weights and the result of an effort of transductivity oriented toward the periodicity of the properties of known elements ranked by order of increasing atomic weights. But we should note that there is a difference between a domain of transductivity obtained at the end of an essentially deductive process and a domain of transductivity obtained at the end of an essentially inductive process: the first is open on both ends; it is composed of a continuous spectrum of various classified and organized values; the second on the contrary is self-enclosed, and its extent has a periodic structure. It comprises a finite number of values.

### III. THE NON-SUBSTANTIAL INDIVIDUAL: INFORMATION AND COMPATIBILITY

#### *1. Relativistic Conception and the Notion of Physical Individuation*

One of the most difficult problems of reflexive thought is the problem of the relation that can be established between these two results of transductivity. If transductivity conducted based on deduction led to the same results as one conducted based on induction, reflection could be reduced to a search for the compatibility between these two types of results, which are acknowledged as legitimately homogeneous. If on the contrary a hiatus remains between these two types of results, reflection faces this hiatus as a problem, for it is neither possible to classify it in a continuous transductivity, nor localize it in a periodic transductivity. The invention of a reflexive transductivity will then be necessary.

The fourth stage of inductive research relative to the corpuscle of negative electricity presents the same characteristic as the previous three; but, in a certain sense it introduces the elementary quantity of electricity in the individual state, not in its visible corpuscular reality but through the discontinuous effect that it produces when it is combined with a very fine material particle. Here still, we see the discontinuity of electricity manifested by a situation where variations of the charge of material particles are produced. The electron is not grasped directly in itself as an individualized particle. Millikan's experiment in fact consists in introducing between the plateaus of a condenser very tiny drops of a non-volatile liquid (oil, mercury). These drops are electrified by their passage into the atomizer that produces them. In the absence of a field between the condenser's electrodes, they fall slowly. When a field exists, the movement will accelerate or slow down, and the variation of speed can be measured. Yet, by ionizing the air included between the plateaus, we observe that the speed of a given drop undergoes abrupt variations from one moment to the next. These variations are interpreted by admitting that the charge of the drop varies when it encounters one of the gas's ions. The measurements show that the captured charges are simple multiples of an elementary charge, equivalent to  $4.802 \times 10^{-10}$  electrostatic units. This experiment is complemented by those in which the electron intervenes through the discontinuity of its charge.

Let us nevertheless note that this discovery of the corpuscular nature of electricity allows a mystery to remain: the dissymmetry between positive electricity and negative electricity, which cannot by any means be predicted inductively in the corpuscular theory: positive electricity would never be

present in the free state, whereas negative electricity is present in the free state. Indeed, there is no structural reason for a corpuscle to be positive or negative. A qualification of the corpuscle cannot be easily conceived; quality appears in the different modes of the possible combinations of elementary corpuscles, but it cannot be easily conceived at the level of this simple structural element that the corpuscle is. Here we come up against one of the limits of inductive thought; its need for simple representative structures leads it to consider quality as something irrational. Quality resists inductive identification. However, since the eighteenth century experimentation has indicated the qualitative differences of “vitreous” electricity and “resinous” electricity. In order to reduce the element of irrationality, it would be necessary to be able to transform the specific qualitative difference into a clear structural difference. But also, since induction tends toward the simple element, it also tends toward the identification of all the elements with respect to one another: after the discovery of the fact that negative electricity is a universal constituent of matter, we have been able to believe that all matter is made of electricity. In this sense, induction through identification would have consummated science; chemistry and physics would have become a generalized electronics. But reduction to absolute identity has been impossible because it could not remove the dissymmetry between two forms or “species” of electricity. It has indeed been possible to consider that a charge of positive electricity is nothing but a “hole of potential” created by the departure of an electron. But, on the one hand, we then are surpassing the limits of induction seeking the simple structural element, and, on the other hand, we are supposing the reality of a material support made of a substance other than negative electricity. For if all matter were constituted by negative electricity, the departure of an electron could never create a “hole of potential” that would manifest as a positive charge equal in absolute value to the electron but with a contrary sign. The veritable limit of induction is plurality in its simplest and most difficult form to cross: *heterogeneity*. It is starting from the moment when inductive thought is faced with this heterogeneity that it must resort to transductive thought. But then it encounters the results of deductive thought, whose limits it also finds at a certain point. Inductive thought is found lacking when a representation of the pure discontinuous is insufficient. Deductive thought is found lacking when a representation of the pure continuous is also found lacking. This is why neither of these two modes of thought can lead to a complete representation of the physical individual: the physical individual then has recourse to the invention of different *systems of compatibility* for the methods or the results. But such epistemological

conditions involve a necessary critique of knowledge fated to determine which degree of reality can be apprehended through the invention of a system of compatibility.

We find this beginning of a discovery of compatibility between the inductive method and the deductive method, between the representation of the continuous and that of the discontinuous, in the introduction of relativistic mechanics into the domain of the free electron.

Other means of producing free electrons have been discovered: the cathodic ray tube was accompanied by the so-called “thermionic” effect and then the beta decay of radioactive bodies. It was known how to determine the trajectories of electrons in space by noting their points of impact on fluorescent screens or photographic plates capable of being affected by this impact. Wilson’s cloud chamber, of which it has been said that it constituted the “most beautiful experiment of the century;” makes it possible to follow the trajectory of an electrified particle. At the end of the studies carried out by Perrin, Villard, and Lénard, the electron could be represented as a corpuscle, i.e. a very small object that can be localized in space and that obeys the laws of dynamics of the material point.<sup>10</sup> In an electrical field, the electron, which has a negative charge, is submitted to an electrical force. In a magnetic field, when it is in movement the electron behaves as a small element of a conduction current and is submitted to an electrodynamic type of Laplace force simultaneously perpendicular to the direction of the magnetic field and to the instantaneous direction of movement, and it is numerically equal to the vectoral product of the electron’s speed through the magnetic field multiplied by the charge. Under the action of this force,  $f = \frac{e}{c} [\vec{v} \times \vec{H}]$ , the electron’s movement occurs like the movement of a material point with a mass of  $0.9 \times 10^{-29}$  g. Rowland’s experiment in 1876 established that a displacement of electrical charges produces a magnetic field, as if it were a question of a conduction current produced by a generator in a fixed conductor.

The inductive value of this discontinuous conception of electricity was particularly manifested in the sense that it made it possible to bring the study of the movement of electrons back to the mechanics of the material point, a theory which has been considered classical for quite a while.

The new mechanics remained theoretical when it was applied to bodies studied by macrophysics; relativistic mechanics is indeed valid for all material bodies; it had already successfully explained the “three phenomena in  $10^{-8}$ ” that classical mechanics had failed to explain: the theory of relativity gained a lot of momentum when it explained the perihelion of the planet Mercury, which had been noted much earlier. The deviation of sunlight observed

during an eclipse confirmed the principle of special relativity. Color changes for moving sources of light led to the same confirmation. However, this theory of relativity, which is a mechanics of extremely rapid movements, could still be contested in the domains of macrophysics. Speaking about the theory of relativity, Le Châtelier declared in his work *L'Industrie, la science et l'organisation au XXe siècle*: "Similar speculations can interest the philosopher but shouldn't captivate men of action who claim to shape nature and guide its transformations". Further on, he adds: "Today the probability of seeing the laws of Newton and Lavoisier disproved is not even one in a billion. It is therefore madness to be preoccupied with similar eventualities or to speak of them and be distracted by them for one instant". Le Châtelier focused his argumentation on the fact that relativistic theory only gives results different from those of classical mechanics for bodies animated by speeds above 10,000 kilometers per second. "However, on Earth, we do not know how to produce speeds above 1 kilometer per second, which is the speed of the projectiles of the famous Big Bertha. There is hardly anything save the planet Mercury that possesses a sufficient speed to warrant relativistic speculations. Even in this case, the predicted perturbations are so weak that we are still not in agreement on their magnitude." The second argument is that: "concerning the transformation of radium into helium, all the scientists that have worked on this problem still have not managed to produce altogether 10 milligrams of this gas. However, considering the millions of tons of material that the industry transforms every day, an exception to Lavoisier's law has never been able to be verified." From a macroscopic and pragmatic point of view, Le Châtelier was perhaps correct; he could seemingly accuse the partisans of relativity of corrupting, through their "skepticism" regarding Newton's law of gravitation and Lavoisier's law of the conservation of elements, the students who were overly inclined to follow the snobs and philosophers declaring that these two fundamental laws of science are nothing but the vestiges of an obsolete past, just as Aristophanes already accused Socrates of "καινολογία"<sup>11</sup> in *The Clouds* facing the Athenian public who were anxious about the spread of new ideas. Nevertheless, both on earth and in simple assemblages made possible with the physical apparatuses of an established instruction at the time when Le Châtelier rose up against "the negation of all good sense" for "dotting the i's and clear explanation," there were already bodies animated by speeds above 10,000 kilometers per second, namely electrons in transit in cathodic ray tubes; these corpuscles belong to microphysics due to their dimension, but, in a tube that is several dozen centimeters long and with the energy that can be accumulated at the limits of the secondary winding of a

Ruhmkorff coil, it is possible to transmit to them a speed above that of the fastest celestial bodies: here there is a discovery of magnitudes that in the usual classification of phenomena were not of the same *species*. A corpuscle 1,836 times lighter than the hydrogen atom behaves like a planet during an experiment that is on the order of magnitude of the human body and that requires a force comparable to the force of our muscles.

The mechanics of relativity profoundly modifies the notion of the individual existence of the physical particle; the electron cannot be conceived like an atom was formerly conceived because it rapidly changes place. Ever since the ancient atomists, the atom was a substantial being. The quantity of matter that it constituted was fixed. Mass invariance was an aspect of this substantial invariance of the atom. The atom is the corpuscle that is not modified by the relation in which it is engaged. The compound results entirely from the atoms that constitute it, but these first elements, the *primordia rerum*, are not modified by the compound that they constitute. The relation remains fragile and precarious: it has no power over the terms; *it results from the terms, which are not modes of the relation in any way*.

With the electron envisioned by the theory of relativity, the mass of the corpuscle is variable according to speed, formulated by Lorentz's law as,  $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$  where  $m_0$  is the mass of the electron at rest, i.e.  $0.9 \times 10^{-27}$  g, and  $c$  is the speed of light in vacuum, and  $v$  the speed of the corpuscle under consideration. The dynamics of relativity therefore presents us with a corpuscle which cannot be characterized by a rigorously fixed mass representing the substantiality of an unchangeable matter, a support unmodified by accidental relations, but which also cannot even receive an upper limit for a possible increase of mass and consequently for the energy conveyed and the transformations able to be produced in other bodies by this particle. The whole set of principles of atomistic thought that seeks the inductive clarity of corpuscular structures is put into question by Lorentz's law. Indeed, from the point of view in which we are situated to consider each particle in itself, it has already produced a profound change, since the fundamental characteristics like mass and the quantity of transported energy must be conceived as *not having an upper limit*: mass tends toward infinity when the speed  $v$  tends toward the limit  $c$ , which measures the speed of light in vacuum. The individual no longer has this essential characteristic of the atom of the ancients, which is that of being *strictly limited* by its dimension, its mass, and its form and which is consequently endowed with a *rigorous identity* through time, an identity that makes it eternal. But the theoretical consequence of this change in the conception of the physical individual is

truly even more important if the mutual relation between particles is considered; if under certain conditions a particle can acquire an energy that tends toward infinity, there is no longer a limit to the possible action of a particle on another particle or a group of other particles, however large that group may be. The discontinuity of particles no longer imposes the *finite* characteristic of possible modifications. The smallest element of a totality can receive as much energy as all the other parts combined. The essentially egalitarian nature of atomism cannot be conserved. The very relation of part to whole is transformed, because the relation of part to part is completely modified from the moment when one part can exert on the other parts an action stronger than all the other elements of the whole taken together: since each physical individual is *potentially unlimited*, no individual at any moment can be conceived as safe from the possible action of another individual. This mutual isolation of atoms, which for ancient atomists was a guarantee of substantiality, cannot be considered absolute; the *vacuum*, an invaluable condition of energetic isolation and structural independence, which was for Lucretius the very guarantee and condition of the individuality of atoms and their eternity, can no longer ensure this function, because distance is only a condition of independence if action through contact alone is effective. In this substantialistic atomism, shock can modify the state of an atom's movement or rest but not its own characteristics, like mass; however, if mass varies with speed, a shock can modify the mass of a particle by modifying its speed; *the accidental, totally fortuitous encounter affects substance*. Passivity and activity are merely two symmetrical aspects of energy exchanges; the actual or potential passivity of substance is as essential as its potential or actual activity. Becoming is integrated into being. Relation, which contains the energy exchange between two particles, includes the possibility of a veritable exchange of being. Relation has the value of being because it is *allagmatic*; if the operation remained distinct from the structure that would be its unmodifiable support, the substantialism of the particle could attempt to account for energy exchanges by a modification of the mutual rapport of particles, thus leaving the respective characteristics of each particle unmodified. But since every modification of the *relation* of one particle to the others is also a modification of its internal characteristics, there is no *substantial interiority* of the particle. Here still, the veritable physical individual, as in the case of the crystal, is not *concentric with a limit of interiority that constitutes the substantial domain of the individual* but is on the very limit of the being. This limit is actual or potential relation. An immediate belief in the interiority of beings qua individual no doubt comes from the intuition of the body proper, which

seems, in the situation of a man reflecting, to be separate from the world by a material sheath that offers a certain consistency and delimits a closed domain. In reality, a suitably deep psycho-biological analysis would reveal that the relation to the external milieu for a living being is not merely spread out on the external surface of itself. Through the mediation that it constitutes between the exterior milieu and the being, the notion of interior milieu, which was formulated by Claude Bernard for the necessities of biological investigation, indicates on its own that the substantiality of the being cannot be confused with its interiority, even in the case of the biological individual. The conception of a physical interiority of the elementary particle manifests a subtle and tenacious biologism that was apparent even in the most theoretically rigorous mechanism of the ancient atomists. With the appearance of the theory of relativity on the plane of the current physical experiment, this biologism gives way to a more rigorously physical conception of individuation. Let us note however that if the possibility for an increase in the mass of a corpuscle had a limit, we could return to a substantialistic atomism simply modified by a logical dynamism. Leibniz's monad is still essentially an atom because its stages of development and involution are regulated by a rigorous internal determinism of the *concrete individual notion*; it doesn't matter that the monad possesses within itself a recapitulation of the modifications of the monads of the whole universe as a microcosm in the form of little perceptions. In fact, from the point of view of the causality of modifications, the monad only draws its modifications from itself and remains absolutely isolated in becoming; the limits of its successive determinations are rigorously fixed by the system of universal compossibility. On the contrary, the physical individual, which is thought according to relativity, has no limits of its own defined once and for all due to its essence: *it is unbounded*. Because of this, the physical individual cannot be determined by a principle of individuation comparable to what Leibnizian dynamics assigns it. The limit, and consequently the relation of the individual, is never a boundary; it belongs to the being itself.

This affirmation cannot be taken as a recourse to pragmatism. For the physical individual, when we say that relation is of the being, we do not take this as meaning that relation *expresses* the being but that it constitutes the latter. Pragmatism is still too dualistic and substantialistic; it just wants to rely on the manifestations of activity as a criterion of the being; this is to suppose that there is a being distinct from operation, an interiority that the exteriorization of action authenticates and expresses by manifesting it. In pragmatism, action is the crossing of a limit. However, according to the

doctrine that we are presenting here, this limit can neither conceal a reality nor be crossed by action, since it does not separate two domains, that of interiority and that of exteriority. This relativistic doctrine cannot lead to a subtler form of pragmatism, like Poincaré's "commodism," which ends up as a scientific nominalism. It is realist without being substantialistic and postulates that scientific knowledge is a relation to being; however, in a similar doctrine, relation has the status of being. But the realism of knowledge must not be conceived as a substantialization of the concept; realism is the direction of this knowledge as relation; here, with the theory of relativity, we see it go from the rational to the real; in other cases, it follows the inverse direction, and then what consecrates the vitality of the subject-object relation is the encounter and compatibility of these two epistemological directions. The realism of knowledge is in the progressive growth of the density of the rapport that links the subject term and the object term. It can only be discovered if we seek out the meaning of this derivation.

In inductive research, this is the first step toward the discovery of transductivity through which the corpuscle receives a non-substantialistic definition of its individuality. Nevertheless, in the application of the theory of relativity to the electron, there remains an element that constitutes a *substantial bond* between the different successive moments when the mass of the electron varies, even if it always increases by tending toward infinity when the speed tends toward the speed of light in vacuum, i.e. the *continuity* between the different successive measures of mass and energy. Relation is not entirely on the same level as being when substantial magnitudes (mass and energy) are posited as capable of continuous variations.

Here, an important doctrinal point remains to be presented and specified before mentioning the epistemological characteristics of quantum theory. Quantum theory indeed supposes that energetic exchanges between wave and corpuscle or between corpuscle and corpuscle always take place in finite quantities, the multiples of an elementary quantity, i.e. the *quantum*, which is the smallest quantity of energy that can be exchanged. Thus, there is a lower limit to the quantity of energy that can be exchanged. But we should ask in what sense Lorentz's formula can be affected *a priori* by the introduction of a quantum theory and how we should consider the possibility of the indefinite increase of a corpuscle's mass when its speed tends toward the speed of light. If we start from a very small initial speed that progressively increases, at the beginning, we will see that when mass can be confused with mass at rest, the increase of kinetic energy equivalent to a quantum corresponds to a notable increase in speed: thus, speed can be represented as increasing

through abrupt leaps; conversely, when the speed is close to that of light, the increase of kinetic energy corresponding to the addition of a quantum translates into a minuscule increase of speed. When the speed tends toward the speed of light, the addition of a quantum of energy translates into an increase of speed that tends toward zero: the leaps of successive additions of quanta are increasingly minimal: the mode of variation of speed *tends toward a continuous regime*.

The importance of quantum discontinuities is therefore variable with the speed of the particle. This deductive result is important, for it shows that a particle like an electron tends toward a regime of continuity when its speed tends toward the speed of light; it is then functionally macroscopic. But it must be asked if this conclusion is fully valid. What is the veritable sense of this limit, i.e. the speed of light? What is absolutely important is not the exact measure of this speed, but instead the existence of a limit that cannot be attained. However, what would happen if an electron attained a speed very close to that of light? Would there not be a threshold beyond which the phenomenon's aspect would completely change? Physics has already presented at least a very important example of the existence of a limit that could not be predicted by simple extrapolation: we can trace the curves that represent the resistivities of metals according to temperature, and these curves are regular enough in an interval of several hundred degrees. Theory shows that close to absolute zero, the resistivity of a metal should tend toward zero. However, experiments show that for certain bodies, instead of decreasing little by little, the resistivity abruptly falls below any measurable value; this is superconductivity. This phenomenon is produced for lead at 7.2°K, at 3.78°K for tin, and at 1.14° K for aluminum (according to the experiments by Heike Kamerlingh Onnes). Modern particle accelerators make it possible to launch electrons at speeds very close to those of light. The energy can then become quite considerable, as in Schenectady's betatron of 100 million electron volts, without the predictions that conform to the theory of relativity being disproven in any way; however, it can be supposed that there is a threshold not yet reached beyond which the phenomenon would change if we could reach it. Consequently, there is currently an empirical limit to the application of the electron's relativity; it is hard to conceive that this limit can be overcome, because an infinite energy cannot be transmitted to an electron. Furthermore, there seems to be certain theoretical necessities for conceiving an upper limit to the characteristic physical parameters of the electron, like that of the electrical field that regulates the electron radius (in classical representation); however, if we seek the temperature of a dark body whose density of radiation

energy would be due to the propagation of this maximum field, then we find a temperature above the order of  $10^{12}$ °K. This temperature is what seems to be at the center of certain white dwarf stars. Higher temperatures and more intense electromagnetic fields are not known.<sup>12</sup>

We cannot therefore found a reflexive approach around the possibility of the indefinite *theoretical* and *absolute* increase of the mass or energy of a particle like the electron, because for reflexive thought a distinction always remains between a very broad empiricism and a universal empiricism; an infinite margin of the unexplored will forever remain between the very high levels of attained energies and that of an infinite energy. This is why it is difficult to speak about what an electron would be if it were approaching the speed of light in vacuum; it even seems difficult to specify if we should conceive the possibility of the existence of a superior threshold of speed beyond which the electron might no longer be considered an electron. This margin of imprecision in knowledge cannot be reduced by the adoption of quantum theory, since the increase of mass and energy makes the dynamic regime of the corpuscle tend toward the continuous when its speed tends toward that of light. If there were a superior threshold of speed and energy, it could not be determined by quantum considerations.

Here we encounter a domain of epistemological opacity that can cast its shadow on a reflexive theory of physical individuation and mark the existence of an epistemological boundary to transductivity. The agnostic consequence resulting from this would itself be relativized by the boundary marking the beginning of its domain of application, the structure of which could not be internally known. If it is itself a relation, this topology of transductivity can be transductible to another type of individuality.

## *2. Quantum Theory: Notion of the Elementary Physical Operation That Integrates the Complementary Aspects of the Continuous and the Discontinuous*

We will begin by attempting to express to what extent the adoption of a quantum principle modifies this conception of corpuscular individuation and extends the conversion of the notion of the individual initiated in relativistic thought. Even if there is actually no rigorous epistemological anteriority of one of the conceptions over the other (in terms of physical theories), a logical anteriority becomes manifest for the conception of individuation. Indeed, the individual can be conceived as having a variable mass according to its relation with the other elements of the system in which it is included; to conceive these variations as continuous or discontinuous constitutes a

supplementary specification contributed to the theory of relativity. However, this point of view is still too formal; the discontinuous quantification of possible degrees of mass and levels of energy indeed contributes a new type of relation between the same type of individuals. Due to quantification, a new condition of stability is brought into change itself; the existence of successive levels that correspond to increasingly large energies for the corpuscle is the veritable synthesis of continuity and discontinuity; furthermore, here we are presented with a possibility of distinguishing, at a given time, among individuals that belong to a system due to the actual differences of the quantum states that exist between them, which is something that Pauli's principle contributes to and which is the key to a new logic of the individual. Pauli's principle states: "electrons, postulated as identical to the point that they could no longer be distinguished in a system, however cannot have (in an atom or a gas) their four quantum numbers be respectively equal; in other words, when an electron is in one of these quadruply quantified states, this excludes (for every other electron) the possibility of being in the same state (whence its name as the principle of exclusion)."<sup>13</sup> In some sense, when it is completed by such a principle, quantum theory recreates a principle of individuation and stability of discernible states that the theory of relativity would lose by destroying the unchangeable substantiality of mass, which is a classical foundation of the identity of beings in a corpuscular theory. A new path for grasping the reality of the individual opens up with quantum theory, whose power of transductivity is so great that it allows for the establishment of a viable relation between an inductive physics of the discontinuous and a deductive energetic theory of the continuous.

Planck introduced the idea of the quantum of action in 1900 due to his work on black body radiation, i.e. radiation emitted by the surface of a body that perfectly absorbs light when it is maintained at a certain temperature. Black body radiation can be decomposed by a classical type of analysis (following Fourier) into a sum of monochromatic radiations. If we want to know the energy that corresponds to an interval of frequency  $\nu \rightarrow \nu + \delta\nu$  in black body radiation, we must determine the spectral density or function  $\rho(\nu, T)$  such that  $\rho(\nu, T)\delta\nu$  gives the quantity of energy that is contained in the unit of volume and that corresponds to the spectral interval  $\delta\nu$ , if  $T$  designates the temperature of the surfaces of an enclosed chamber whose surfaces, including all the material bodies that it can contain, are maintained at a certain uniform absolute temperature. Here we are at the point of the encounter between an energetic theory (thermodynamics) and a structural research; indeed, the theory of thermodynamics is what allowed Kirchoff to

show that this thermal equilibrium radiation in no way depends on the nature of the walls of the chamber or of the bodies that are included there, but only on a temperature  $T$ . Other thermodynamic understandings allow us to demonstrate that the quantity of energy contained in the unit of volume of black body radiation must increase by four powers to that of the absolute temperature  $T$ : this experimentally verified law is called Stefan's law.<sup>14</sup> Ultimately, thermodynamics is also what allowed Wien to demonstrate that  $\rho(\nu, T) = \nu^3 F \frac{\nu}{T}$ , where  $F$  is a function of the variable  $\frac{\nu}{T}$ , which the thermodynamic approach is unable to determine.

Thus, thermodynamic research here gave the indication of its own limits and invited scientific thought to go further through an analysis of *the energetic relations* between matter and radiation within the confines of an enclosure at determinate temperature. This was indeed a necessary encounter between the theory of corpuscles and the theory of electromagnetic radiation defined by Maxwell, between the culmination of research related to the theory of the discontinuous and that of researches related to the theory of the continuous. Here is how Louis de Broglie in the cited work presents the epistemological situation at this moment: "Besides, this analysis seemed quite easy, for the theory of electrons then provided a very well defined schema for the phenomena of the emission and absorption of radiation by matter: it was sufficient to suppose that the sides of the enclosure contained electrons in order to study how these electrons absorbed, on the one hand, a part of the energy of the surrounding black radiation and gave back to it, on the other hand, a certain quantity of energy through the processes of radiation, and then to ultimately explain that the processes of absorption and emission statistically compensated one another in such a way that the spectral composition of the radiation at equilibrium remained at a constant average."<sup>15</sup> Lord Rayleigh and Planck made the initial calculation, which was later confirmed by Jeans and Henri Poincaré. It necessarily led to the following conclusion: the function  $\rho(\nu, T)$  must be expressed  $\rho(\nu, T) = \frac{8\pi k}{c^3} \nu^2 T$ , where  $k$  is a certain constant that intervenes in the statistical theories of physics and whose numerical value is well known. (This is the Boltzmann constant, which is  $k = 1.37 \times 10^{-16}$  in units of  $c$ ). This theoretical law, which is known as the Rayleigh-Jeans law, shows an increase of  $\rho$  as a function of  $\nu$ , represented by a parabola that increases indefinitely without a maximum; this law leads to the conclusion that the total energy of black radiation would be infinite. This law is only in agreement with experiments for small values of  $\nu$  for a given temperature. These experiments allow us to trace a bell curve representing the variations of  $\rho$  according to  $\nu$  for a given temperature. In terms of this new curve, the total quantity of

energy  $\int_0^{\infty} (\rho(\nu, T) \delta\nu)$  contained in the black radiation has a finite value that is given by the area included between the  $\nu$  axis and the bell curve, according to the following empirical formula introduced by Wien:  $\rho(\nu, T) = A\nu^3 e^{-\frac{B\nu}{T}}$ .

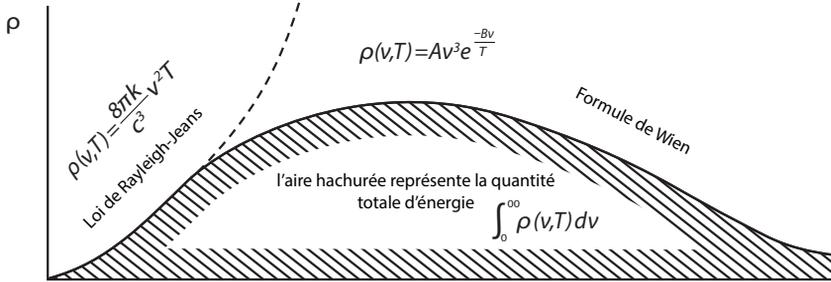


Figure 7

The theoretical justification for Wien's formula remained to be discovered. Classical corpuscular theory is articulated by classical energetic theory in the following manner, marking a privilege of continuity over discontinuity: an electron animated by a periodic movement of frequency  $\nu$  can continuously emit and absorb the electromagnetic radiation of frequency  $\nu$ . However, this conception would be valid if it were supposed that the *relation* which constitutes the energy exchange between the corpuscle and the electromagnetic wave remained *independent* of the corpuscular individual. But, if relation is conceived as having the value of being, then it seems to extend the wave's energy into the states of the corpuscle and to translate the corpuscle's individual reality into the wave's levels of energy. The fact that this relation is asymmetrical, i.e. creates a rapport between an electromagnetic field (thinkable according to the continuous) and a corpuscle (thinkable according to the discontinuous), necessarily requires relation to simultaneously express discontinuity in energetic terms and continuity in structural terms. Under this condition, *it is not a simple rapport, but a relation that has the value of being*. The quantum characteristic of *relation* defines a mode of reality that is different from *structure* and continuous energy; this characteristic is that of *operation*, which integrates within it the complementary characteristics of the continuous and the discontinuous: the characteristic of continuity in the operation becomes an *order* of quantum states, which are able to be hierarchized in an increasing series starting from an absolute inferior quantity; the characteristic of structuration and individual consistency in the operation becomes the complementary aspect of this hierarchy, i.e. the

characteristic of the quantification of exchange. Operation appears as a real relation or real mutual transduction between a continuous term and a discontinuous term, between a structure and an energy.

A substantialistic theory of the particle led to a continuous representation of the energetic exchanges between radiation and the particle. Planck supposed on the contrary that it was necessary to admit that an electron animated by a periodic movement of frequency  $\nu$  can only emit or absorb radiant energy in *finite quantities* of value  $h\nu$ , where  $h$  is a constant. According to this hypothesis, the function  $\rho(\nu, T)$  must have the form:  $\rho(\nu, T) = \frac{8h\nu^3}{c^3} \frac{1}{e^{\frac{h\nu}{kT}} - 1}$ ,

with  $k$  always being the same constant as in Rayleigh's law and  $h$  being the newly introduced constant. For small values of  $\frac{\nu}{T}$ , Planck's equation is conflated with Rayleigh's equation, whereas for large values of this quotient it leads to Wien's empirical formula. This formula is also in agreement with the laws of thermodynamics, since it gives, for the radiation's total energy, a finite quantity proportional to  $T$ , just as Stéfan's law desires; and this quantity is that of the formula  $\rho(\nu, T) = \nu' F \frac{\nu}{T}$ , just as Wien's law requires. The constant  $h$  (Planck's constant) has the dimensions of the product of an energy by a time, or rather of a quantity of movement by a length; it therefore has the dimensions of the physical quantity called action in mechanics; it plays the role of a unit of action. "The constant  $h$  plays the role of a sort of a unit of action, the role, it could be said, of an atom of action. Planck has shown through considerations which I will not develop that this is indeed the profound meaning of the  $h$  constant. Whence the name of the 'quantum of action' that he has attributed to it."<sup>16</sup>

Here, we see the intervention of an important element valid both for the history of ideas as well as for the research of the physical individual being itself; the introduction of the quantum of action into physics was indeed considered by Louis de Broglie in 1923–1924 as needing to be incorporated into the fusion of the notions of waves and corpuscles that he brought about within the framework of the classical conceptions on spatiotemporal representations and causality. This conception, which Louis de Broglie called the "theory of the double solution," was described in the May 1927 issue of the *Journal de Physique*. Furthermore, alongside the normally envisioned continuous solutions of the equations of wave mechanics that were considered as having a statistical signification, this theory envisions other solutions that involve a singularity and that allow us to define in space the position of a corpuscle, which then takes on a much better defined individual sense due

to this very singularity. The sense of these solutions is no longer statistical like the first ones. Counter to this theory stood the likes of Born, Bohr, Heisenberg, Pauli, and Dirac, who rejected the determinism of classical physics and proposed a purely probabilistic interpretation of wave physics wherein the laws of probability had a primary characteristic and did not result from a hidden determinism; these authors dedicated themselves to the discovery of the “uncertainty relations” proposed by Heisenberg and to Bohr’s ideas concerning “complementarity.” In October 1927, the Solvay Conference of Physics marked the conflict between deterministic and indeterministic representations; here, Louis de Broglie expounded his doctrine in the form (which he qualified in 1953 as “softened”) of the pilot wave; at that time he said, “facing the almost unanimous disapproval attributed to my exposition, I have become discouraged and have returned to the probabilistic interpretation of Born, Bohr and Heisenberg, to which I have remained faithful for twenty-five years.” Nevertheless, in 1953, Louis de Broglie questioned if this faithfulness were fully justified; indeed, he observes that David Bohm, an American physicist, had taken back up “his old ideas in the shortened and barely defensible form of the pilot wave.” He also observes that J. P. Vigi er pointed out a profound analogy between the theory of waves with singularities and Einstein’s attempts to represent material particles as field singularities in the framework of general relativity. Material corpuscles as well as photons are represented as singularities within the spatiotemporal field with wave characteristics, the structure of which requires Planck’s quantum of action. This is how Einstein’s conception of particles and those proposed by Louis de Broglie could be joined in the theory of the double solution: a “grandiose synthesis” of quanta and relativity would be realized in this way.

For the study of individuation in physics, this doctrine presents quite a particular interest, for it seems to indicate that the physical individual, the corpuscle, can be represented as associated with a field without which it would never exist and that this field is not a pure expression of the probability for the corpuscle to be in a particular point at a particular instant (“probability wave”), but that the field is a veritable physical quantity associated with other quantities that characterize the corpuscle; the field, without absolutely belonging to the individual, would be centered around it and would therefore express a fundamental property of the individual, i.e. polarity, which would be there in its simplest form, because a field is precisely composed of polarized quantities that are generally representable by systems of vectors. According to this manner of seeing physical reality, the wave-corpuscle duality would not at all be the apprehension of two “complementary facets of reality” in the

sense that Bohr gives this expression, but instead the apprehension of two realities equally and simultaneously given in the object. The wave would no longer necessarily be a continuous wave. This is how the singular atomicity of action, which is the foundation of the theory of quanta, would be understood. The fundamental problem that wave mechanics poses for a theory of the physical individual is in fact the following: in the wave-corpuscule complex, how is the wave linked to the corpuscule? Does this wave belong to the corpuscule in some way? For the wave-corpuscule duality is also a wave-corpuscule pair.

If we begin with the study of waves, the quantum aspect of the emission or absorption of radiation also involves the idea that the energy of radiation during its propagation is concentrated into quanta of  $h\nu$ ; consequently, the radiant energy itself is concentrated into grains, and thus we arrive at a first manner of conceiving an association of the wave and the corpuscule when the corpuscule is nothing but a quantum. If radiation is quantified, the radiant energy is concentrated into grains in quanta of the value  $h\nu$ . This conception is necessary to interpret not only the photo-electric effect and the Compton effect, but also the existence of a clear limit on the side of the large frequencies in the continuous spectrum of X-rays emitted by an anticathode submitted to a bombardment of electrons in the Crookes or Coolidge tube (which is what allows for the experimental calculation of the constant  $h$ ); it provides a basis for the construction of a satisfying theory of the atom and of spectral lines, according to Rutherford's representation, to which Bohr has applied a theory of radiation derived from the theory of quanta. The quantified Rutherford-Bohr atom then had a discontinuous series of possible quantified states, the quantified state being a stable or stationary state of the electron: according to Bohr, in quantified states, the electron does not radiate; the emission of spectral lines then occurs due to the passage from one stationary state to another. However, this doctrine forces us to consider electrons as corpuscles that can only take certain quantified movements. Einstein proposed in 1905 the interpretation of the frequency threshold of the photo-electric effect and of the law that yields the kinetic energy of photoelectrons,  $T = K(\nu - \nu_0)$ , where  $\nu$  is the incident frequency and  $\nu_0$  the threshold frequency, after returning to the old corpuscular theory of light in a new form by supposing in a monochromatic luminous wave of frequency  $\nu$  that energy is rolled up in the form of a corpuscule of energy  $h\nu$  ( $h$  being the Planck constant). Thus, according to this theory, there are grains of energy equal to  $h\nu$  in radiation. The frequency threshold of the photo-electric effect is then given by the equation of the frequency threshold  $\nu_0 = \frac{W_0}{h}$ , in which  $w_0$  is the electron's work function.

The  $K$  constant of the experimental law cited above must be equal to the Planck constant, since the electron will escape with a kinetic energy equal to  $T = h\nu - w_0 = h(\nu - \nu_0)$ , an equality that verifies that experimental study of visible light, X-rays and gamma rays, as revealed particularly by Millikan's experiments (with a surface of lithium and then of sodium receiving the light emitted by a mercury-arc valve), the experiments of Maurice de Broglie for X-rays, and finally the experiments of Thibaud and Ellis for gamma rays.

In the theory of photons, the photon's individuality is not purely that of a corpuscle, for its energy, given by the expression  $E = h\nu$ , requires a frequency  $\nu$ , and every frequency presupposes the existence of a periodicity that is not at all implicated in the definition of a corpuscle consisting in a certain quantity of matter enclosed in its spatial limits. The photons' quantity of movement is guided in the direction of their propagation and is equal to  $\frac{h\nu}{c}$ . Relative to the upper limit of the continuous spectrum of X-rays emitted by an anticathode, the Duane-Hunt law measures this maximum frequency by the expression  $\nu_m = \frac{T}{h} = \frac{eV}{h}$ . However, this law can be interpreted directly by admitting that, after the slowing down of the electron incident on the matter of the anticathode, X-rays are emitted by the photons. The largest frequency that can be emitted is the one that corresponds with the case where an electron loses the totality of its kinetic energy in a single stroke:  $T = eV$ , and the maximum frequency of the spectrum is given by  $\nu_m = \frac{T}{h} = \frac{eV}{h}$  in conformance with the Duane-Hunt law.

Ultimately the theory of the photon was corroborated by the discovery of the Raman Effect and the Compton Effect. In 1928, Raman showed that illuminating a substance like benzene with a visible monochromatic radiation of frequency  $\nu$  yields a diffused light that contains, beyond the frequency  $\nu$  itself, other frequencies of the form  $\nu - \nu_{ik}$ , where  $\nu_{ik}$  are infrared frequencies that can be emitted by the molecules of the diffusing bodies, as well as frequencies in the form of  $\nu + \nu_{ik}$  with a much lower intensity. The explanation is clear concerning the theory of photons: if the molecules of the diffusing body are capable of emitting a radiation of frequency  $\nu_{ik} = \frac{-E_i - E_k}{h}$  because they are capable of two quantified states of energy  $E_i$  and  $E_k < E_i$ , the body illuminated by the photons of energy  $h\nu$  will emit diffused photons after the encounter between the photons and the molecules; the exchange of energy between the molecule and the photon of energy  $h\nu$  will be translated by an increase in frequency if the photon has gained energy and by a decrease if it has lost energy. If a molecule gives to a photon the energy  $E_i - E_k$  by passing from the quantified state  $E_i$  to the quantified state  $E_k$ , the energy of the photon after the encounter will be  $h\nu + E_i - E_k = h(\nu + \nu_{ik})$ . In the inverse case,

the diffused photon's energy will be  $h\nu - (E_i - E_k) = h(\nu - \nu_{ik})$ . In the first case, the photon's frequency will be  $\nu + \nu_{ik}$ , and in the second case it will be  $\nu - \nu_{ik}$ .

The Compton effect, which is produced with X-rays and gamma rays, consists in a diffusion of radiation by matter, but in the Compton effect the changes of frequency that correspond to this diffusion do not depend on the nature of the diffusing body and only depend on the direction in which the diffusion is observed. This effect is interpreted by saying that the X-ray and gamma photons encounter in the diffusing body the free or approximately free electrons that are at rest or almost at rest. The variation of the photon's wavelength is due to an energy exchange with an electron; the trajectories of the photon and of the electron can be slowed down after this energy exchange, which is a veritable shock by means of the Wilson chamber, when the photon still produces, after having struck the electron, the birth of a photoelectron, since it has encountered a gas molecule; the electron's trajectory is directly visible in the Wilson chamber due to the ionization that it produces (this is Compton's and Simon's experiment).

To clarify this relation of the wave and the corpuscle, Louis de Broglie has resorted to a critique of the concept of corpuscles such as it is used by physicists, and he opposes two conceptions of the corpuscle. The first is one that conceives the corpuscle as "a small, well localized object that depicts in space through time a sensibly linear trajectory upon which at each moment it occupies a well-defined position and is animated by a well determined speed." But there is a second conception according to which it can be said "that a corpuscle is a physical unit characterized by certain constants (mass, charge, etc.) and capable of producing localized effects in which it intervenes totally and never just in part," like, for example, the photon in the Compton effect or the photo-electric effect. Yet, according to Louis de Broglie, the second definition is a consequence of the first, but the inverse is not true: "one can indeed imagine that there are physical units capable of producing local effects but which cannot be constantly identified with small objects depicting linear trajectories in space."<sup>17</sup> However, we must choose between the ways of defining the relation of the wave and the corpuscle based on this moment. Which term is more real? Are they just as real as each other? Is the wave merely a sort of field of probability, which is, for the corpuscle, the probability of locally manifesting its presence by an observable action in such or such point? Louis de Broglie shows that three interpretations are logically possible. This author has wanted to accept what would allow for the broadest synthesis of the notions of waves and corpuscles; starting, as we have tried to indicate, from the two cases where the necessity of this bond

was apparent, that of the photon and that of the quantified movements of corpuscles, he has wanted to make this bond possible for electrons and other elements of matter or of light by linking, through formulas wherein the Planck constant  $h$  would necessarily figure, the aspects of the wave and the corpuscle indissociably tied to one another.

The first type of relation between waves and corpuscles comes from the work of Arthur Schrödinger, which consists in denying the reality of the corpuscle. Only waves would have a physical signification, analogous to those of the waves of classical theories. In certain cases, the propagation of waves would give rise to corpuscular appearances, but these would be nothing but appearances. "At the start, to clarify this idea, M. Schrödinger wanted to assimilate the corpuscle to a small packet of waves, but this interpretation could not be sustained, for the fact that a packet of waves always has a tendency to rapidly and incessantly stretch out in space and would soon not be representing a corpuscle endowed with a prolonged stability."<sup>18</sup>

Louis de Broglie does not accept this negation of the corpuscle's reality; he declares that he wants to accept the wave-corpuscle duality "as a physical fact."

The second interpretation concedes the reality of the wave-corpuscle duality and wants to give it a concrete signification conforming to the traditional ideas of physics, and it considers the corpuscle as a singularity within a wave phenomenon of which it would be the center. But, Louis de Broglie says, the difficulty is knowing why wave mechanics successfully utilizes continuous waves without singularities of the type that are found in the continuous waves of the classical theory of light.

Lastly, the third interpretation consists in only considering the ideas of the corpuscle and of the continuous wave and in regarding them as complementary facets of reality, in the sense that Bohr gives this expression; this interpretation is qualified by Louis de Broglie as "orthodox."

The second interpretation was at first that of Louis de Broglie in 1924 following the defense of his thesis: he considered the corpuscle as a singularity within an extended wave phenomenon, the whole of which forms nothing but a single physical reality. "Since the movement of the singularity is tied to the evolution of the wave phenomenon and forms its center, it would depend on all the circumstances that this wave phenomenon would encounter in its propagation in space. This is why the corpuscle's movement would not follow the laws of classical mechanics, which is a purely punctual mechanics in which the corpuscle is merely subject to the actions of the forces exerted upon it along its trajectory without undergoing any repercussion from the existence of the obstacles that can be found farther along its

trajectory: in my conception, on the contrary, the movement of the singularity would be subject to the influence of all the obstacles that would influence the propagation of the wave phenomenon with which it is interdependent, thus explaining the existence of interferences and diffraction.”<sup>19</sup>

However, as Louis de Broglie says, wave mechanics has developed by only contemplating continuous solutions without singularities for equations of propagation (these solutions are customarily designated by the Greek letter  $\Psi$ ). If the propagation of a wave (a flat and monochromatic  $\Psi$  wave) is associated with a uniform and rectilinear movement, then a difficulty is presented: the phase of the wave that allows to define the frequency and wavelength associated with the corpuscle indeed seems to have a direct physical sense, whereas the wave's constant amplitude seems to be able to be just a statistical representation of the possible positions of the corpuscle. As Louis de Broglie affirms in the same annual conference presentation, “thus there would be a mixture of the individual and of the statistical that would be mysterious and would seem to have to be clarified.” This is why de Broglie will postulate in a May article of *Journal de Physique*<sup>20</sup> that all continuous solutions for the equations of wave mechanics are somewhat doubled by a solution with a singularity  $u$  that carries a singularity that is mobile in general (the corpuscle) and that has the same phase as the solution  $\Psi$ . Between the solution  $u$  and the solution  $\Psi$ , which both have a wave form, there is no phase difference (since the phase is the same function of  $x, y, z, t$ ), yet there is a considerable difference of amplitude, because solution  $u$  conveys a singularity, whereas that of  $\Psi$  is continuous. If the equation of propagation is supposedly the same for  $u$  and for  $\Psi$ , then a fundamental theorem can be demonstrated: the mobile singularity of  $u$  must eventually describe a trajectory such that in each point the speed is proportionate to the phase gradient. “It could be said that this is how the reaction of the propagation of the wave phenomenon on the singularity that forms its center would be translated. I am also demonstrating that this reaction could be expressed by considering the corpuscle-singularity as being subject to a ‘quantum potential’ that was precisely the mathematical expression of the reaction of the wave on it.” Thus, the diffraction of light by the edge of a screen can be interpreted by saying that the corpuscle of light is subject to an action of the screen's edge and is thereby diverted from its rectilinear route, just as the partisans of the old corpuscular theory of light proclaim, but by considering that the action of the screen's edge on the corpuscle takes place through the intermediary of this “quantum potential” which is the mathematical expression of the wave on the corpuscle; the wave would therefore serve as a means of energy exchange between the corpuscle and

the screen's edge. In this interpretation, the  $u$  wave with its mobile singularity therefore simultaneously constitutes the corpuscle and the wave phenomenon that surrounds it, which is a single physical reality. What describes physical reality is the  $u$  wave and not the  $\Psi$  wave, which has no real physical signification; since the  $\Psi$  wave is deemed to have the same phase as the  $u$  wave, and the corpuscle-singularity is always displaced by following the phase gradient, the possible trajectories of the corpuscle would coincide with the curves orthogonal to the surfaces equal to the phase of  $\Psi$ ; this would lead to considering the probability of finding the corpuscle in a point as equal to the square of the amplitude or intensity of the  $\Psi$  wave. This principle was already accepted for quite a while in wave mechanics, since it was necessary for establishing the theory of the diffraction of electrons. In 1905, Einstein had already shown that the probability for a photon to be present in a point of space is proportionate to the square of the amplitude of the light wave that is associated with it; here we rediscover one of the essential principles of the wave theory of light: the density of radiant energy is given by the square of the amplitude of the luminous wave; in this case, the  $\Psi$  wave seems like a purely fictive wave, a simple representation of probabilities. But it is worth mentioning that this formal and somewhat nominal characteristic of the  $\Psi$  wave was only just so, because, in phase concordance with it, there was a  $u$  wave phase with a singularity that really described the central corpuscle of an extended wave phenomenon; and this is how Louis de Broglie concludes his retrospective exposition in 1953: "If we could have the impression that the  $\Psi$  wave fully sufficed to describe the behavior of the corpuscle such that we could observe it experimentally, this would be due to the coincidence of phases that formed the cornerstone of my theory."<sup>21</sup> In order to be received at that time, this theory required that we rework the theory of the phenomena of interference, for example that of Young's slits, by only utilizing the  $u$  wave with singularities. It would be just as necessary to interpret, with the help of the  $u$  wave, the wave mechanics of systems of corpuscles developed in the framework of Schrödinger's configuration space. But in 1953, Louis de Broglie proposes a modification of the  $u$  wave: "In 1927, I considered it as a solution with a singularity of the linear equations accepted by wave Mechanics for the  $\Psi$  wave. Various considerations, particularly the assimilation with the theory of generalized relativity of which I will speak later, have made me think that the veritable equation of  $u$  wave propagation could be non-linear like the ones we encounter in Einstein's theory of gravitation, which is a non-linear equation that would admit, as an approximate form, the equation of wave mechanics when the values of  $u$  would be weak. If this

point of view were exact, we could even admit that the  $u$  wave does not behave like a mobile singularity in the strict sense of the word singularity, but merely as a very small, mobile singular region (with dimensions on the order of  $10^{-13}$  cm) within which the values of  $u$  would be large enough for the linear approximation to no longer be valid, although it would be fully valid in the space outside this very small region. Unfortunately, this change in our point of view does not facilitate the resolution of the mathematical problems that are posed, because if the study of the solutions of linear equations with singularities is often difficult, that of the solutions of non-linear equations is even more so.”<sup>22</sup> Louis de Broglie attempted to simplify his theory for the Solvay Conference in 1927 by introducing the notion of the “pilot wave,” which was essentially the  $\Psi$  wave considered as guiding the corpuscle following the formula: “speed proportionate to the phase gradient.” Since the corpuscle’s movement is defined by the phase gradient that belongs to the solutions  $u$  and  $\Psi$ , everything seemingly happens as if the corpuscle were guided by the continuous  $\Psi$  wave. The corpuscle would then become an independent reality. This representation was not well received by the Solvay Conference, and Louis de Broglie regretted having simplified his theory in the direction of a certain formalism that eventually resulted in a nominalism: “the theory of the pilot wave leads to this unacceptable result of determining the movement of the corpuscle by a physical quantity, the continuous  $\Psi$  wave, which has no real physical signification, depends on the state of knowledge of the one who utilizes it and must vary abruptly when information happens to modify this knowledge. If the conceptions that I have announced in 1927 one day rose again from their embers, this would only occur in the subtle form of the double solution and not in the truncated and unacceptable form of the pilot wave.”<sup>23</sup> Louis de Broglie considers that the first form of his theory, which conveys the  $u$  wave and the  $\Psi$  wave, albeit difficult to justify mathematically, is quite superior to that of the pilot wave, since it is capable (in successful cases) of offering an extremely profound view of the constitution of matter and of the duality of waves and corpuscles and is even perhaps capable of allowing for a rapprochement of quantum conceptions and relativistic conceptions. Nevertheless, this rapprochement is something Louis de Broglie ardently desires, considering it to be “grandiose.”

This is why Louis de Broglie once again considers the theory of the double solution ( $u$  wave and  $\Psi$  wave) as needing to be studied starting from the moment he witnesses Bohm and Vigier resume this point of view. Following Bohm’s attempt, Vigier establishes a rapprochement between the double solution and a theorem demonstrated by Einstein. After developing the great

lines of generalized relativity, Einstein was preoccupied with the way in which the atomic structure of matter could be represented by the singularities of the gravitational field. Nevertheless, in generalized relativity we accept that the movement of a body is represented in the space-time curve by a geodesic of this space-time; this postulate allowed Einstein to newly discover the movement of the planets around the Sun and to further interpret by the same token the centennial displacement of Mercury's perihelion. Since then, if we want to define the elementary particles of matter by the existence of singularities in the gravitational field, it would have to be possible to demonstrate, solely on the basis of the equations of the gravitational field, that the movement of singularities occurs following the geodesics of space-time without having to introduce this result as an independent postulate. Einstein demonstrated this in 1927 while working in collaboration with Grommer, and then the demonstration was repeated and extended in various ways by Einstein and his collaborators Infeld and Hoffman. The demonstration of Einstein's theory presents, as Louis de Broglie claimed in 1953, a certain analogy with what he had himself presented in 1927 to prove that a corpuscle must always have its speed directed following the phase gradient of the  $u$  wave of which it constitutes a singularity. "M. Vigier fervently pursued attempts to clarify this analogy by seeking to introduce the functions of the  $u$  wave into the definition of the metrics of space-time. Although these attempts have still not fully ripened, it is certain that the path that he has trekked is quite interesting, for it could lead to a unification of the ideas of general relativity and wave mechanics."<sup>24</sup> Since material corpuscles and photons are considered to be singular regions in the metrics of space-time surrounded by a wave field to which they belong and whose definition would introduce the Planck constant, it would become possible, according to Louis de Broglie, to unify Einstein's conceptions on particles and those of the double solution theory. This "grandiose synthesis" of relativity and of quanta would have, among many other advantages, the advantage of avoiding "subjectivism," which is related, as Louis de Broglie says, to idealism in the philosophical sense, which tends to deny the independent physical existence of the observer. "Nevertheless, the physicist instinctively remains, as Meyerson has strongly emphasized long ago, a realist," and he has several good reasons for this: "subjectivist interpretations will always give him a feeling of unease, and I ultimately believe that he would be happy to break away from this."<sup>25</sup> But this synthesis, which is able to re-establish a much more profound and realist signification of the double solution theory, would also have another advantage: the singular zones of various corpuscles can in fact encroach upon one another starting

at a certain scale; this encroachment is not significant and important enough at the atomic scale ( $10^{-8}$  to  $10^{-11}$  cm) to constrict the “orthodox” interpretation, but this does not necessarily apply at the nuclear scale ( $10^{-13}$  cm). At this scale, it could be that the singular zones of corpuscles encroach on one another and that these corpuscles can no longer be considered isolated. Thus, we see appear a new mode of calculation of the relation between physical individuals that would force a consideration of density and of individual characteristics, which are defined as the singularity of the  $u$  wave. The theory of nuclear phenomena, and particularly the theory of the forces that maintain the stability of the nucleus, could begin through this new path. Physics could define a structure of particles (which is not possible with the  $\Psi$  wave) that excludes any structural representation of particles due to its statistical characteristic. The new types of mesons that have been discovered could thus be provided with a structural image due to this return to spatiotemporal images. The statistical  $\Psi$  wave could then no longer be considered a complete representation of reality; and the indeterminism that accompanies these conceptions, in the same way that the impossibility of representing the realities of the atomic scale precisely in the framework of space and time through variables that would be hidden to us, would have to be considered incompatible with this new representation of physical reality.

### 3. *The Theory of the Double Solution in Wave Mechanics*

However, it is important to note that if we begin by acknowledging that the physical individual should not be considered as a reality limited to itself and defined by its spatial limits but rather as the singularity of a wave, i.e. as a reality that can be defined by the inherence to its properties but which is also defined by the interaction that it has with other physical realities at a distance, the consequence of this initial breadth in the definition of the individual is that this notion remains affected by a coefficient of realism. Conversely, if we begin by upholding the opposite notion of the individual as being defined *stricto sensu* as a particle limited by its dimensions, then this physical being loses its reality, and probabilistic formalism replaces the realism of the preceding theory. It is specifically in probabilistic theories (which accept the classical notion of the individual from the start) that this notion is lacking due to progress in the theory of the probability wave; according to Bohr’s expression cited by Louis de Broglie, corpuscles become “unsharply defined individuals within finite space-time limits.”<sup>26</sup> The wave also loses all realist physical signification; according to the expression of Destouches, it is nothing more than a representation of probability that depends on the knowledge acquired

by the one who utilizes it. "It is personal and subjective like the assessments of probability and, like them, it is abruptly modified when the user acquires new information: this is what Heisenberg has called the 'reduction of the packet of waves by measurement,' a reduction that would alone suffice to demonstrate the non-physical characteristic of the  $\Psi$  wave."<sup>27</sup> This probability does not result from an ignorance; it results from pure contingency; such is "pure probability," which does not result from a definite hidden determinism that is calculable according to hidden parameters; the hidden parameters would not exist.

The physical individual, the corpuscle, becomes in the theories of Bohr and Heisenberg a set of potentialities affected by probabilities; it is nothing more than a being that appears fleetingly, sometimes under one aspect and sometimes under another, in conformity with the notion of complementarity that belongs to Bohr's theory and according to the relations of Heisenberg's uncertainty principle, which are the foundation of an indeterministic and probabilistic theory. In general, neither a well determined position, a speed, nor a trajectory can be attributed to the corpuscle: it can only be revealed as having a certain speed or position the moment when its measurement or observation is made. At each instant, so to speak, it possesses a whole series of possible positions or states of movement, since these various potentialities can be actualized at the moment of the measurement with certain probabilities. The associated  $\Psi$  wave is a representation of the set of the corpuscle's potentialities with their respective probabilities. The extension of the  $\Psi$  wave in space represents the indetermination of the corpuscle's positions, which can be revealed to be present in any point whatsoever of the region occupied by the wave with a probability proportionate to the square of the wave's amplitude in this point. The same applies for the states of movement: the  $\Psi$  wave has a spectral decomposition in a Fourier series or integral, and this decomposition represents all the possible states of a measurement of the quantity of movement, the possibility of each possible result of such a measurement that is given by the square of the corresponding coefficient of the Fourier decomposition. This theory has the fortune of finding in front of it, and ready to serve as its means of expression, a perfectly adequate mathematical expression: the theory of functions and proper values, developments in a series of proper functions, matrices and Hilbert space; thus, all the resources of linear analysis are immediately usable. The double solution theory is not as well served by the current state of development of mathematical formalism; it seems that a certain irregularity in the development of mathematical thought according to various paths has led to a much greater facility

of expression for the indeterministic and probabilistic theory than for the double solution theory; but the privilege thus given by a certain state of mathematical development to one of the interpretations of the wave-corpuscule relation should not be considered an index of the superiority of the easily formulable doctrine in terms of what concerns the value of the representation that it gives of physical reality. It is necessary to dissociate formal perfection from fidelity to the real. This fidelity to the real is translated by a certain capacity of discovery and fruitfulness in research. However, the indeterministic and probabilistic theory of the relation between waves and corpuscles seems to have lost this power of discovery and is closed within an increasingly remarkable self-constructive formalism (S matrices, minimum length, non-localized fields) that nevertheless do not allow for the resolution, for example, of problems relative to the stability of the nucleus.

Louis de Broglie considers this opposition between the two conceptions of the wave-corpuscule relation as essentially residing in the deterministic or indeterministic postulate. We could also consider that what is in question is the representation of the physical individual, at first in an elementary sense, but then on all levels. Probabilistic theory can only be probabilistic because it considers that the physical individual is what it seems relative to the measuring subject; there is something of a recurrence of probabilities that are installed in the very being of the physical individual despite the contingency of the relation through which the event of measure intervenes. On the contrary, at the basis of the double solution theory, there is the idea that relation has the value of being and really belongs to being. A particular wave belongs to this individual, and the latter is its center and singularity; the individual is what contains the instrument through which relation is established, since this relation is that of a measurement or some other event that conveys an energy exchange. Relation has the value of being; it is an individuating operation. In the indeterministic and probabilistic theory, a certain static substantialism of the physical individual remains in the subject; the individual can indeed be one of the terms of the relation, but the relation is independent of the terms; in the end, we could say that relation is nothing, it is only a probability for the relation to occur here or there. Relation is not of the same nature as the terms; it is a purely formal thing, something artificial in the profound sense of the term when there is a measurement, i.e. a relation of subject and object. This formalism and this artificiality, which stem from an overly narrow definition of physical individuation, then reflects back onto the usual definition of the individual, which is practically defined only by the relation: it then becomes this "unsharply defined individual". Yet the

individual precisely cannot be “sharply defined” at the start, before any relation, because it carries its possibility of relation around it and is this possibility of relation. Individuation and relation are inseparable; the capacity of relation belongs to the being and enters into its definition and into the determination of its limits: there is no limit between the individual and its activity of relation; relation is contemporaneous with being; it belongs to being energetically and spatially. Relation and being simultaneously exist as a field, and the potential that relation defines is veritable, not formal. Just because an energy is in a potential form does not mean that it does not exist. The response will be that we cannot define the potential outside of a system; this is true, but it is possible that we need to postulate that the individual is a being which cannot exist as an individual except in relation with a non-individuated real. In the probabilistic conception, it is postulated that the individual can exist alone and afterwards is found to be incapable of incorporating relation, which seems accidental and undetermined. Relation should neither be conceived as immanent to the being nor as external and accidental to it; these two theories unite in their mutual opposition in the sense that they suppose that the individual could be alone by right. If, on the contrary, we posit that the individual forms part of *at least* one system, relation becomes as real as the individual qua being, which could abstractly be conceived as isolated. The individual is *being and relation*; it is a center of activity, but this activity is transductive; it is exerted across and through a field of forces that modifies the whole system in terms of the individual and the individual in terms of the whole system. Relation always exists as potential, but it can or cannot be at a certain moment in the process of correlatively modifying the individual and system. Quantum laws seem to indicate that this relation only operates step by step and not continuously, something that guarantees stable states for both the system and the individual despite the conservation of potentials. Formalism supposes that the individual is conceived before relation, which then remains purely calculable without being subjected to the conditions of the individual’s energetic states; the individual’s state and its state changes are not conceived as the principle and origin of relation; in formalism, relation is not confused with its energetic modality. On the contrary, in realism, relation is always an energetic exchange that implies an operation on the part of the individual; the structure and operation of the individual are tied together; every relation modifies the structure, and every change of structure modifies the relation, or rather *is* relation, for every change of the individual’s structure modifies its energetic level and consequently implies an energy exchange

with other individuals constituting the system in which the individual has received its genesis.

Louis de Broglie argues that this realism requires a return to the Cartesian representations of space and time where everything is formed by “figure and movement.” Several reservations should be made about this point; Descartes indeed refuses to consider action at a distance to be possible, and he only acknowledges action through contact; an individual must be present in a point in order for it to act there; the Cartesian representation of individuation precisely identifies the individual with its geometrical limits characterized by its figure. On the contrary, it seems that the conception which considers the individual as the singularity of a wave and which consequently requires a field does not accept the Cartesian representation of individuation, even if it accepts its conception of determinism. To recall Bachelard’s expression, there is a non-Cartesian epistemology, not in the sense of determinism or indeterminism, but in the sense of what concerns the mode of action of one individual on another, whether through contact or the intermediary of a field (what Bachelard calls “electrism”). However, it would actually be because probabilistic physics begins by way of an initial Cartesian definition of individuation that it culminates in indeterminism. And this initial definition of individuation forms the basic postulate of every physical theory. For Descartes, relation is not considered as part of the individual, does not express the individual, and does not transform the individual; relation is accidental with respect to substance. The indeterministic theory conserves this definition of the individual at least implicitly, because this theory calculates the probabilities of presence at a specific point without accounting for the individual that must be present there; this same theory of indeterminism is nothing but a determinism that postulates that hidden parameters do not exist; but what is precisely identical in this determinism and indeterminism is determination, which is always an event for the individual and not a relational operation. For both, determination is a rapport and not a relation, a veritable relational act. This is why we are better off not affirming too much the possibility of a return to the Cartesian conceptions of space and time. As Louis de Broglie has said many times, Einstein’s system is much better suited to this conception of individuation than any other, including that of Descartes; a corpuscle that can be represented as the singularity of a field is not conceivable in Cartesian geometrism, insofar a singularity cannot be introduced into this space *qua res extensa* (extended substance) without excessively modifying Cartesian geometry and mechanics.

In the end, we could ask ourselves whether or not, instead of being capable of entering into the framework of an indeterministic physics or that of deterministic physics, we should consider the theory of singularities as the foundation for a new representation of the real that encompasses these two as particular cases and that should be called the theory of transductive time or the theory of the phases of being.

This definition of a new manner of thinking becoming, which calls for determinism and indeterminism as borderline cases, applies to other domains of reality than that of elementary corpuscles; this is why we have been able to obtain the diffraction of bundles of molecules by crystalline surfaces (Stern, in 1932, obtained the diffraction of molecular rays of hydrogen and helium by verifying Louis de Broglie's relation between the speed and the wavelength,  $\lambda = h / mv$ , within a margin of 1 percent).

However, it seems difficult to generalize this method by applying it to all orders of magnitude without carrying out a recasting of what could be called the topology and chronology of the physical axiomatic, i.e. without rethinking each time the problem of the individuation of the ensemble in which the phenomenon develops; in this sense, two questions can be posed: what are the limits of the usage of the notion of the photon as a physical individual? What can we consider as the real source of light in the cases where the continuous wave characteristic of light is involved in producing a phenomenon? In these two cases, it seems that the physical system must be considered in its totality.

Let's suppose that a magnetic field, for example, exists and is constant. We can speak of the field's existence and measure its intensity at a determined point, just as we can define its direction. Let's now suppose that what produced this field, for example a current in a solenoid, stops. The field will also stop, not abruptly and simultaneously in all points, but according to a perturbation that extends starting from the field's origin, the solenoid, with the speed of an electromagnetic wave. Can we consider this propagating perturbation as a photon, or at the very least as a grain of energy? If it were a question of an alternating magnetic field, this point of view would be normal, and it would be possible to define a frequency and a wavelength characterizing the presence of this alternating magnetic field. Would it not then be necessary to characterize the presence of the magnetic field, which is continuous in each point, as a potential that is a relation between the solenoid and the bodies capable of transforming these variations of the magnetic field in a current, for example? But it could be supposed that the solenoid would disappear the moment when the current that upholds the continuous

magnetic field is cut; this perturbation will not propagate any less, as though the solenoid still existed, and it will be able to produce the same effects of induction in other bodies; here this will no longer be a relation between physical individuals, since one of them will have disappeared the moment when the perturbation will arrive in a determined point far from its origin.

In the same way, it seems quite difficult to give the individuality of the photon to the modifications of an unspecified electromagnetic field. From 10-kilometer radioelectric waves (international and submarine telegraphy) to the most penetrating gamma rays, a formulaic analogy and a veritable continuity in both the modes of production and the physical properties tie together all electromagnetic relations. However, the granular nature of these radiations is quite apparent for short wavelengths, but it becomes extremely unclear for large wavelengths, and, if we wanted, this could tend toward an infinite wavelength corresponding to a null frequency without thereby nullifying the reality of the electrical field and the magnetic field. A perturbation that would be produced in these fields would propagate at the speed of light; but if no perturbation were produced, then nothing would propagate, and yet fields continue to exist, since they can be measured as continuous fields. Should the continuous field be distinguished from the perturbation that could propagate if it appears? The continuity of the field in each point can also be interpreted as an information indicating that the source still existed at a determined instant. Since the field is real, it would be necessary to suppose as real an infinite wavelength that would correspond to this null frequency. But then the individuality of the grain of energy loses its signification outside the physical beings that radiate or receive this energy. Therefore, it still seems that a definition of physical individuality is to be specified. Perhaps we shouldn't speak of the individuality of the particle of energy like the individuality of the particle of matter; there is a source of the photon and of the electromagnetic perturbation. The conception of space would be contested; it is doubtful that the Cartesian conception can be suitable without being completed. Let us ultimately note that a quantitative formalism does not suffice to resolve this difficulty of relation between space and time: the cessation of a magnetic field is not identical to the establishment of the magnetic field; even if the effects of induction that the two variations of flux can provoke in a circuit (both at the end and at the start) are equal but for the current sense, the presence of the constant magnetic field corresponds to a possibility of energy exchange between, for example, the solenoid that creates it and a circuit that is made to turn at a certain distance in such a way as to penetrate one of its sides with a constantly variable flux. When the field no longer exists, this

possibility of energetic coupling no longer exists; the regime of possible energy exchanges in the system has changed; it can be said that the system's topology has changed due to the disappearance of a constant field that nevertheless did not transport energy when no flux variation took place. Thus appears the reality of relations other than those of events between individuals (such as a theory of probabilities can make them seem).

Finally, it would be quite important to know whether the new path down which Louis de Broglie wants to see wave mechanics tread suppresses or conserves the indiscernibility of individuals with the same characteristics, for example electrons. Still using probabilistic methods, according to Kahan and Kawal,<sup>28</sup> we must postulate that the probability of finding two electrons in two defined states when they are in interaction is independent from their numbering; this indiscernibility of identical particles disrupts the exchange in the problem that seeks their respective energy levels. We could also wonder if Pauli's principle of exclusion is still valid.

A similar difficulty relative to the individuation of physical systems appears in the phenomenon of interferences: whenever we consider an experiment of interferences in a non-localized field, we theorize this experiment (Young's slits contemplated as a means of producing not a diffraction but two synchronous oscillators, Fresnel's mirror, Billet's lens) by saying that the light waves are emitted by two synchronous sources (which are synchronous because they receive their light from a single source) and that they are themselves nothing but secondary sources arranged at equal distances from a primary source. Yet, if we carefully consider the structure and activity of this primary source, we realize that it is possible to obtain a very clear phenomenon of interference (with extinction practically complete in the dark bands), even if a primary source containing a very large number of atoms is utilized; a source, for example, constituted by a segment of Tungsten filament .5 mm long and .2 mm in diameter necessarily contains several tens of thousands of atoms. Furthermore, we can take an extremely voluminous source, like a carbon arc lamp in which light emanates from a gap and from a point whose active surface (from which the column of luminous vapor stems) is about a square centimeter for a strong intensity. However, since it has passed through a minuscule diaphragm that serves as the primary source, the light that emanates from this strong luminous area is capable of producing the phenomenon of interference as if it were produced by a very small segment of incandescent filament. Then is there a real synchronization between the molecules and the atoms of these large luminous surfaces? Every moment a very large number of non-synchronized oscillators emit light; it would seem normal to

consider the phenomenon as a result that conforms with the laws of statistics; we would then have to suppose that the phenomenon of interference will be all the more unclear because there will be a greater number of non-synchronized oscillators (we mean by this not oscillators of different frequencies but relative to an unspecified phase) in order to constitute the primary source; and it does not seem that experimentation verifies this prediction. Yet, given the order of magnitude of the sources utilized, even the smallest sources already contain a large number of elementary oscillators that do not seem to be able to be in phase. These oscillators cannot be in phase when they have different frequencies; however, the phenomenon is always produced even though only the central bands are distinct, since the bands relative to each frequency are less superposed the farther they are from the central band. What is the phase synchronization that can exist between waves emitted by oscillators of the same frequency? Does this synchronization arise from the unity of the system that contains them? Is there a coupling that is produced between these oscillators placed at a short distance from one another? But if a primary source is constituted by means of an optical apparatus that unifies the rays emitted by two distinct sources, would this phase synchronization remain? Or instead, is the phenomenon independent of any phase synchronization? It is perhaps noteworthy to link the study of light to that of the source which produces it. The photon's individuality cannot be considered absolutely independent from the oscillator that produces it or from the system to which this oscillator possibly belongs. Thus, all the oscillators included in the same energetic system would have a certain linkage between them that could make synchronization possible, and there would be not just a frequency synchronization but a phase synchronization between these oscillators in such a way that the individuality of the photons is affected and somehow marked by this original systematic community. Finally, let's note that the light originating from a star can still give rise to a phenomenon of interference, as if the source were actually that of an extremely small, real diameter; it nevertheless seems impossible to consider a star as a single oscillator, even if it presents itself with an apparent diameter smaller than any assignable magnitude; the extreme smallness of this apparent diameter cannot in principle change the phase rapport of the different photons picked up by the interferometer; photons that originate from parts quite distant from one another (relative to wavelength) on the star that is taken as their source can be picked up by this interferometer. Then where does this synchronization come from? It no doubt comes from the apparatus in which the interferences are produced; but the latter is not itself a veritable source. Or instead it is necessary

to suppose that each photon is divided into two quantities of energy that would be like semi-photons, and that each half of the photon would manage to interfere with the other half on the screen in which the phenomenon is produced; this supposition hardly appears acceptable precisely due to the individual nature of the photon. For all these reasons, it seems that we cannot bestow physical individuality upon the photon in the sense of a material corpuscle; the photon's individuality would merely be proportionate to its frequency, i.e. to the quantity of energy ( $h\nu$ ) that it transports, without this individuality ever being able to be complete, since it would then require this frequency to be infinite, and no oscillator can produce an infinite frequency. A photon that would have an infinite frequency could be assimilated to a veritable particle of matter. We should still note that there perhaps exists a threshold beyond which it could be said that the photon's frequency corresponds to a veritable individuality: this frequency would be that for which the photon's energy is or would be equal to the energy of a material particle whose transformation into energy would precisely give the quantity of energy which would be the energy of this very high frequency photon. This photon would then be functionally equivalent to a piece of matter.

#### *4. Topology, Chronology and Order of Magnitude of Physical Individuation*

Furthermore, if we contemplate microphysical reality directly, an interpretation of individuation starting from the phenomena of structural change would aim to consider becoming as essentially linked to the operations of individuation that are carried out in successive transformations; determinism would remain applicable as a borderline case when the system considered is not the theater of any individuation, i.e. when no exchange takes place between energy and structure (which would modify the system's structures), thus leaving it topologically identical to what it was in its previous states; on the contrary, indeterminism would seem like a borderline case when a complete structural change manifests in a system with the transition from one order of magnitude to another; this is the case, for example, of the modifications brought to a system by the fission of an atomic nucleus: intranuclear energies, which up to that point belong to the internal system of this nucleus, are unleashed by fission and can act as a gamma photon or a neutron on the bodies that belong to a system situated on a scale larger than that of the atomic nucleus. Nothing in a macroscopic system allows us to predict at which moment of macroscopic time there will be a fission unleashing an energy that will nevertheless be effective on the macroscopic level. Indeterminism

is not merely linked to measurement; it also stems from the fact that physical reality involves topologically interlocking scales of magnitude, each of which has their own becoming and their own particular chronology. Indeterminism would exist in a pure state if there were no correlation between the topology and the chronology of physical systems. This absence of correlation is never absolutely complete; this can only be said abstractly of an absolute indeterminism (realizable by a complete internal resonance) or of an absolute determinism (realizable by a complete independence between chronology and topology). The general case is that of a certain level of correlation between a system's chronology and topology, a level which is moreover variable due to the vicissitudes of its own becoming; a system reacts on itself not only in the sense of the principle of entropy through the general law of its internal energetic transformations, but also by modifying its own structure through time. The becoming of a system is the manner in which it individuates, i.e. essentially the manner in which it is conditioned according to the different structures and successive operations through which it reverberates within itself and phase-shifts relative to its initial state. Determinism and indeterminism are merely borderline cases, because there is a becoming of systems: this becoming is the becoming of their individuation; there is a reactivity of systems with respect to themselves. The evolution of a system would be determined if there were no internal resonance of the system, i.e. no exchange between the different scales that it encompasses and that constitute it; no quantum structural change would be possible, and we could know the becoming of this system in a theory of the continuous or according to the law of large numbers (as thermodynamics does). Pure indeterminism would correspond to such an elevated internal resonance that any modification occurring on a determined scale would immediately reverberate throughout all levels as a structural change. In fact, the general case is that of quantum thresholds of resonance: in order for a modification produced on one of the levels to reach the other levels, it must be above a certain value; internal resonance only develops discontinuously and with a certain delay from one scale to another; the individuated physical being is not totally simultaneous relative to itself. Its topology and chronology are separated by a certain gap that is variable according to the becoming of the individuated whole; substance would be a physical individual totally resonant with respect to itself and consequently totally identical to itself, perfectly coherent with itself and singular. The physical being must be considered, on the contrary, as more than unity and more than identity, rich in potentials; the individual is undergoing individuation based on a pre-individual reality that sustains it; the perfect individual (totally

individuated, substantial, deprived and emptied of its potentials) is an abstraction; the individual is undergoing ontogenetic becoming, it has with respect to itself a relative coherence, a relative unity, and a relative identity. The physical individual must be thought as a chrono-topological whole whose complex becoming involves successive crises of individuation; the being's becoming consists in this non-coincidence of chronology and topology. The individuation of a physical ensemble would then be constituted by the interlinking of the successive regimes of this ensemble.

Such a conception would therefore consider energetic regimes and structural states as convertible with one another through an ensemble's becoming; due to the notion of orders of magnitude and the notion of thresholds in exchanges, it would assert that individuation exists between the pure continuous and the pure discontinuous; the notion of thresholds and of quantum exchange is indeed a mediation between the pure continuous and the pure discontinuous. It would bring in the notion of information as a fundamental characteristic of individuation conceived according to dimensions that are both chronological and topological. We could then speak of a more or less elevated level of individuation: an ensemble would possess a more elevated level of individuation in proportion to the greater amount of pre-individual reality it would envelop and compatibilize in its chronological and topological systematics, or in proportion to the difference between orders of magnitude.

Such a hypothesis supposes that there is no elementary individual, no first individual anterior to every genesis; there is individuation in an ensemble; the first reality is pre-individual and is richer than the individual understood as the result of individuation; the pre-individual is the source of chronological and topological dimensionality. The oppositions between continuous and discontinuous, particle and energy, would thus express not so much the complementary aspects of the real as the dimensions that emerge in the real when it becomes individuated; complementarity on the level of individuated reality would be the translation of the fact that individuation appears, on the one hand, as ontogenesis and, on the other hand, as an operation of a pre-individual reality that not only produces the individual, the model of substance, but also produces the energy or the field associated with the individual; only the associated field-individual pairing accounts for the level of pre-individual reality.

This supposition of the first pre-individual nature of reality is moreover what allows us to consider the physical individual veritably as an ensemble; the individual corresponds to a certain dimensionality of the real, i.e. to an associated topology and chronology; the individual is an edifice in its most

current form, i.e. in the form in which it appears to us, whether crystal or molecule. As such, it is not an absolute but a reality that corresponds to a certain state of (generally metastable) equilibrium and is founded on a regime of exchanges between the different orders of magnitude that can be modified either by internal becoming or by an external event that brings a certain new condition to the internal regime (for example, an energetic condition when the neutron originating from the fission of a nucleus provokes the fission of another nucleus). Thus, there is a certain consistency of the individual but not an absolute antitypy, an impenetrability in a substantial sense. The consistency of the individual edifice is still founded on quantum conditions; it depends on thresholds.

The limits of the physical individual are also themselves metastable; an ensemble of fissile nuclei isn't really an individuated ensemble if the number of nuclei, taking into account the average radioactivity of the nuclei, is small enough for the fission of a nucleus to have little chance of provoking the fission of another nucleus;<sup>29</sup> everything happens as if each nucleus were isolated from the others; each has its own chronology, and the fission occurs for each nucleus as if it were alone; on the contrary, if a large quantity of fissile material is gathered together, the probability for the results of the fission of a nucleus to provoke the fission of another nucleus increases: when this probability reaches unity, the internal chronology of each nucleus abruptly changes: instead of consisting in itself, it forms a network of internal resonance with the resonance of all the other nuclei capable of fission: the physical individual is then the entire mass of fissile material and no longer each nucleus; the notion of critical mass gives the example of what can be called a relative threshold of individuation: the chronology of the ensemble becomes abruptly coextensive with the topology of the ensemble;<sup>30</sup> there is individuation because there is exchange between the microphysical level and the macrophysical level; the capacity for the ensemble's reception of information abruptly increases. By modifying topological conditions, we can utilize nuclear energy either for abrupt effects (through the gathering of several masses, each inferior to critical mass) or for continuous moderate effects (by controlling the exchange between fissile nuclei by means of a controllable apparatus that maintains the ensemble below the unitary coefficient of amplification, for example through the greater or lesser absorption of radiation). Consequently, it can be said that the degree of individuation of an ensemble depends on the correlation between the system's chronology and topology; this degree of individuation can also be called the level of interactive communication, since it defines the degree of the internal resonance of the ensemble.

From this point of view, it seems possible to understand why the antagonistic representations of the continuous and the discontinuous, of matter and energy, of structure and operation, are not usable except as complementary pairs; this is because these notions define opposite and extreme aspects of the orders of reality between which individuation is established; but the operation of individuation is the active center of this relation; it is the latter that is the unity of this center that splits into aspects which are complementary for us, albeit in the real they are paired by the continuous and transductive unity of intermediary being, what we call here internal resonance; the complementary aspects of the real are extreme aspects that define the dimensionality of the real. Since we can only grasp reality through its manifestations, i.e. when it changes, we only perceive extreme complementary aspects; but, rather than the real, what we perceive are dimensions of the real; we grasp its chronology and topology of individuation without being able to grasp the pre-individual real that subtends this transformation.

Information, understood as the arrival of a singularity that creates a communication between orders of reality, is what we can think most easily, at least in several particular cases like (free or limited) chain reactions. This intervention of a notion of information does not however allow us to resolve the problem of the rapport of different levels of individuation. A crystal is composed of molecules; it requires the unity of energetic conditions (metastability) and structural conditions (a crystalline germ) for us to have a crystallized supersaturated solution; can an individuated being such as a molecule, which is already an edifice, intervene as a structural germ of this larger edifice, i.e. a crystal? Or instead, does it take a structural germ that is already of an order of magnitude superior to that of a molecule for the crystal to be able to begin? In the current state of knowledge, it is difficult to come up with a generalizable answer to this question. It can merely be said that the problem of the rapports of inert matter and life would be clearer if it could be shown that the living being is characterized by the fact that it discovers in its field of reality structural conditions that allow it to resolve its own incompatibilities, the distance between the orders of magnitude of its reality, whereas inert matter does not have this capacity of the autogenesis of structures; a singularity is required in order for the supersaturated solution to crystallize; does this mean that inert matter does not increase its capital of singularities, whereas living matter increases this capital, since this increase is precisely the ontogenesis of the living being and is capable of adaptation and invention? This distinction can only be given as a methodological hypothesis; it does not seem that we can oppose a living matter and a non-living matter,

but instead we can oppose a primary individuation in inert systems and a secondary individuation in living systems, specifically according to the different modalities of the regimes of communication during these individuations; between the inert and the living, there would then be a quantum difference of the capacity for the reception of information rather than a substantial difference: if it exists, the continuity between the inert and the living would have to be sought on the level that is situated between microphysical reality and macrophysical reality, i.e. on the level of the individuation of systems like the large molecules of organic chemistry, which are complex enough for variable regimes of the reception of information to be able to exist in them and restricted enough in their dimensions for microphysical forces to intervene in them as carriers of energetic and structural conditions.

According to this conception, it could be said that the bifurcation between the living and the non-living is situated on a certain dimensional level, that of macromolecules; phenomena on an inferior order of magnitude, which are called microphysical phenomena, would in fact neither be physical nor vital, but pre-physical and pre-vital; the pure non-living physical would only begin on the supra-molecular scale; it is at this level that individuation puts forth the crystal or the mass of protoplasmic matter.

In the macrophysical forms of individuation, we indeed distinguish the living from the non-living; while an organism assimilates by diversifying, the crystal grows through the iteration of an addition of indefinitely ordered layers. But at the level of macromolecules, it can hardly be said whether viruses are living or non-living. To adopt the notion of information reception as an essential expression of the operation of individuation would be to assert that individuation is carried out on a certain dimensional (topological and chronological) scale; below this scale, reality is pre-physical and pre-vital, since it is pre-individual. Above this scale, there is *physical* individuation when the system is capable of receiving information a single time, then develops and amplifies this initial singularity by individuating in a non-self-limited way. If the system is capable of successively receiving several inputs of information (of compatibilizing several singularities instead of iterating the single and initial singularity cumulatively and through transductive amplification), then individuation is vital, self-limited and organized.

It is customary to see in vital processes a greater complexity than in non-vital physicochemical processes. However, to be faithful (even in the most hypothetical conjectures) to the intention that animates this research, we will suppose that vital individuation does not come *after* physicochemical individuation but during this individuation and before its fulfillment, by suspending

it at the moment when it has not reached its stable equilibrium and by making it capable of expanding and propagating before the iteration of the perfect structure merely able to repeat itself, which would conserve in the living individual a bit of pre-individual tension, of active communication, in the form of internal resonance between extreme orders of magnitude.

According to this way of viewing things, vital individuation would come to be inserted in physical individuation by suspending its course, by slowing it down and by making it capable of propagating in the inchoate state. The living individual would be, in some sense and on its most initial levels, a crystal in the nascent state that is amplified without stabilizing.

To relate this schema of interpretation to the most current notions, we can appeal to the idea of neoteny and generalize these types of rapports between classes of individuals by supposing a slew of possible neotenic developments in the category of living beings. In a certain sense, animal individuation can be considered more complex than vegetal individuation. However, the animal can also be considered an inchoate plant that develops and becomes organized while conserving the motive, receptive and reactional possibilities that appear in the reproduction of plants. If it is supposed that vital individuation retains and expands the most precocious phase of physical individuation (such that the vital would be the physical in suspense, slowed down in its process and indefinitely expanded), it can also be supposed that animal individuation is nourished by the most primitive phase of vegetal individuation, which retains within it something prior to its development as an adult plant and, more specifically, maintains a capacity for receiving information over a much longer period of time.

Thus, it would be understood why these categories of increasingly complex but also increasingly unfinished and decreasingly stable and self-sufficient individuals require more complete and more stable layers of individuals as an associated milieu. Living beings require physicochemical individuals to live; animals requires plants, which are for them, in the proper sense of the term, Nature, in the same way that chemical compounds are for plants.

PART II

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The Individuation of  
Living Beings



# Information and Ontogenesis: Vital Individuation

## I. PRINCIPLES TOWARD A STUDY OF THE INDIVIDUATION OF THE LIVING BEING

### *1. Information and Vital Individuation; Levels of Organization; Vital Activity and Psychical Activity*

Physiology poses the difficult problem of levels of individuality depending on the species and according to each being's moments of existence; the same being can in fact exist on different levels; the embryo is not individualized in the same sense as the adult being; furthermore, in fairly related species, there are behaviors that correspond to a more or less individualized life depending on the species, without these differences necessarily seeming to be linked to a superiority or inferiority of vital organization.

To shed some light on this, it would be helpful to define a measure for levels of individuation; however, if the degree of individuality is submitted to variations in the same species depending on the circumstances, it is difficult to measure this individuality absolutely. It would then be necessary to define the type of reality in which individuation takes place, by saying with which dynamic regime it is exchangeable when the level of organization does not vary throughout the whole system that contains the vital unit. Then we would obtain a possibility of measuring the degree of individuality.<sup>1</sup> According to the methodological postulate that we just defined, it would be helpful to resort to the study of integration in systems of organization. In fact, organization can occur either in each being or through the organic relation that exists between different beings. In the latter case, the internal organization in the being is duplicated by an external integration; the group is integrative. The only concrete reality is the vital unit, which can in certain cases be reduced to a single being and which in other cases corresponds to an extremely differentiated group of multiple beings.<sup>2</sup>

Furthermore, the fact that an individual is mortal and not divisible by fission or regenerable through protoplasmic exchange corresponds to a level of individuation that indicates the existence of thresholds. Unlike physical individuation, biological individuation takes into account the existence of the whole species, colony, or society; it is not indefinitely extendable like physical individuation. If physical individuation is unlimited, we must seek where there is a transition between physical individuation and biological individuation. Yet, the biologically unlimited is found in the species or in the group. What we call individual in biology is in reality something like a sub-individual much more so than an individual; in biology it seems that the notion of individuality is applicable to several stages or according to different levels of successive inclusion. But analogically, it would be necessary to consider the physical individual as a biological society, and the latter alone would be the image of a (albeit very simple) totality.

The first consequence of this manner of thinking establishes that the level of organization contained in a physical system is inferior to that of a biological system, but that a physical individual can possibly have a level of organization superior to that of an individual biological system integrated into a vaster ensemble. Nothing is theoretically opposed to the fact that there is a possibility of exchanges and alternations between a physical system and a biological system; but if this hypothesis is valid, it will be necessary to suppose that a physical individual unit transforms into a biological group, and that what makes the living being appear is in a sense the suspension of the development of the physical being and its analysis, not a synthetic relation which unites completed physical individuals. If this is the case, then we will have to say that only very complex physical edifices can transmute into living beings, which truly limits the possible cases of spontaneous generation. According to this view, the unit of life would be the complete organized group and not the isolated individual.

This doctrine is not a materialism, since it supposes a sequence leading from physical reality to the higher biological forms without establishing a distinction between classes and genera; but, if it is complete and satisfactory, this doctrine must be able to explain why and in what sense there is the possibility of inductively observing the genus-species (or even the species-individual) relation. This distinction must be situated in a broader reality that can account for both the continuity and the discontinuities between species. This discontinuity seems comparable to the quantum characteristic that appears in physics. The criterion of syncrystallization that allows us to recognize chemical species (by indicating in which system they crystallize) indicates a type

of rapports of real analogy founded on an identity of ontogenetic dynamism; the process of the crystal's formation is the same in both cases; there can be a sequence during the growth of a crystal composed of different chemical species, so that its growth is continuous despite the specific heterogeneity of the different levels. The unity created by the continuity of an operation of individuation that encompasses species which seem heterogeneous to one another according to an inductive classification indicates a profound reality pertaining to the nature of these species as rigorously as what is called specific characteristics; the possibility of syncrystallization does not however indicate the existence of a genus, because, starting from the criterion of syncrystallization, we cannot go back down to the particular characteristics of each syncrystallizable body by adding on specific differences. Such a property, which indicates the existence of a process of information during an operation of individuation, does not belong to the systematics of genera and species; this property indicates other properties of the real, properties which the latter presents when we consider it relative to the possibility of the spontaneous ontogeneses that can occur in it depending on its own structures and potentials.

Such are the properties that can be studied in order to characterize the living being rather than the specific form, which does not allow for us to go back down to the individual, since this form has been obtained by abstraction and therefore by reduction. This kind of research supposes that we consider legitimate the usage in biology of a paradigm taken from the domain of the physical sciences and particularly from the processes of morphogenesis that occur within this domain. In this sense, it is necessary to suppose that the elementary levels of the biological order contain an organization of the same order as the one that the most perfectly individuated physical systems contain, for example those that generate crystals or the large metastable molecules of organic chemistry. Indeed, such a research hypothesis can seem quite overwhelming; custom in fact prompts us to think that living beings cannot result from physical beings, since they are superior to the latter due to their organization. Nevertheless, this very attitude is a consequence of an initial postulate according to which inert nature cannot contain a high level of organization.<sup>3</sup> If, on the contrary, we posited right from the beginning that the physical world is already highly organized, we wouldn't be capable of committing this basic error that results from a devaluation of an inert matter; in materialism, there is a doctrine of values that supposes an implicit spiritualism: matter is given as less richly organized than the living being, and materialism seeks to show that the superior can emerge from the inferior. It

constitutes an attempt at the reduction of the complex to the simple. But if from the start it is estimated that matter constitutes systems provided with a very high level of organization, then we cannot so easily hierarchize life and matter. Perhaps it would be necessary to suppose that the organization is conserved but is transformed in the passage from matter to life. If this were the case, then we would have to suppose that science will never be complete, since this science is a relation of beings that by definition have the same degree of organization: a material system and an organized living being attempting to think this system by means of science. If it were true that organization is neither lost nor created, we would conclude that organization cannot but be transformed. A type of direct relation between the object and the subject manifests in this affirmation, for the relation between thought and the real becomes a relation between two organized reals that can be analogically linked by their internal structure.

However, even if organization is conserved, it is untrue to say that death is nothing; there will be death, evolution and involution, and the theory of the rapport between matter and life must be able to account for these transformations.

According to this theory, there would be a determined level of organization in each system, and these same levels could be found in a physical being and in a living being. This is why it would be necessary to suppose that when beings like an animal are composed of several superposed ranks of relays and systems of integration, there is no single organization within them that would have any exterior cause, origin, or equivalent: since the level of organization belonging to each system is limited, it can be thought that if a being seems to possess a high level of organization, this is because it actually integrates already informed and integrated elements and because its own integrative task is quite limited. Its individuality would then be reduced to a fairly restrained organization, and the word nature, which is applied to what in the individual is not the product of its activity, would have a very important meaning, since each individual would be indebted to its nature for the rich organization that it seems to possess on its own. It could then be supposed that the external richness of the relation to the milieu is equal to the internal richness of organization contained in an individual.

Internal integration is made possible by the quantum nature of the relation between (interior and exterior) milieus and the individual as a definite structure. The individual's characteristic relays and integrators could not function without this quantum regime of exchanges. The group exists as an integrator and differentiator relative to these sub-individuals. The relation between the

singular being and the group is the same as between the individual and sub-individuals. In this sense, it is possible to say that there is a homogeneity of relation between the different hierarchical scales of the same individual and similarly between the group and the individual. The total level of information is then measured by the number of stages of integration and differentiation as well as by the relation between integration and differentiation (which can be called transduction) in the living being. In the biological being, transduction is not direct but indirect according to a twofold ascending and descending chain; along each of these chains, transduction is what allows for signals of information to pass, but this passage, instead of being a simple conveyance of information, is integration or differentiation, and it is produced by a preliminary labor due to which the final transduction is made possible, whereas in the physical domain this transduction exists in a system as a weak or elevated internal resonance;<sup>4</sup> if integration and differentiation alone were real, life would not exist, for it would also require resonance to exist, but then it would be a question of a particular type of resonance that allows for a preliminary activity which requires an elaboration.

If we utilize psychological terms to describe these activities, we will see that integration corresponds to the usage of representation and differentiation corresponds to the usage of activity which distributes in time energies acquired progressively and kept in reserve, whereas representation preserves the information that is acquired through abrupt leaps according to the circumstances in such a way as to create a continuum. Ultimately, transduction is carried out by affectivity and by all the systems that play the role in the organism of transducers on various levels. The individual would therefore always be a system of transduction, but, while this transduction is direct and on a single level in the physical system, it is indirect and hierarchized in the living being. It would be false to think that only transduction exists in a physical system, for there is also an integration and a differentiation, but they are situated on the very limits of the individual and only detectable when it grows. This integration and differentiation at the limits are found in the living individual, but then they characterize its relation to the group or to the world, and they can be relatively independent from the differentiation and integration that take place within the living individual. Such an assertion makes it impossible to understand how these two groups of integration and differentiation are connected. Those that act on the exterior cause structural changes of the ensemble in which they are produced, changes which are comparable to those of a corpuscle that absorbs or emits energy in a quantum way by passing from a more excited state to a less excited state, or vice versa. Perhaps the relation

between the two types of processes is the basis of this variation in the individual's levels accompanied by a structural change that is the internal correlative of an exchange of information or energy with the outside. Indeed, let's note that effort doesn't just have motor aspects but also has affective and representative aspects; the quantum characteristic of effort, spanning both a continuity and a discontinuity, very clearly represents this integration and this differentiation in the mutual relations of an interior grouping to an exterior grouping.

The problem of individuation would be resolved if we knew what information is in its rapport with other fundamental physical quantities, like the quantity of matter or the quantity of energy.

The homeostasis of the living being does not exist in the purely physical being, because homeostasis is related to external conditions of transduction due to which the being utilizes the equivalence in external conditions as safeguards for its own stability and its internal transduction. Heterogeneous transductive characteristics only appear in physics in the margins of this physical reality; on the contrary, interiority and exteriority are everywhere in the living being; the nervous system and the interior milieu guarantee that this interiority is in contact on all sides with a relative exteriority. The equilibrium between integration and differentiation is what characterizes life; but homeostasis is not full vital stability. The quantum nature of discontinuous action will be opposed to the continuous nature of the constructive knowledge of synthesis in order to constitute this mixture of the continuous and discontinuous that is manifested in the regulative qualities which serve as a rapport between integration and differentiation. Qualities appear in the reactivity through which the living being evaluates its own action; however, these qualities do not allow us to reduce this rapport to a simple consciousness of the discrepancy between the end and the result, and thus to a simple signal. This is what the automaton lacks in order to be a living being; the automaton can only adapt in a manner convergent with a set of conditions by increasingly reducing the gap that exists between its action and its predetermined end; but it does not prevent and does not discover ends during its action, for it does not carry out any veritable transduction, since transduction is the expansion of an initially very restricted domain that increasingly takes on size and structure; biological species are endowed with this capacity of transduction due to which they can indefinitely expand; crystals are also endowed with this capacity to indefinitely expand; but, whereas the crystal has its whole power of growing localized on its limit, this power in the species has fallen to an ensemble of individuals that grow for themselves, from the interior as well

as the exterior, and that are limited in time and space but reproduce and are unlimited due to their capacity to reproduce. The most conspicuous biological transduction is thus essentially the fact that each individual reproduces analogues. The species advances in time, like a physicochemical modification that would proceed by degrees with a marginally weak recovery of generations, i.e. like active molecular levels on the edge of a crystal undergoing formation.<sup>5</sup> In some cases, an edifice comparable to that of the crystal is left behind by the generations that come after it.<sup>6</sup> Furthermore, the growth of the living individual is an ongoing and localized type of transduction that has no analogue in physics; a particular individuality combines with the specific individuality.

Life would therefore be conditioned by the recurrence of causality due to which a process of integration and a process of differentiation can receive a coupling while remaining distinct in their structures. Thus, life is not a distinct substance of matter; it supposes processes of integration and differentiation that cannot in any way be given by something other than physical structures. In this sense, there would be a profound triality of the living being through which we would find in it two complementary activities and a third activity that carries out the integration of the preceding as well as their differentiation via the activity of causal recurrence; indeed, recurrence does not add a third relation to the preceding, but the qualification that it authorizes and constitutes provides a relation between activities that could not have any other commonality. The basis of unity and affective identity is therefore in the affective polarity due to which there can be a relation of the one and the multiple, of differentiation and integration. What the qualification constitutes is the relation of two dynamisms; it is already this relation on the lowest level, and it remains on the level of the superior affectivity of human feelings. Beginning with pain and pleasure understood in their concretely organic nature, relation manifests as a closure of the reflex arc, which is always qualified and oriented; higher up in sensible quality, a similar polarity, which is integrated as a global and particularly dense constellation, characterizes the acquired personality and allows for it to be recognized. When a subject wants to express its internal states, what it resorts to is this relation through the intermediary of affectivity, which is the principle of art and of all communication. In order to characterize an exterior thing that cannot be shown, it is through affectivity that we can pass from the continuous totality of knowledge to the singular unity of the object to be evoked, and this is possible because affectivity is present and available to institute the relation. Each

association of ideas passes through this affective relation. Thus there are two possible types of utilization of relation already constituted by going from the unity of knowledge to the plurality of action or from the multiplicity of action to the unity of knowledge; these two complementary paths are joined together in certain symbolisms, like poetic symbolism, and due to this double relation poetic symbolism can become self-enclosed in aesthetic recurrence, which does not benefit the integration of the entire subject, since it is in fact already virtually contained in the premises of the symbol-object to be contemplated and utilized as a mixture of activity and knowledge.

The anatomo-physiological study of vital processes reveals the distinction between the motor and receptor organs, at least in the arrangement of the cortical areas and in the functioning of the brain; but we also know that the brain is not just composed of areas of projection; a large part of the frontal lobes takes part in the association between the receptor and motor areas; the neurosurgical practice of lobotomy, which consists in dampening the recurrence of causality linking integration and differentiation, deeply modifies the subject's affectivity, whereas, in principle, this lobotomical intervention perfectly leaves intact the center or centers of affectivity situated in the region of the pituitary stalk, i.e. in regions quite different from those that constitute the neocortex; according to this hypothesis, it would be necessary to distinguish between instantaneous affectivity, which is perhaps indeed localizable in the region of the pituitary stalk, and relational affectivity, which concerns what is produced by the integrative activity and differentiated activity, which could be called affective activity, since it characterizes the individual in its singular life and not in its relation to the species. The region of the archicortex would then concern more so the regulation of drives than the regulation of elaborated affectivity; it would manifest in the relation between the subject's tendencies and the qualities that it discovers in the milieu, more so than in the conscious elaboration of this transduction characterized by the activity of the neocortex, which is the affectivity of the individual qua individual.

We would also understand in this sense that affectivity is the sole function (due to its relational aspect) capable of giving a meaning to negativity: the nothingness of action and the nothingness of knowledge are indiscernible without a positive context in which to intervene as a limitation or a pure lack; by contrast, for affectivity nothingness can be defined as the contrary of another quality; as Plato has noted, every realized quantity appears to be inserted according to a measurement in an indefinite dyad of contrary and absolute qualities; qualities become pairings of opposites, and this bipolarity

of each qualitative relation is constituted as an ongoing possibility of orientation for the qualified and qualifying being; nothingness has a meaning in affectivity, because two dynamisms confront one another at each instant; the relation of integration to differentiation is constituted as the bipolar conflict in which forces are exchanged and reach equilibrium. The being conserves its identity due to its orientation with respect to itself and to this affective polarization of every content and every psychical constituent. Identity seems to be founded on the permanence of this orientation in the course of existence, an orientation which is deployed due to the qualification of action and knowledge. Certain very profound intuitions of the pre-Socratic philosophers reveal how a qualitative dynamism exchanges actions and structures in existence, either within a being or from one being to another. Heraclitus and Empedocles in particular defined a relation of the structure and of the operation which supposes a bipolarity of the real according to a multitude of complementary paths. Affectivity realizes a type of relation which would be conflict (in terms of action) and incompatibility (in terms of knowledge); this relation can only exist on a level of affectivity, since its bipolarity allows it to unify the heterogeneous; quality is transductive by nature, for each qualitative spectrum links with and distinguishes terms that are neither identical with nor foreign to one another; the subject's identity is precisely a transductive type of identity, particularly across the first of all transductivities, that of time, which can furthermore be fragmented as much as desired into instants or grasped as a continuity; each instant is separated from those that can follow or precede it through time by precisely what unites these instants and constitutes its continuity relative to them; distinction and continuity, separation and relation are the two complementary aspects of the same type of reality. The fundamental type of vital transduction is the temporal series, which is both integrative and differentiating; the identity of a living being is composed of its temporality. An error could be made by conceiving temporality as a pure differentiation, as the necessity of an ongoing and renewed choice; individual life is differentiation to the extent that it is integration; here there is a complementary relation that cannot lose one of its two terms without itself ceasing to exist by transforming into a false differentiation, which is in reality an aesthetic activity through which, within a dissociated personality, each choice is known as a choice by way of the subject's consciousness and becomes an information to be integrated, whereas it was an energy to be differentiated: choice is what is chosen, more so than the object of the choice; the affective orientation loses its relational capacity within a

being whose choice constitutes the whole relational activity, which in some sense comes to support itself through its own reactivity. The choice must be conspicuously discontinuous to represent a veritable differentiation; a continuous choice in a subject that is conscious of the fact that it chooses is in reality a mixture of choice and information; from this simultaneity and from the information results the elimination of the element of discontinuity characteristic of action; an action mixed with information by this type of recurrence actually becomes a mixed existence, simultaneously continuous and discontinuous, quantum, proceeding through abrupt leaps that introduce a reversal in consciousness; this type of action cannot end up in a veritable constructive affectivity but merely in a precarious stability in which an illusion of choice is produced by a recurrence that ends in oscillations of relaxation. Relaxation differs from the constructive choice insofar as choice never links the subject back to previous states, whereas relaxation periodically relates the subject back to a neutral state that is the same as the previous neutral states; a sentiment such as that of the empty absurd (which we seek to distinguish from the mysterious absurd) precisely corresponds to this state of a return to nothingness in which each reactivity or recurrence is abolished by an absolute inactivity and absence of information; that is because in this neutral state, activity leads to an increase in the value of information, and the absence of activity causes a complete lack of information: if elements of information are then presented as coming from the outside, then they are abandoned as absurd because they are without value; they are not qualified because the subject's direct affectivity no longer performs and has been replaced by a recurrence of information and action. This existence is the feature of every aestheticism; the subject in the state of aestheticism is a subject that has replaced its affectivity with a reactivity of action and information according to a closed cycle that is incapable of accepting a new action or a new information. In a certain sense, aestheticism could be treated as a vicarious function of affectivity; but aestheticism destroys the recourse to affectivity by constituting a type of existence that eliminates the circumstances in which a veritable action or a veritable information could arise; the temporal series is replaced by a series of cyclochronic units that succeed one another without being continuous and that carry out a closure of time according to an iterative rhythm. Every artificiality that renounces the creative aspect of vital time becomes a condition of aestheticism, even if this aestheticism does not utilize the construction of the object to carry out the return of causality from action to information and is more simply content with a recourse to an action that iteratively modifies the conditions of grasping the world.

*2. Successive Levels of Individuation:  
Vital, Psychological, Transindividual*

How is the psychological distinguished from the vital? According to this theory of individuation, the psychological and the vital are not distinguished as two substances or even as two parallel or superposed functions; the psychological intervenes as a slowing down of the individuation of the living, a neotenic amplification of the first state of this genesis; the psyche exists when the living being does not completely become concretized and conserves an internal duality. If the living being could be entirely pacified and satisfied in itself in what it is as an individuated individual within its somatic limits and through its relation to the milieu, there would be no appeal to the psyche; but instead of having the capacity to overlay and unify the duality of perception and action, it is when life becomes parallel to an ensemble composed by perception and action that the living being problematizes itself. All the problems of the living being cannot be resolved by the simple transductivity of regulative affectivity; when affectivity can no longer intervene as a power of resolution, when it can no longer carry out this transduction which is an individuation perpetuated within the already individuated living being, affectivity gives up its central role in the living being and becomes situated alongside the perceptive-active functions; a perceptive-active problematic and an affective-emotional problematic then suffuse the living being; the appeal to psychological life is like a slowing down of the living being, which conserves this slowing down in an extended and metastable state that is rich in potentials.<sup>7</sup> The essential difference between simple life and the psyche consists in the fact that affectivity does not perform the same role in these two modes of existence; in life, affectivity has a regulative value; it dominates the other functions and guarantees this ongoing individuation that is life itself; in the psyche, affectivity is pressed on all sides; it poses problems instead of resolving them and leaves the problems of the perceptive-active functions unresolved. The entrance into psychological existence essentially manifests as the appearance of a new problematic which is higher and more difficult and which cannot receive any veritable solution from within the living being, properly speaking, conceived within its limits as an individuated being; psychological life is therefore neither a prompting nor a superior rearrangement of the vital functions that continue to exist under it and with it, but a new plunge into pre-individual reality followed by a more primitive individuation. Between the life of the living being and the psyche, there is the interval of a new individuation; the vital is not a matter for the psychological; it is not necessarily taken up again and resumed by the

psyche, for the vital already has its own organization, and the psyche can do nothing but disrupt it by attempting to intervene in it. A psyche that attempts to be constituted by dealing with the vital and by taking it as a matter in order to give it a form merely ends up with malformations and an illusion of functionality.

In fact, the veritable psyche appears when the vital functions can no longer resolve the problems posed to the living being, i.e. when this triadic structure of perceptive, active, and affective functions is no longer able to be utilized. The psyche appears or at the very least is postulated when the living being no longer has enough being in itself to resolve the problems posed to it. It should not be surprising to find purely vital motivations at the basis of psychical life: but it should be noted that they exist as problems and not as guiding or determining forces; thus, they do not exert a constructive determinism onto the psychical life that they call upon to exist; they provoke it but do not positively condition it. The psyche appears as a new stage of the individuation of the being, whose correlative in the being is an incompatibility and a decreasing supersaturation of vital dynamisms and, outside the being as a limited individual, a recourse to a new charge of pre-individual reality that is capable of bringing a new reality to the being; the living individuates more precociously, and it cannot individuate by being its own matter to itself, like the larva that metamorphoses by feeding off itself; the psyche expresses the vital and, correlatively, a certain charge of pre-individual reality.

Such a conception of the rapport between vital individuation and psychical individuation leads to representing the existence of the living being as playing the role of a source for psychical individuation, but not the role of a matter relative to which the psyche would be a form. Moreover, such a conception requires the following hypothesis to be posited: individuation does not follow a law of all or nothing; it can occur in a quantum way, by sudden leaps, and an initial stage of individuation leaves around the constituted individual, associated with it, a certain charge of pre-individual reality, which can be called associated nature and which is still rich in potentials and organizable forces.

Thus, when the psychical appears, there is a relation between the vital and the psychical that is not a relation of matter to form but of individuation to individuation; psychical individuation is a dilation, a precocious expansion of vital individuation.

What results from such a hypothesis is that the entrance into the path of psychical individuation forces the individuated being to surpass itself; the psychical problematic, which calls upon pre-individual reality, results in

functions and structures that are not achieved within the limits of the living individuated being; if the living organism is called individual, the psychical leads to an order of transindividual reality; indeed, the pre-individual reality associated with individuated living organisms is not segmented like them and does not have limits comparable to those of separate living individuals; when this reality is grasped within a new individuation initiated by the living being, it conserves a relation of participation that connects each psychical being to other psychical beings; the psychical is the nascent transindividual; for a certain amount of time, it can appear as the pure psychical, an ultimate reality that could consist in itself; but the living cannot borrow the potentials that produce a new individuation from the associated nature without entering into an order of reality that makes it participate in an ensemble of psychical reality which surpasses the limits of the living; psychical reality is not self-enclosed. The psychical problematic cannot be resolved in an intra-individual way. Emergence into psychical reality is an emergence into a transitory path, since the resolution of the intra-individual psychical problematic (that of perception and that of affectivity) leads to the level of the transindividual; the complete structures and functions resulting from the individuation of the pre-individual reality associated with the living individual are only accomplished and stabilized in the collective. Psychical life goes from the pre-individual to the collective. A psychical life that would like to be intra-individual would not be able to overcome a fundamental disparation between the perceptive problematic and the affective problematic.<sup>8</sup> The psychical being, i.e. the being that achieves as completely as possible the functions of individuation by not limiting individuation to this first stage of the vital, resolves the disparation of its internal problematic to the extent that it participates in the individuation of the collective. This collective, which is a transindividual reality obtained by the individuation of the pre-individual realities associated with a plurality of living beings, is distinguished from the pure social and from the pure inter-individual; the pure social indeed exists in animal societies; in order to exist, it does not require a new individuation that expands upon vital individuation; it expresses the manner in which living beings exist in society; vital unit is literally what is directly social; information that is attached to social structures and functions (for example, the functional differentiation of individuals in the organic interdependence of animal societies) is lacking in individuated organisms qua organisms. This society supposes as a condition of existence the structural and functional heterogeneity of different individuals in society. On the contrary, the transindividual collective groups together homogeneous individuals; even if these individuals

present some heterogeneity, it's only to the extent that they have a basic homogeneity that they are grouped together as a collectivity and not insofar as they are complementary with respect to one another in a superior functional unity. Society and transindividuality can also exist by being superposed in the group, just as the vital and the psychical are superposed in individual life. The collective is distinguished from the inter-individual insofar as the inter-individual does not necessitate a new individuation in the individuals in which it is instituted, but merely a certain regime of reciprocity and exchanges that suppose analogies between intra-individual structures without challenging individual problematics. The birth of the inter-individual is progressive and does not suppose the interaction of emotion, the capacity of the individuated being to provisionally disindividuate in order to participate in a broader individuation. Inter-individuality is an exchange between individuated realities that remain in their same level of individuation and that seek in other individuals an image of their own existence parallel to this existence. The addition of a certain coefficient of inter-individuality to a society can give the illusion of transindividuality, but the collective only truly exists if an individuation institutes it. It is historical.

## II. SPECIFIC FORM AND LIVING SUBSTANCE

### *1. Insufficiency of the Notion of Specific Form; Notion of the Pure Individual; Non-univocal Nature of the Notion of the Individual*

Life can exist without individuals being anatomically and physiologically or merely physiologically separate from one another. Let's consider the coelenterate as a type of this kind of existence in the animal kingdom; these beings are characterized by the fact that they have no general cavity; the cavity that hollows out their body and expands into more or less complicated canals is a digestive cavity. Their symmetry is radial, since their organs are mirrored around the axis that passes through their mouth. The majority of coelenterates are apt to bud and form colonies; individuals formed by this budding are called blastozoids, and they can remain in communication with the initial being, which is called an oozoid because it hatches from an egg; corals, hydroids, and gorgonians form extremely numerous colonies. However, continuous formations can appear between individuals, thus constituting a solid material unity of the colony; this is what is seen in polyps joined together in a colony when the coenenchyme fills the spaces that separate individuals; this deposit of limestone, whether compact or spongy, deprives the polyp of its branchy form and gives it a massive aspect; individuals will no longer

appear except through their calyces, which are open on the level of the colony's shared surface. A coenosarc then joins together the individuals of the same colony, giving birth to new individuals through budding and by secreting the coenenchyme. In certain colony formations, the individuals manifest a differentiation that winds up in some sense transforming them into organs: some have a nutritive role, others have a defensive role, while others have a sexual role, and it could be claimed in some sense that veritable individuality is transferred to the colony if an impregnable residue of individuality didn't remain in the differentiated beings that compose the colony, namely the absence of synchronization in particular births and deaths; temporally, there remains a distinction between individuals that is not canceled out by the high degree of interdependence of their complementary relations. Certainly, it could be said that in a superior organism there are particular births and deaths of cells; but what is born and dies without synchronization in this superior animal is not the organ but the constituent of the organ, the elementary cell.<sup>9</sup> We would like to show that the criterion that allows for the recognition of real individuality here is not the material and spatial bond or separation of beings in a society or a colony, but the possibility of life apart and of migration outside the first biological unit. The difference that exists between an organism and a colony resides in the fact that the individuals of a colony can die one after another and be replaced without jeopardizing the colony; what constitutes individuality is non-immortality; each individual can be treated as a quantum of living existence; conversely, the colony does not possess this quantum characteristic; in some sense, it is continuous in its development and its existence. What makes individuality remarkable is its thanatological nature. Because of this, it should be said that amoebae, as well as a large number of infusoria, are not strictly speaking veritable individuals; these beings are capable of regeneration by exchanging one nucleus with another being, and after a period of time they can reproduce by dividing into two parts; certain holothuria can also divide into a plurality of segments when conditions of life become poor, each segment afterwards reconstituting a complete unit, i.e. a holothuria similar to the previous entity. In this case and properly speaking, there is no distinction between the individuals and the species; individuals do not die but divide. Individuality can only appear with the death of beings; death is the correlate of individuality. A study of pre-individual life has a theoretical interest, since the passage from these pre-individual systems of existence to individual systems allows us to grasp the correlate or correlates of individuation and their biological signification; in particular, the vast domain of coelenterates manifests a transitional zone

between non-individuated life systems and totally individuated systems; the study of these mixed types makes it possible to establish valuable functional equivalences between individuated systems and non-individuated systems on the same level of biological organization and in somewhat equivalent circumstances, either in the same species or from one species to another closely related species.

An interesting point that deserves to be noted before a general study is the following: sexual reproduction seems most directly associated with the individual thanatological characteristic starting from this very level: colonies of coelenterates in certain cases lay eggs that produce jellyfish, and reproduction is guaranteed by these jellyfish; but in certain cases an entire individual detaches from the colony, and it will lay eggs much later after having led a detached life and then die, whereas a new colony is founded by the budding of a source-individual that emerges from this egg; thus a free individual exists, having the capacity to die, between two colonies capable of an indefinite development in time; here, with respect to the colonies, the individual plays a role of transductive propagation; in its birth it emanates from a colony, and before its death it generates the starting point for a new colony after a certain displacement in time and space. The individual is not a part of a colony; it is inserted between two colonies without being integrated in either, and both its birth and its end reach an equilibrium to the extent that it emanates from one community but engenders another; *it is relation*.<sup>10</sup> However, such a function is very difficult to perceive on the superior and highly differentiated level, because the individual, in the individuated forms of life systems, is in fact a mixture: two things are taken up in it: the nature of pure individuality, comparable to what is seen at work in the relation between two colonies and the nature of continuous life, which corresponds to the function of organized simultaneity such as we see it at work in a colony; the drives<sup>11</sup> of the individual and its tendencies define the distinction between these two functions that may not be represented together in the individual; the drives are indeed relative to the pure individual, insofar as the latter is what transmits vital activity through space and time; conversely, the continuous and everyday tendencies do not possess this irreversible aspect of creative nature that the drives define through successive "stinging blows," which displace the constituted individual and can be in contradiction with its tendencies; tendencies involve the common and the continuous, since there can easily be a synergy between tendencies shared by a very large number of individuals, whereas drives can be much more atypical insofar as they correspond to a transfer function of the individual and not to an integration into

the vital community; drives can even be seemingly devitalizing, precisely because they do not belong to the everyday continuity of existence; drives generally reveal themselves by way of their characteristic as consequences without premises; they introduce a transductive dynamism that borrows nothing from the continuity of the tendencies and that can even inhibit it; human communities build up a whole defense system against the instinctual drives by seeking to define tendencies and drives in univocal terms, as if they shared the same nature; this is where the error comes from; if tendencies and drives shared the same nature, it becomes impossible to distinguish the transductive characteristic<sup>12</sup> from that of belonging to a society; the manifestations of the sexual drive are, for example, treated as testifying to the existence of a tendency, and then we start talking about a sexual need; the development of certain societies perhaps incites the confusion of needs and tendencies in the individual, since the hyper-adaptation to communal life can be expressed by the inhibition of drives on behalf of tendencies; indeed, since tendencies are continuous and therefore stable, they are able to be integrated into communal life and even constitute a means for the integration of the individual, which is incorporated into the community by its nutritive and defensive needs, both of which transform it into a user and a consumer. Freud's doctrine does not distinguish between drives and tendencies clearly enough. His doctrine seems to consider the individual univocally, and although it distinguishes between a certain number of zones in the individual from the structural and dynamic point of view, it leaves behind the idea that the individual can manage a complete integration through the construction of the superego, as if the being could discover a condition of absolute unity in the passage to the act of its virtualities; since it is too hylo-morphic, this doctrine cannot account for an essential duality in the individual except by resorting to an inhibiting alienation, insofar as the rapport to the species cannot be conceived except as an inclusion of the individual; but Aristotelian entelechy cannot account for the full sense of the individual and leaves out the properly instinctual aspect through which the individual is a transduction that takes place and not a virtuality that is actualized. Even if it must be said that the metaphysical is still physiological, we must recognize the aspect of the individual's duality and characterize through its trans-communal functioning this existence of instinctual drives. The thanatological nature of the individual is incompatible with everyday tendencies, which can conceal this nature or defer its manifest existence but cannot annihilate it. This is why a psychical analysis must take into account the complementary nature of the tendencies and drives in the being that we call individual, a being which, in

all individuated species, is in fact a mixture of vital continuity and instinctual trans-communal singularity. The “two natures” that classical moralists find in man are neither an artifact nor the translation of a mythological creationist dogma into the framework of current observation; in fact, the easiness here would be on the side of the biological monism of the tendencies according to an operative thought that believes to have done enough by defining the individual as the non-analyzable being that cannot be the object of consciousness except through its inclusion in the species. Aristotle’s doctrine, which is the prototype for all vitalisms, in fact arises from an interpretation of life oriented around “superior” (i.e. totally individuated) species; this doctrine could not be otherwise in a time when so-called inferior species were very difficult to observe. Aristotle takes into account certain species of coelenterates and worms, but mainly to discuss the characteristics of the soul’s inherence to the body according to totality or part by part, for example in ringed worms, which can regenerate after an accidental segmentation, both segments of which continue to live on. In fact, the model of living beings is in the superior forms, and, insofar as “beings do not want to be poorly governed,” the aspiration of all beings towards a single form leads Aristotle to consider the superior forms before all else. It is not vitalism properly speaking that has led to the confusion of drives and tendencies, but a vitalism founded on a partial inspection of life that puts more value on the forms closest to the human species by constituting a *de facto* anthropocentrism more so than a veritable vitalism.

Furthermore, a vitalism that ignores the distinction between functions relative to the tendencies and those relative to the drives cannot establish a difference between functions in themselves and the structural dynamisms that allow for the operation of these functions by maintaining the stability of vital characteristics; thus “the death drive”<sup>13</sup> cannot be considered symmetrical with the life drive; instead, the death drive is the dynamic limit of the operation of the life drive and is not another drive; it appears as the mark of a temporal threshold beyond which this positive drive no longer operates, either because the transductive role of the isolated individual is achieved, or because it is complete, or because it has failed and because the pure individual’s quantum of duration has been exhausted; it marks the end of the pure individual’s dynamism. The tendency for beings to persevere in their being, in the sense of the Spinozist *conatus*, pertains to an instinctual ensemble that leads to the “death drive.” It is in this sense that a relation of the reproductive drive and the death drive can be discovered, since they are functionally homogeneous. Conversely, the reproductive drive and the death drive are

heterogeneous with respect to the different tendencies, which are tendencies of continuity and socially integrable reality.<sup>14</sup> In superior species, the alternation of the individual stage and the colony stage is replaced by the simultaneity of individual life and society, something which complicates the individual by placing in it a twofold bundle of individual (drive) and social (tendencies) functions.

*2. The Individual as Polarity; Functions of  
Internal Genesis and of External Genesis*

The method that emerges from these preliminary considerations requires us not to be primarily preoccupied with hierarchically organizing the levels of vital systems, but to distinguish them in order to see what the functional equivalences are that allow for vital reality to be grasped throughout these different systems by developing the whole range of vital systems, instead of classifying them in order to hierarchize them. According to our initial hypothesis, life is deployed through transfer and neotenzation; more than a continuous or dialectical progress, evolution is a transduction. Vital functions should be studied according to a method of equivalence that posits the principle by which there can be an equivalence of structures and functional activities. From pre-individual forms to individualized forms, relations of equivalence can be revealed by passing through the mixed forms that include alternating individuality and transindividuality according to the interior or exterior conditions of life. On the other hand, it should be supposed that there is a relative interdependence of species which makes a hierarchization quite abstract, at least when it only considers the anatomo-physiological characteristics of the individual; a rational study of species would have to integrate a sociology for each species.

Certainly, it is difficult to somewhat abstractly define a method for the study of vital individuation; however, it seems that this hypothesis of functional duality makes it possible to account for two types of relations and two kinds of limits that are discovered in the individual; in a first sense, the individual can be treated as a particular fragmentary being, an actual member of a species, a detachable or not currently detachable fragment of a colony; in a second sense, the individual is what is capable of transmitting the life of the species and constitutes the depository of specific characteristics, even if it should never be called upon to actualize them in itself; as a carrier of virtualities which do not necessarily take on a sense of actuality for it, it is limited both in space and in time; it thereby constitutes a quantum of time for vital activity, and its temporal limit is essential to its function of relation. Often

this individual is free in space, since it guarantees the transportation of the specific seeds of the species, and the counterpart to its temporal brevity is its extreme spatial mobility. According to the first form of existence, on the contrary, the individual is a fragment of a currently existing whole in which it is inserted and which limits it spatially; as a fragmentary being, the individual possesses a structure that allows it to grow; it is *polarized* inside itself, and its organization allows it to incorporate alimentary matter, either through autotrophy or by starting from already elaborated substances; the individual as a fragmentary being possesses a certain corporeal schema according to which it grows through differentiation and specialization, which determine the parts during their progressive growth starting from the egg or initial bud; certain studies on regeneration, particularly those dedicated to the freshwater planarian, show that the capacity of regeneration stems from the elements that conserve a germinative capacity even when the individual is an adult and that these elements have a kinship with the sexual cells; nevertheless, the capacity of development does not suffice to explain regeneration, even if we introduce the action of a hypothetical substance like the organism, which is meant to explain induction exerted by a terminal element, for example a head that can be grafted anywhere onto the body of a flatworm; in order for this induction to be able to be carried out, a certain number of secondary elements, probably including physical mechanisms and hormonal dynamisms, must be present; yet above all, after the segmentation of the egg, there needs to be the intervention of a principle of organization and determination that leads to the production of different organs of the being. This principle of spatial determination is what cannot be confused with the principle of production outside of other beings, either by budding or sexual reproduction; even if certain cells can indistinctly aid the regeneration of the particular being or generate other beings, even if there is a link between regeneration and reproduction, a difference of orientation intervenes in the manner in which this fundamental activity is carried out, either toward the interior or toward the exterior; this is the very criterion that allows to distinguish pre-individuality from individuality properly speaking, for in the state of pre-individuality, these two functions are joined together, and the same being can be considered as an organism, society or colony; reproduction through scissiparity is both a phenomenon of modification of the fragmentary individual's corporeal schema and of reproduction; budding is still quite partially a mixture of two types of generation, growth and reproduction properly speaking; but when we progress along the animal series, this distinction between two generations becomes increasingly clear: on the level of mammals for example, the

distinction becomes so clear that it is compensated by a relation of exteriority between parents and the young, somewhat similar to a parasitic relationship, at first internal and then external, through gestation and then breastfeeding; the female is a being that is capable of being parasited on, and any type of parasiting can create in a male the appearance of female sexual characteristics, as the study of the barnacled crab shows. Everything happens as if the complex forms necessitated a rigorous distinction between the functions of external genesis and those of internal genesis. External genesis, or reproduction, indeed introduces an amplificative function prominently linked to the operation of individuation: since it can exist in a continuous regime, simple growth on the contrary belongs to the colony and does not necessitate individuation.

This distinction is made clear by the extremely precocious detachment of the young which, instead of developing as a bud, is an independent being, a parasite of the parent but entirely distinct from it in its internal organization; gestation corresponds to this anatomical separation compensated by a nutritive relation; the quantity of organized matter that detaches from the body of a mammal in order to form an egg is less considerable than what detaches from a bird. Gestation, which makes possible the anatomical separation of the young while maintaining the alimentary relationship, authorizes the slowing of the growth of the young and accentuates foetalization, according to the hypothesis of Bolk, who sees in this principle one of the reasons behind evolution; the less rapid maturation of the individual allows it to be dedicated to a longer formation through learning during the time when the nervous centers are still receptive, i.e. before adult age. However, if we consider these various characteristics of vital organizations, we see that the two functions of the individual conserve their distinction and that this distinction increases when the individual becomes more developed; in a simple vital organization, these functions are antagonistic; they can only be fulfilled successively or entrusted to different forms;<sup>15</sup> when the individual is sufficiently developed, it can guarantee the simultaneous fulfillment of two functions due to a more complete separation of operations relative to each of these functions; reproduction then becomes the act of all individuals, all of which also possess the exercise of other functions. The individual is therefore the system of compatibility of these two antagonistic functions that correspond, for the former, to the integration into the vital community and, for the latter, to the amplificative activity of the individual through which it transmits life by generating its young. Internal organization corresponds to another type of being than reproduction; in totally individualized species, reproduction

and the actual organization are joined together in the same being; somatic and germinal functions are made compatible in individual existence, since the stage of life in colonies has disappeared.

For these different reasons, we shall distinguish three vital systems: pure pre-individual life, in which somatic and germinal functions are not distinct, as in certain protozoa and poriferans; meta-individual forms, in which somatic and germinal functions are distinct but need to be carried out by a specialization of individual action that involves a specialization of the individual according to somatic or germinal functions; and lastly, totally individualized forms, in which the germinal functions are delegated to the same individuals as those that carry out the somatic functions; then there is no longer colonies but a community or a society. Transitional forms can be found among these three groups, particularly in insect societies, which are often constituted due to the organic differentiation of the members, some of whom are reproducers, soldiers, workers, etc.; in certain societies, the age in individual development intervenes as a principle of selection between the different functions that are thereby successively fulfilled, which is a principle of unity requiring a lesser complexity of individual structures than when the individual simultaneously fulfills somatic functions and germinal functions. In this sense, we can consider lifeforms singularly represented by individual beings as equivalent to alternating forms (colony and separate individual) in which the passage to the colony stage would never be produced, since the individual generates other individuals instead of founding a colony that will emit separate individuals. In the alternating form, the colony is like the completion of the individual; the individual is *younger* than the colony, and the colony is the adult state *after* the individual, which, *mutatis mutandis*, is comparable to a *larva of the colony*. From then on, instead of founding the colony, when the individual is reproduced as an individual, the vital functions of continuity (nutrition, growth, functional differentiation) should be fulfilled by a new layer of the individual's behaviors, i.e. social behaviors.

### 3. Individuation and Reproduction

The essential function of the living individual qua individual, distinct from a colony, is amplification, discontinuous propagation, for example with the change of location. It can then be asked: what is at stake in reproduction? Death is the fatal termination of every multicellular organism, but the former results from the latter's functioning and not from an intrinsic property of living matter. For Rabaud, the intrinsic property of living matter resides in "this incessant process of destruction and reconstruction in accordance

with exchanges with the exterior, which constitutes its metabolism.”<sup>16</sup> In a unicellular organism, if reconstruction compensated destruction, and assuming that in this process non-assimilated materials do not accumulate to the point of hindering its functioning, the organism would remain indefinitely comparable to itself.

However, according to Rabaud, this illusion of the immortal individual merely corresponds to a mental construction; two facts modify the individual: the first is that metabolism is effectuated in constantly changing conditions; new masses of protoplasm identical to the preceding masses do not necessarily result from the reconstruction of living matter, since not only the quantity and quality of the materials in question but also the natures of the external influences vary incessantly. The second fact is that the rapports between the elements of which the individual mass consists change depending on their influences, and their change sometimes leads to a sort of disequilibrium; this particularly includes the nucleoplasmic rapport, i.e. the one established between the bulk of the nucleus and the cytoplasm.<sup>17</sup>

This is the rapport that regulates reproduction. Rabaud wants to show that the reproduction of the individual does not introduce any finality and is explained in a purely causal manner. It is necessary to study this explanation in order to appreciate the extent to which the disequilibrium that causes death differs from the disequilibrium that causes reproduction. For it is necessary to note that the profound modification that affects the individual in reproduction is not the same as in death; even if the individual loses its identity through a splitting into two individuals of equal size, it becomes other, since two individuals now replace the single individual, but it does not die; no organic matter decomposes; there is no cadaver, and the continuity between the single individual and the two individuals to which it has given birth is complete. Here there is not an end but a transformation of the topology of the living being that makes two individuals appear instead of one.

Rabaud establishes the fact that it is only the value of the nucleoplasmic rapport that makes the cell divide into two independent parts without an intervention of a mysterious influence (despite the cell's volume). An analysis of reproduction in metazoans allows us to clearly confirm this fact due to the relative anatomical simplicity of the individuals that constitute them.

Schizogony takes place as a cellular division: the individual divides into two equal or unequal parts, and each part, having become independent, constitutes a new individual; with multiple variations, the nucleus traverses the series of ordinary phases that consist of its division into fragments, chromosomes (barely distinct in protozoa), then the division of these chromosomes

and their separation into two equal groups, and finally the splitting of the cytoplasm, transversally for infusoria and longitudinally for flagellates. Each of the new individuals becomes complete; each regenerates a mouth, a flagellum and so on.

In other cases, the individual first secretes a layer of cellulose within which it divides into a series of individuals considerably reduced in size, and these individuals either resemble the initial individual or are different from it, but each of them afterwards rapidly resumes its specific aspect. Schizogony consists in the fact that the individual multiplies in isolation without the intervention of the fertilizing action of another individual of the same species.

On the contrary, in still other cases multiplication only begins after the union of two individuals. Depending on the milieu, this conjugation or pairing can be temporary, as in infusoria. After interlocking on a portion of their surface, the two individuals exchange a pronucleus with each of their partners, and then they separate and multiply through simple division. In these infusoria, the two modes of reproduction, gamogony and schizogony, alternate according to the conditions of the milieu. Furthermore, in gamogony, the two individuals are perfectly similar; neither can be qualified as male or female. The conjugation can also lead to the fusion not only of two pronuclei, but also of two whole individuals that are in a state of total fusion, at least for a while; it is furthermore quite difficult to say if the individuality of two beings that fuse is conserved; in fact, their nucleus undergoes two successive divisions; all the products of division degenerate, except one; the remaining two non-degenerated products of the two nuclei fuse, but this mutual nucleus immediately divides, and the fused mass in turn divides and produces two new complete individuals. Would there be a conservation of the individual identity of two infusoria in the non-degenerated masses of nuclei at the moment of the fusion of two nuclei? It is hard to answer this question. This example is taken from the case of the actinophyrid. Fusion can be even more complete in the amoeba, particularly in *Sappinia diploidea*, which normally possesses two nuclei. The nuclei of each individual, and then the two individuals, fuse together, but each nucleus divides separately while losing a part of its substance; then the rest of each of the nuclei gather together away from the rest of the nucleus of the other individual without fusing; a single binuclear individual forms in this way and then multiplies. In this case, the nucleus of each initial individual remains (or rather the rest of this nucleus) in the individuals that arise from multiplication through the division of the intermediary binuclear individual. Male and female cannot be distinguished in this procedure.

The appearance of the distinction between male and female takes place in vorticella, which are basically infusoria anchored to the substrate. The male gamete is an individual of reduced size that arises from a vorticella that has progressively undergone two successive divisions. This individual interlocks with a fixed vorticella and fuses with it entirely. After the disappearance of the macronuclei and the division and degeneration of micronuclei, except for a fragment that remains behind and produces a pronucleus, the pronuclei, which constitute the only remainder of the initial macronuclei, exchange, and then the male pronuclei regenerate, and the male gamete itself is absorbed; the nucleus fragments into eight equal parts, seven of which constitute the macronucleus, while the eighth constitutes the micronucleus. It just so happens that this gamogony alternates with a schizogony according to a veritable evolutionary cycle. This includes sporozoans, particularly haematozoons and coccidias. The cycle of haematozoons at first involves an amoeba anchored in a human blood cell; this individual divides along the planes of radial division; new individuals (merozoites) propagate in the blood and will anchor onto new red blood cells; after a certain time period, the merozoites stop multiplying, which, according to Rabaud, must be attributed to a modification of the host acted upon by a parasite. If, on the other hand, a modification of the milieu is produced (absorption by a mosquito), these merozoites become macrogametocytes or microgametocytes; after shedding a part of their nucleus, macrogametocytes become macrogametes; the microgametocytes emit extensions that envelop, taken together, the whole substance of the nucleus, and these extensions are microgametes. The conjugation of macrogametes and microgametes yields an element surrounded by a thin membrane that grows and divides into sporoblasts, which give rise to elongated elements called sporozoites that are inoculated by the mosquito into human beings, thereby allowing the cycle to recommence. Thus, there is an alternation of a certain number of forms and of two types of reproduction. The reproduction of coccidias occurs in the same way but without an intermediary host. In gregarines, agamous reproduction barely exists, and sexuality is marked particularly clearly. And yet, in the fusion of two individuals that become encysted together, only a part of the nucleus is involved in reproduction. The encysted individuals (macrogametocyte and microgametocyte) divide and form macrogametes and microgametes; after being fertilized, the egg multiplies by dividing into spores, and these spores divide into eight sporozoites that in the end develop into adult gregarines. In this case, the two procedures of reproduction are interlinked to the point of only constituting a single complex process; it seems that gamogony has absorbed schizogony,

because in the groups formed by two gregarines encysted together, there is a veritable schizogony that passes from the microgametocytes and from the macrogametocyte that constitute these two gregarines to the microgametes and macrogametes; the spores divide into sporozoites in the same way.

According to Rabaud, reproduction essentially consists in schizogony. This schizogony generally produces equal parts, except in certain cases. Schizogony continues indefinitely in a constantly renewed milieu, as the researches of Baitelle, Woodruff, Chatton, and Metalnikov have shown. Sexuality appears under the action of the milieu: a differentiation is established between individuals, and each division no longer occurs without the preliminary conjugation of two individuals and the fusion of their nuclei. Rabaud does not accept the conclusions of Maupas's study, which supposes that an overly prolonged schizogony involves the individuals' death, whereas sexuality would allow for a rejuvenation; sexuality would therefore be an obligatory process. Maupas also supposes that conjugation only occurs between individuals of different lineages. Rabaud opposes against this thesis the works of Jennings, who shows that conjugation also takes place between individuals with fully related parents. Furthermore, asexual reproduction does not in any way involve the aging of the individuals or their death. The experimental research of Mr. and Mrs. Chatton shows that sexuality is or is not established according to the quality of the nutritive exchanges to which infusoria are submitted. Rabaud states that we can provoke the conjugation of *Colpidium colpoda* or of *Glaucoma scintillans* by adding to the infusion in which these protozoans live a certain quantity of  $Cl_2Ca$  and by feeding them with *Pseudomonas fluorescens*. For Rabaud, sexuality appears "not as an indispensable process, but as a complication that does not bring with it any obvious advantage." The fusion of two completely comparable protoplasts, equally and supposedly old and worn out, can only lead to a rejuvenation.

Ultimately, Rabaud does not want to accept the idea according to which sexual multiplication would be superior to asexual multiplication just because it would give rise to the combination of substances that come from two independent generators and would thus generate a new living organism endowed with the characteristics belonging to its kin, whereas asexual reproduction would be nothing but the continuation of the same individual fragmented into a large number of distinct parts. Asexual multiplication does not give rise to individuals that resemble each other in an exactly identical way. According to Woodruff, there is a veritable recasting of the nucleoid which, produced periodically at the end of a certain number of generations, indicates

that the organism, even in the case of asexual reproduction, far from remaining similar to itself, undergoes more or less important modifications.

According to Rabaud, sexuality does not bring anything particularly useful to the protozoans' existence; fission remains the most direct process and highlights the fundamental nature of reproduction. In fact, the division of the nucleus is always equal, but sometimes the division occurs in such a way that the fragmentation of the cellular body yields very unequal parts; the little cell, or daughter cell, that separates from the large or mother cell is an unspecified part of the latter and is capable of reproducing an individual similar to it. Sexuality is nothing but a particular case of a general phenomenon, a case in which the element that stems from an individual only multiplies after the union with an element that stems from another individual. We will note, however, that what multiplies is the element that stems from two individuals.

In metazoans, the processes are the same, but they pose the problem of individuation in a more complex way, for here the phenomenon of reproduction is hard to detach from association and dissociation, since it can intervene in various degrees and thus create a web of rapports between descendant individuals, or between ascendant and descendant individuals, or the ensemble formed by ascendant and descendant individuals. Here, unlike with protozoans, reproduction is no longer merely the genesis of an individual by way of a process that Rabaud likens to schizogony; here, reproduction is a perpetuation of intermediate conditions and of mediated states between the complete separation of independent individuals and a mode of life within which there would be nothing but growth without reproduction or the appearance of new individuals; it is therefore necessary to study these lifeforms that indicate a transition between mere individuation via schizogony and life without individuation in order to understand if there can be conditions of ontogenetic individuation at this level. Sometimes a methodical prejudice remains in our study: we are seeking to grasp the criteria of individuality in biology by defining the conditions of individuation for species in which the individuated state and the non-individuated state are in a variable rapport. This genetic method can allow some characteristic to remain that will not have been grasped; we should only judge it based on its results, and for the moment we are supposing that genesis can account for the being, the individuation of the individual.

The fission of an individual (whether adult or not) into two equal parts that complete each other on their own account—i.e. schizogony—exists in

numerous metazoans within which, despite appearances, it is comparable to what occurs in protozoans. According to Rabaud, the only veritable difference is that the process brings about a fragment that includes many cells; but these cells form a whole that is just as coherent as the components of a protozoan: "In both cases, division results from a process that involves perfectly comparable physiological units."<sup>18</sup> In certain cases, the individual does not split into two appreciably equal parts; this is the case that most approaches schizogony in protozoans. This case presents itself in various coelenterates, including hydra and several sea anemones; the plane of fission usually passes through the longitudinal axis of the body but sometimes rarely through the transversal axis; this is also found in certain jellyfish (*Stomobrachium mirabile*). This rupturing lasts one to three hours; the breaking apart of sea anemones begins at the level of the foot, then moves up all along the body and penetrates into its depths; the two halves separate, the edges of the wound come closer together, the stripped cells multiply and produce new parts that replace the absent parts: schizogony implies regeneration. This process exists in various echinoderms, for example starfish (*Asterias tenuispina*) and ophiuroids (*Ophiactis*, *Ophiocoma*, *Ophiothela*). The plane of fission passes through two interradial planes and divides the animal into two appreciably equal parts with, however, an extra arm on one part than another when the number of arms is unequal (for example, the pentamerous starfish); after separation, each fragment of the disc becomes round, the liquid of the general cavity flows into the wound, coagulates, and closes it; the integument scars over, and the subjacent tissues, which are actively proliferating, sprout forth two or three arms and form two complete individuals from two fragments. This division can yield four complete individuals, for example in holothuria such as *Cucumaria lactea* and *Cucumaria planci*; an initial transversal sectioning yields two halves, and these two halves section yet again, thus yielding four individuals similar to the first.

Rabaud likens scissiparity (the case in which fission yields equal or subequal parts) to cases in which the fragments that separate are unequal, even extremely unequal. "Indeed, these cases only differ from scissiparity through the relative importance and number of the parts that separate; the processes of regeneration and the ultimate result remain the same: the multiplication of individuals at the expense of a single one."<sup>19</sup> Perhaps it can be remarked, however, that in the case of scissiparity there is no remainder to the division; the individual does not die properly speaking; it multiplies; on the contrary, an individual like a fish lays eggs a certain number of times, then dies. What is important here is obviously not the rapport of dimensions between the

different parts that appear during reproduction; instead, what is important is the fact that the two parts are or are not contemporaneous with one another; if, in a division into two equal parts, one of the parts were viable and the other non-viable, either immediately or after a period of time, it would be necessary to say that this process is different from scissiparity, wherein the two halves are contemporaneous with one another or have the same age. The veritable limit is thus situated between all the processes of division that generate individuals of the same age and the processes of division that generate a young individual and leave behind an older individual, which is not rejuvenated when it generates more young beings. Animals that possess reproduction via scissiparity can generally fragment in such a way that only a strip detaches and yields a new individual as a result. Some sea anemones (like *Aiptasia larerata* or *Sagartioides*) are torn to pieces; in others, the tentacles spontaneously detach, for example in *Bolocerooides* (studied by Okada and Komori), and these fragments regenerate. A stony coral (*Schizocyatus fissilis*) divides longitudinally into six equal segments that regenerate and yield six complete individuals. The arms of several starfish, after separating from the body, bud into a complete animal after having passed through the so-called "comet" stage, which is characterized by the fact that the young arms are smaller than the old arms. For certain species (*Linckia multifora*, *Ophidaster*, *Brinsinga*, *Labidaster*, *Asterina tenuispina*, *Asterina glacialis*), a fragment of the disc must remain attached to the arm for regeneration to take place. Some planarians, such as *Policelis cornuta*, some oligochaete worms, such as *Lumbriculus*, some polychaetes, such as *Syllis gracilis*, and many others dislocate under certain conditions into a variable number of fragments. Tunicates multiply constantly via the transversal fragmentation of their postabdomen; the heart, which is in this terminal segment, disappears and reforms in each segmentation. In hydras, a tentacle section regenerates if it represents at least 1/200th of the total weight; below this weight, a section regenerates less easily. The same principle applies for a fragment of planarian or oligochaete. When the amputation is quite minimal, reproduction, from the point of view of the animal that remains almost intact, takes on the appearance of a simple reconstitution.<sup>20</sup> Rabaud asserts that autotomy, a case in which the animal spontaneously mutilates itself following an external excitation and then becomes whole again while the detached fragment disintegrates without proliferating, is a case of schizogony. From the point of view of the old individual, it is possible that autotomy and schizogony have identical consequences, namely the necessity of regeneration to replace the detached fragment. But the same cannot be said from the point of view of the detached

fragment; there are many cases of autotomy in which the detached fragment cannot regenerate at all in such a way as to yield a new individual. Autotomy is in general a process of defense. In the stick insect *Carausius morosus*, for example, autotomy occurs when a member is pinched; this autotomy occurs in certain places in which there are special muscles that contract abruptly when the member is excited by pressure in a particular point, thereby breaking off the member. These member fragments do not produce a new *Carausius morosus*; the lizard's tail, broken by reflexive autotomy, also does not produce a new lizard. It indeed seems that the autotomy reflex undertakes a defensive behavior and is not directly linked to schizogonic reproduction as a particular case. Let us further note that autotomy, which is provoked systematically by a reflexive trigger on the stick insect and other insects, produces a degree of mutilation such that any regeneration becomes impossible, since the animal can be, for example, deprived of all its legs; in this case, autotomy involves the death of the individual without any reproduction; it is thus a reflex of the individual that detaches an article or a member but does not divide the individual qua individual and does not include the involvement of the essential function of amplification.

The existence of schizogony as a fundamental fact and fundamental schema of reproduction takes on great importance relative to the nature of the individual with respect to its specific lineage: according to Weismann, there would be two parts in the ensemble of the body of the individual: one of the parts, which is perishable and strictly linked to the individual, is the soma; the other, which is continuously uninterrupted from one generation to another insofar as the lineage is prolonged, is the germen. According to Weismann, in each generation the germen produces a new soma and gives it its own characteristics; it is essentially hereditary; the soma never produces the slightest bit of germen, and a modification undergone by the soma does not redound on the germen but remains individual. Thus, the individual is strictly distinguished from the species; the soma is nothing but the bearer of the germen, which continues to propagate the species without anything to retain from its passage throughout different successive individuals.

On the contrary, according to Rabaud, the examination of schizogony allows us to refute this unjustified distinction between soma and germen. All the parts of a being that are capable of schizogony are soma and germen; they are soma and germen with respect to one another; they are made of the same substance: "All the tentacles, all the tentacle fragments of a hydra produce the same number of hydras similar between them, for all these tentacles

are made of the same substance. If one of them, in isolation and under a local action, experiences the slightest modification, the other tentacles would not experience the same modification. Separated from the body, the modified tentacle would perhaps produce an individual bearing a new disposition; but the other tentacles would certainly produce young fully comparable to the original hydra. All these tentacles are equally *hereditary substance*.”<sup>21</sup>

For Rabaud, every reproduction is a regeneration; it thus stems from the individual itself, which is hereditary substance in all its parts. The schizogonic mode of reproduction is the fundamental mode; it yields regeneration in the pure state, i.e. the intense proliferation of elements that constitute the schizogonic germs. In fact, it is with this name “germs” that we can, according to Rabaud, qualify the fragments that proliferate and separate from the parent, even if it is a question of two halves of a sea anemone or of an echinoderm; no essential particularity is attached to the dimensions of the fragments, since the processes of regeneration do not change with size. From the same animal, fragments separate that are very unequal in size and that nevertheless regenerate in the same way, as can be seen in the planarian, for example. Thus, there is a continuity between the case in which the animal is cut into two halves and the case in which it loses just a small fragment that afterwards becomes a complete individual. These fragments, which can be called schizogonic germs and which sometimes, due to a particular formation, deserve to be called buds, originate from any part of the body whatsoever. The property of regeneration due to which they transform into a complete individual is therefore not the privilege of the determined elements of the body within which the germen would reside to the exclusion of the other elements that would be the pure soma. All the elements of the body, indifferently and under certain conditions, are endowed with the same property. Regeneration would therefore be the fundamental vital mode of amplification.

This conclusion, which is relative to the schizogonic nature of every reproduction, insofar as every reproduction is a regeneration, is of the utmost importance for the notion of the individual. This notion loses hereditary substantiality in Weismann’s thesis; the individual would become nothing but a simple unimportant accident without any veritable density throughout the genealogical series. According to the theory that leads every reproduction back to a schizogonic regeneration, the individual becomes substantial and not accidental; the capacity of reproducing is really, indivisibly, and completely in the individual, and not in a germen that would be sheltered from every mixture and every attack that would be borne by the individual

without being of the individual. In the fullest sense of the term, the individual is living substance; its power of regeneration, the principle of reproduction, expresses the basis of the process of amplification that vital phenomena manifest.

In other cases, it is interesting to consider a mode of agamous reproduction that is quite significant because it utilizes a single individual which detaches as a link between two colonies; in this case, everything happens as if individuation simply appeared between two states in which it is diffuse, because it simultaneously resides in the whole and in each of the more or less autonomous parts; it could then be said that individuation appears in the pure individual, which is the form that operates the transition from one colony to another.

Sponges emit certain gemmules, and bryozoa emit statoblasts; in both cases, it is a question of buds that do not differ from other unspecified buds; however, the statoblast is charged with inert substances, separates from its founder, and hibernates without significantly modifying; the statoblast is indeed a "dormant bud," for example in *Stolonica socialis*, according to the studies of Séllys-Longchamps. In this case, Rabaud does not accept the nutritive role of the enclaves; but he cites other cases, for example that of the plumatella and entoprocta, which form statoblasts that fall into the general cavity and are only relinquished by the death of the parent.<sup>22</sup> The gemmules that originate from freshwater sponges and calcareous sponges are groupings of embryonic cells that contain a large quantity of enclaves, all of which is surrounded by a sheath. These gemmules form within the sponge by way of a gathering of free cells that stem from different regions of the sponge and accumulate from each place. Around them, other cells are positioned in epithelial membranes that secrete a spongy sheath and disappear; the gemmule remains included in the sponge's tissues until the parent's death. In certain cases, the gemmules have a central mass composed of differentiated tissues; they take on the name of sorites.<sup>23</sup> This is the case of hexactinellids, tethyids, and desmacids. This procedure of reproduction may not exist. But it is worth noting that in colonies wherein this reproduction does exist, due to its mode as well as its role, it represents and replaces the colony in its totality; it only comes into play in the case of the colony's death, an event that can never take place; the statoblast is therefore a concentrated, individualized form that is the depository of the capacity to reproduce the colony.

It can ultimately be said that even during agamous reproduction, a reduction of the complex organism occurs that primes the formation of the

gametes; no doubt, the whole organism reproduces itself, but it does so via elementary individuated beings: gametes (spermatozoids in particular) are comparable to tiny living units that can exist autonomously; there is a passage of the complex organism's reproduction through a phase of elementary individuation that has an autonomous fate, is obviously very limited in time, and is made dependent on the conditions of the bio-chemical milieu, yet nevertheless constitutes an elementary phase of individuation. For these different reasons, the dualism of the soma-germen opposition, as well as Rabaud's monistic theory according to which the individual is hereditary substance, could perhaps be softened; the individual is indeed hereditary substance, but only like a gamete in an absolute way; however, the gamete in the sexual reproduction of complex organisms is hardly a single gamete: it is a gamete with respect to a partner; the pair of gametes is what is both hereditary substance and the reality capable of ontogenesis.

#### *4. Undifferentiation and Dedifferentiation as Conditions of Reproductive Individuality*

Due to a sort of law of opposition that appears in every problem concerning the individuated being, what the individual gains in density and in substantiality when reproduction is defined as a regeneration and not as a transmission of the germen from soma to soma, it loses in independence relative to other individuals. Those species in which the individual's substantiality is most solid and obvious—going all the way to the capacity of never dying, insofar as each individual can divide without remainders—are also those in which the individual's boundaries are the most difficult to trace, because all the modes of association exist in it and because reproduction often gives rise to intermediary forms between an organism and a society, forms which are hard to name insofar as they are basically mixtures.

This disappearance of the independence of the individual can either occur provisionally, in budding, or definitively, thereby leading to a colony; even in the colony, various degrees of independence are possible.

Budding produces independent individuals, but it only produces them slowly, and the various fragments first proliferate before separating from one another, as if regeneration were consequently prior to schizogony instead of following it. This preliminary regeneration via proliferation gives birth to a mass of indefinite contours, which protrude weakly at first, then increasingly, and which is then called a bud: amplification is contemporaneous with the beginning of the process.

The region in which the bud occurs is more or less narrowly localized in general, which, according to Rabaud, does not imply a special type of properties, opposing it to all the other regions (and which would designate it as the support of a possible germen). Localization “certainly arises from some secondary arrangement that reverberates throughout the local metabolism”,<sup>24</sup> localization is a “secondary incident.” It is necessary to merely remark that the parts of the body most capable of detaching and proliferating—like the hydra’s tentacles, which play the role of the germ—are not the buds’ birth-place. On the contrary, the outer lining of the body is what easily produces buds, which eventually separate from their point of origin. According to Rabaud, only local, purely contingent conditions would be able to restrict an absolutely general possibility “in its essence” to certain elements of the body. This possibility of proliferation would not be the privilege of certain elements of the body to the exclusion of certain other elements.

What the two modes of reproduction have in common (budding and schizogony) is the existence of undifferentiated and dedifferentiated elements that play the role of reproductive elements while remaining unspecified elements of the body: before the proliferation of the schizogonic germ, like at the moment of a bud’s formation, the elements that prepare the formation of this germ or of this bud conserve or recuperate embryonic properties, i.e. remain undifferentiated or dedifferentiated.<sup>25</sup>

The localization of budding and its essential characteristics manifest in the coelenterates of the hydrozoan group; in the hydra, the bud is a diverticulum of the outer lining that spreads out, expands, and then pierces its vacant extremity, from which tentacles appear; the bud seems to originate from undifferentiated cells that actively multiply and insinuate themselves between elements of the endoderm and between those of the ectoderm for which they are substituted; these cells would therefore not be dedifferentiated but non-differentiated; they play the role of veritable generative cells. What would give birth to this localized budding would be these cells’ distribution under the integumentary epithelium due to unknown influences. The substantiality of the whole individual would be absolutely certain if it could be confirmed that dedifferentiation is the sole procedure of budding; it is less clear in the case in which, like in the hydra, there is an undifferentiation in question. But Rabaud points out that these undifferentiated elements are not unified into special organs; these are dispersed elements that originally belong to the integuments with which they are in contact.

Let’s note that to completely clarify this question of undifferentiated elements and to understand their role in reproduction, it would be helpful to

see if there is a difference between schizogonic properties and properties relative to the budding of the schizogonic germ; when it is notable in size, like the arm of a starfish or serpent star, this germ is integrated into the new individual without rejuvenating it; this new individual therefore has a part of its body that is old, while the other parts are new. During a new schizogony, does this old part have the same properties as those that have been newly formed? Can it still give birth by way of regeneration to a new individual? Systematic experiments in this sense do not seem to have been undertaken from the perspective of a study of *neotenzion*.

The localization of budding is also quite distinct in saltwater hydrozoans. In some hydrozoans, stolons form, which are non-differentiated buds; the coenosarc thins and ultimately separates from the original branch when the stolon spreads out; the perisarc thins, and the bud, whether propagule or frustule, becomes free with a substrate to which it adheres and on which it slowly creeps; it is only at this moment that it proliferates out somewhat from its length; the proliferation rapidly grows perpendicularly to the longitudinal axis of the frustule, and two days later it transforms into a hydranth. The same frustule in this way produces several hydranths that remain linked together. We should note that in this procedure of reproduction, there is a veritable synthesis of schizogony and budding; indeed, the formation of the stolon begins as a budding; but instead of proliferating, this bud detaches, which corresponds to a schizogony; then the detached bud starts to proliferate, which corresponds to a budding; we should further note that this synthesis of schizogony and budding leads to a lifeform that is intermediate between pure individualization and a life that is so collective and with such strong bonds between individuals that the latter would no longer be anything but the different organs of a single whole constituting the veritable individual. Other coelenterates, such as campanularia, produce a frustule that, by detaching from the hydrocaulus, drags along the hydranth under which it has formed; but this hydranth is reabsorbed and disappears as the frustule emits buds; everything happens as if the activity of budding that generates a new ensemble were incompatible with the conservation of an already formed individual. Perhaps it is necessary to see in this disappearance of the hydranth a consequence of the dedifferentiation that we have seen at work in every reproductive activity, either via schizogony or via the formation of a bud.

There is also budding in tunicates, where it is complicated by the fact that the bud develops at the end of a stolon and grows in the lower part of the body on an undifferentiated tissue that belongs to the mesenchyme and is quite narrowly localized in the region of the postabdomen.

This stolon is a tube limited by the ectoderm and divided lengthwise into two parts by a mesenchymal partition; the stump of the stolon emits several buds, each of which grows and produces an independent ascidian. The active part of the bud is a block of mesenchymal cells originating from the partition; the entire individual is differentiated starting from these cells; the other elements are reabsorbed. In this case, the procedure thus conserves an aspect of budding; it is a budding at a distance that takes place through the intermediary of the stolon; yet this is nevertheless a budding, since the separation only occurs after the differentiation.

Budding presents itself in another form that poses the problem between the founding individual and the young individual, for example in aquatic oligochaete worms in the *naididae* group. Indeed, budding occurs in quite a narrowly localized zone in the posterior part of the worm behind a septum. At this level, the elements of the external integument multiply starting with the ventral side, and what results is a thickening of this wall that propagates around the somite at the same time as a superficial constriction appears following the transversal median plane, revealing a relative morphological discontinuity between two individuals; the non-differentiated cells of the intestines multiply along with the elements of the mesoderm that line the segment's cavity. The various organs of a new individual, a zooid, differentiate within the embryonic tissue formed by these cells, with the head appearing in the anterior part of the bud in immediate contact with the tissues of the parent. Often this new zooid, before separating from its parent, in turn buds in the same way; it then constitutes a chain of several single-file individuals that are linked together one after another. Each individual buds in an approximately continuous way; it even happens that a second zone of proliferation occurs in one of the segments situated in front of the posterior segment. Moreover, it may happen that the undifferentiated zone is established in the last somite, higher up; then the following somites, already differentiated before the establishment of the undifferentiated zone, do not dedifferentiate in order to form the new individual; they immediately form an integral part of the zooid and unite with the homologous tissues originating from the bud; the founder regenerates the removed parts.

Thus, a definitively undifferentiated zone separates the individuals that remain aggregated in a chain; these individuals can remain linked together long enough to become almost adults; we find this in certain turbellarians from the *rhabdozoela* subclass, which are non-segmented worms related to planarians. We can see in this sense how the mode of reproduction is significant in the individual's relation to other individuals; the relation of

dependence or independence expresses to a large extent the way the individual has been generated, which is why an important aspect of the inter-individual relation is a form of reproduction, even when it spans the whole life of each individual.

This is what is particularly important to study in the case where various modes and degrees of individuation appear in colonies.

Colonial budding is not always established following the same mode. In fact, there are all kinds of transitions between a proliferation that is nothing but a growth of substance and a proliferation that, after producing anatomically and physiologically distinct individuals, on the other hand leaves them grouped in a mechanical unity. The two borderline cases can be represented in terms of ascidians and sponges. The ascidian represents the borderline case in which individuals, while separating from one another, nevertheless remain quite strictly grouped together; on the contrary, sponges represent the borderline case in which an active proliferation yields a simple growth of substance, whereas the new parts seem to be a certain number of individuals. However, even in this case, the individuated state is not completely nullified; it can appear if the mode of reproduction changes; the individuated state temporarily reappears if the sponge produces a bud that detaches, something that occurs every now and then; this would confirm the hypothesis according to which there is a link between the appearance of the well-characterized living individual and the functions of amplifying reproduction: the individual is essentially the bearer of the capacity to reproduce (not necessarily to reproduce *itself*, for it can, on the contrary, reproduce a colony that is not at all comparable to it).

As we have seen, the reproduction of ascidians is performed by a stolon; this stolon expands while anchoring onto a substrate, and then its extremity develops into an individual that detaches from its founder but remains anchored in place. All the stolons originating from the same founder behave in the same way and produce a certain number of buds: what ensues is a grouping of individuals anchored side by side but independent from one another.

On the contrary, the sponge, which is at first simple, begins to ramify, and each ramification takes on the aspect of the initial sponge, with a new osculum and inhalant pores; morphologically, these new parts seem to represent a series of individuals; but the external morphological criterion here is lacking and is shown to be insufficient; these ramifications remain in complete and definitive continuity with the sponge's mass; none of them have the value of a bud; the various regions of the sponge form a new mass, all of a piece, in

which no element possesses a veritable autonomy. Let's note however that the ensemble of the sponge can hardly be called individual more so than each of its parts; the various parts are not organs of the individual that would be the sponge, since these various parts are not merely continuous but also homogeneous; the appearance of new parts is a growth of the quantity of the sponge's living matter but does not bring about a significant differentiation. Since there is not more in the whole than in the parts, it is difficult to call the whole an *individual* simply because it is the whole. This whole is not indivisible at all; if we remove a part of this sponge that multiplies, the sponge is not mutilated but diminished. Here, we are faced with an absence of structure that does not allow us to give the name individual to the whole more so than to the parts, nor does it allow us to remove this name from the parts in order to give it to the whole, since the whole is nothing but the sum of its parts, the heap that they form. In fact, this extreme case is the one in which individuality belongs equally to the parts and to the whole; the parts do not have a veritable individuality, since they are not independent; but they nevertheless have a defined form, with an osculum, inhalant pores, and a certain orientation with respect to the whole, an orientation that is more prominent in certain species. Thus, there is no absolutely complete continuity between the various parts, and a relative unity belongs to each part, despite their lack of independence; each part is complete by itself and could be self-sufficient; each part therefore possesses a certain virtual individuality that the mode of reproduction does not highlight. Furthermore, the whole also possesses a relative individuality that is complementary to that of the parts; this individuality consists of the rudiments of orientation that seem to direct the genesis of new parts: they do not come absolutely at random from the old parts but according to certain directions of privileged growths. The studies that have been carried out until now are not sufficient for us to say with certainty by what force the whole acts on the parts so as to orient them, which thereby produces, despite the randomness of proliferation, ensembles that are not organized but ordered, the first degree of individuation prior to which there is nothing but pure continuity. Indeed, what is quite remarkable is the fact that the individuality of the whole only appears here as a form and not as an organization; but this existence of a form is not negligible, since the individuality of the whole consists of precisely what is removed from the parts in terms of their freedom and their capacity to grow in all senses; however slight this influence may be, it is nevertheless a subordination of the generation of the parts and of their growth to the existence and arrangement of the whole; it is the origination of a structure. The slightest appearance of individuation is

therefore contemporaneous with the manifestation of a dynamic structure in the process of a being's reproduction, a reproduction which, moreover, is still not distinguished from growth.

Furthermore, let's note that if two sponges are very close to one another, the budding that they emit indeed lacks a distinction between the two groups-individuals; this dynamic structure of growth does not pass from one individual to the other; the extensions of each sponge remain distinct and do not influence one another, as if this morphological dominance exerted by the whole onto the parts were reserved for them alone and would not be transmitted, even by the narrowest proximity. The morphological criterion is therefore important, since it appears at the very first degree of individuality, in a state in which individuality is still fragmentary and does not exist in the whole except in the slightest perceivable way. Everything happens as if individuality were a measurable physical parameter or quantity with the ability to distribute between the parts and the whole; the more the whole is individualized, the less individualized the parts are; on the contrary, if the parts are almost complete individuals, virtually detachable without requiring regeneration afterwards, the whole is poorly individualized; the whole nevertheless exists as an inhibitor or accelerator of the growth of the parts; it plays a morphological role through its dominance, which is exerted on reproduction. We must regret that studies on the genesis of forms have not been pushed far enough for us to say by which agent these accelerating or inhibiting influences exert themselves and constitute a veritable field of growth in which the individual develops and which it itself involves. The same type of phenomena is prominent in the vegetal world: lichens, an association of algae and fungi, do not develop anarchically; in certain species, the extremities are calloused and endowed with a hardness; when light is not very abundant, the forms become comparable to those of plant leaves, such that this vegetal association could be mistaken for a single living plant in the same type of milieu (for example, sedges and ferns).

Between the two extreme forms of the ascidian and the sponge, there are a multitude of degrees of individualization of the ensemble, i.e. according to our hypothesis, a multitude of values of rapport between the degree of individualization of the parts and the degree of individualization of the whole. Other ascidians produce stolons arrayed more or less regularly but without their own membrane; these stolons ramify and tangle together in the particularly thick membrane of the parent and then bud within this membrane; the buds partially emerge while developing; the region of the thorax, which includes the pharynx and the peribranchial chamber, has its own membrane

and emerges from the parent's membrane. Once they have fully developed, the adults remain in continuity with the original stolon but lose all functional relation with it; only the shared membrane joins and maintains them. There is, however, a certain regularity to the grouping: the mere fact of having a membrane and more so a common origin suffices to define for all these developed buds an incorporation in the individuality of the whole. Since each individual buds in turn, the colony, which envelops the products of several generations, branches out and can acquire fairly large dimensions. We should nevertheless note that this dynamic structure of the ensemble seems to have a certain limit; the whole colony is not organized all of a piece; when it is large, it is formed from several groups distributed at random; but each group presents a certain order; these groups, which truly indicate the dimension of the group's individuality for the species considered, are called coenobia.

A similar process of reproduction takes place in *Heterocarpa glomerata*, which generates stolons that are reabsorbed when the new individual has been born; a single membrane remains that strictly maintains the products of several successive generations tied together. Here again, the mode of reproduction is indeed what determines the specific degree of individuality linking the regime of individuation back to that of reproduction. Reproduction in golden star tunicates (*Botryllus schlosseri*) takes place in a different way and leads to a different regime of individuation: reproduction takes place through a very short stolon (whereas in polystyelines it grows to 1.5 cm) that integrally transforms into an individual; the buds then form clearly delimited coenobia: the whole colony derives from a first individual that begins to bud before having reached adulthood. Afterwards, this budding occurs symmetrically until four buds of the same generation alone remain (those that would support them having been reabsorbed); these buds are arranged into crosses in such a way that their cloacae converge and coalesce into a shared cloaca around which the successive generations are grouped as and when older generations disappear: what results is an important agglomeration of individuals that completely possesses all the organs (most notably the heart) that make an autonomous life possible.

However, the autonomy of the individuals is not full-fledged: they conserve vascular relations between each other; a circular vesicle surrounds the coenobium. Yet each individual has a heart whose beating is not synchronous with the beating of the others. In this sense, this regime of reproduction—in which a clear morphological dominance of the whole over the parts manifests by way of a fairly rigorous symmetry in budding and then by way

of the circular form of the coenobium during its development—corresponds to a colony in which the individuality of the whole is quite clearly prominent, to the point of creating vascular relations between the individuals.

In coelenterates, the formation of colonies is a frequent phenomenon. The majority of hydroids produce a large number of stolons that arise beneath the hydranth and then stretch out and ramify without detaching from the founder; by ramifying, they emit lateral buds that transform into hydranths and, in turn, sprout a stolon. This ramification is *indefinite*, and an equally indefinite colony corresponds to the *indefinite* process of reproduction. We should however note a very important but poorly studied fact in order to be able to found a theory on it alone: certain ruptures are produced in this indefinite ramification that lead to collective individuals and limited colonies, as in the previous cases in which we saw the colony produce via proliferation not a single colony of indefinite dimensions, but coenobia of limited dimensions: everything happens as if a certain quantitative limit produced an elementary morphological induction that divided the colony into restricted groups; a certain phenomenon of individuation therefore seems to arise even within the processes of growth, which here are not separate from those of reproduction. Rabaud considers these ruptures as accidental and not physiological.<sup>26</sup> He separates them from the ruptures of short stolons, which he qualifies as “physiological ruptures”; but the conditions of these “physiological ruptures” are as poorly understood as the ones that interrupt the continuity of development. Thus, there is no irrefutable reason that forces us to oppose so-called accidental ruptures to physiological ruptures; perhaps they depend on one another in the same way as the processes of reproduction considered in its dynamic structure, which presides over the establishment of the anatomical or physiological structure of the colony or groupings of individuals. Within one of the groups of hydranths, a coenosarc remains continuous along the hydrocaulus, thereby putting into relation all the hydranths through the system of channels that crosses it; in this sense, certain physiological bonds and a nutritive community in particular are established by this morphological continuity that is itself accompanied by a continuity in the process of reproduction. And yet the indirect nature of this continuity leaves the hydranths with a certain degree of functional autonomy.

The form of the colony is in general correlative to the mode of reproduction: thus, in other coelenterates, like hydractiniids, the stolon creeps along and ramifies while remaining strictly in contact with the substrate; this is how it forms a network without any erect branches; the buds are born and grow perpendicular to this network, thereby transforming into elongated hydranths.

In hexacorallia, buds arise directly at the expense of the wall of the body above the skeleton that serves as a point of support. Colonies take on quite varied forms, but these forms are in relation with the mode of generation, thereby allowing for the recognition of species. In the immense colonies of madrepores, which form coral reefs, the existence of a polarity is quite prominent. Development often takes on the form of extremely ramified branches that follow an orientation of the whole, which indicates a relative morphological individuality of the colony. The aesthetic aspect of these coral ramifications seems to indicate that this morphology is not arbitrary. This morphology could be likened to the way in which certain complex efflorescences form, like those of ice, which is not independent from the characteristics of the substrate on which it forms yet which deploys forms in harmony with the laws of crystallization. Perhaps it would be necessary to seek in the kinship of form the functional analogies that link together a large number of processes of individuation belonging to extremely different domains; one aspect would be shared by all: the identity of the process of growth, which would be the creation of organized ensembles based on a self-constitutive schema that responds to a dynamism of growth and to the initial givens depending on chance; the same law could then be found again in the growth of an efflorescence, in the development of a tree, in the formation of a colony, and even in the genesis of mental images, as if a dynamic dominance would give a structure to ensembles based on a singularity. A morphological analogy could reveal an identity of the process of formation of collective individualities; in each case the structure of the individual would be linked to the schema of its genesis, and the criterion, perhaps the very foundation, of the individuated being would reside in the autonomy of this genetic schema.

### III. INFORMATION AND VITAL INDIVIDUATION

#### *1. Individuation and Regimes of Information*

A question can then be posed that is perhaps more formal than profound, since it can only be answered by a recasting of commonplace concepts: does colonial budding consist in an excessively proportioned, simple growth of a single individual? Does it on the contrary give birth to distinct yet inter-linked individuals? In a word, what is an individual? We respond to this question that we cannot rigorously speak of the individual but of individuation; we must come back to the activity, to the genesis, instead of attempting to grasp the fully formed being in order to discover the criteria by means of which we will know whether or not it is an individual. The individual is

not a being but an act, and the being is an individual as an agent of this act of individuation through which it appears and exists. Individuality is an aspect of generation, is explained by the genesis of a being, and consists in the perpetuation of this genesis; the individual is that which has been individuated and continues to be individuated; it is the transductive relation of an activity, both result and agent, the consistency and coherence of this activity through which it has been constituted and through which it constitutes; the individual is hereditary substance, according to Rabaud's expression, since it transmits the activity that it has received; it is what makes this activity pass through time in a condensed form as information. It stores, transforms, reactualizes, and carries out the schema that has constituted it; it propagates the schema by individuating. The individual is the result of a formation; it is an exhaustive recapitulation and can reproduce a vast ensemble; the existence of the individual is this operation of amplifying transfer. This is why the individual is always in a double and amphibological relation with what precedes it and what follows it. Growth is the simplest and most fundamental of these operations of transfer that establish individuality. The individual condenses information, transports it, and then modulates a new milieu.

The individual assimilates a genesis and in turn carries it out. When the nervous system is sufficiently developed, this genesis can be assimilated by the nervous system and can expand into creative acts, like the imagery that the being invents according to a law of development that has roots in experience but would not exist without a self-constituting activity. Learning does not differ from genesis profoundly, but learning is a genesis that requires a very complex somatic formation. The individual is what it is in accordance with this activity of amplifying transfer, which is an active genesis and not a genesis that is passively undergone; degrees of individuality are relative to the density of this activity. This criterion alone is fundamental, i.e. the exercise of an amplifying and transductive activity. If this activity is distributed between the whole of a colony and the parts of this colony, it should be said that the parts are incomplete individuals, yet the whole should not be considered an organism whose individuals would be nothing but organs; indeed, these incomplete individuals are increasingly incomplete the more dependent on one another and virtually less detachable they are; however, it can be noted that in morphology the interdependence of incomplete individuals is marked by the importance of the functions of the shared relations that belong to the whole. If this relation between the parts of the whole is only nutritive, the individuality of the parts can still be considered noteworthy; for these individuals,

the fact of taking in the same interior milieu establishes a bond between them, but this bond nevertheless leaves behind a certain independence. On the contrary, if nerve fibers link the different parts to one another, the functionality of these different parts is bound by a much stricter interdependence; a strict functional bond exists with the community of information; the individuality of the parts becomes very weak. What needs to be introduced to determine the degree of individuality is therefore not the morphological criterion alone, but the morphological criterion and the functional criterion. For example, as Rabaud indicates,<sup>27</sup> the cells of an organism like a metazoan are defined by well-determined contours, but they are nevertheless not individuals, since each of them only functions under the direct, constant, and unavoidable influence of its neighbors; each cell involves very strict rapports of dependence with the others, such that its functional activity is nothing but an element of the functional activity of the whole. This loss of functional individuality produces a very low level of individuality. Thus, independent of any genesis, individuality can be presented as characterized by functional autonomy; but this is only true if the word autonomy is given its full meaning: self-regulation, the state of obeying nothing but its own law and developing according to its own structure; this criterion coincides with hereditary substantiality; beings are autonomous when they themselves regulate their own developments and store information and regulate their action themselves by means of this information. The individual is the being that is able to conserve or increase a content of information. It is the autonomous being in terms of information, since it is information that grants it veritable autonomy.<sup>28</sup> If individuals that were bound together by a coenosarc had nothing in common but nourishment, they could still be called individuals. But if chemical messages pass with this nourishment from one individual to another, and consequently if there is a state of the whole that regulates the different parts, then the autonomy of information becomes very weak in each part and individuality lowers correlatively. What needs to be studied is the regime of information in a being in order to know what the degree of individuality of the parts with respect to the whole is; the individual is characterized as the unit of a system of information; when one point of the ensemble receives an excitation, this information will be reflected in the organism and will come back in the form of a more or less generalized motor or secretory reflex; this reflection of information sometimes takes place in the same part in which the excitation occurs or in a part that constitutes with it the same organic unity; but this reflex is nevertheless made dependent upon a center, if the whole is individualized; this center creates facilitation or inhibition. In

this case, there is a center in which the individual stores past information and by means of which it commands, monitors, inhibits, or facilitates (in the English way of speaking, "controls") the passage from a centripetal information to a centrifugal reaction. What defines individuality is the existence of this center by means of which the being regulates itself and modulates its milieu. The stronger the center's control, the more individualized the whole, and the less the parts can be considered autonomous individuals. A regime of fragmentary information reveals a weak individualization of the whole. In animals whose parts are quite differentiated, such as mammals, the regime of information is very centralized; the information received by any one part of the body immediately reverberates throughout the central nervous system, and all the parts of the body respond in a short enough time with an appropriate action, at least those that depend directly on the central nervous system. In animals that have a poorly centralized nervous system, the relation is established between the different parts more slowly; there is a unity of the system of information, but its speed sharply decreases. We can obtain a notion of this less coherent, less rigorously unified individuality by analyzing what our individuality would be if we only had sympathetic and parasympathetic systems: a unity of information would remain, but the reactions would be slower, more diffuse, and less perfectly unified; this difference is so great between the two regimes of information that we are sometimes hard-pressed to make coincide within us the reverberation of an information in the central nervous system with its reverberation in the sympathetic system, and this difficulty can sometimes veer toward splitting, as if individuality were indeed defined by a regime of information; a being that would have two totally independent regimes of information would have two individualities. What complicates the problem in the case of colonies of metazoans is the fact that every alimentary relation is also a chemical relation and that the importance of chemical messages is greater in proportion to how elementary the being is; this chemical sensitivity is what forms the unity and guarantees the individuality of a plant, allowing for the self-regulation of exchanges in accordance with its needs, the opening and closing of pores, perspiration, and the movements of the sap, as the studies of Sir Bose have shown. We can therefore suppose that in the animal the existence of a community of chemical information lowers the level of the individuality of the parts but nevertheless leaves a certain individuality intact. In sum, the regime of information is what defines the degree of individuality; in order to appreciate it, we must establish a rapport between the propagation speed of information and the duration of the act or event to which information is relative. Therefore, if

the duration of information propagation is small relative to the duration of the act or event, an important region of the being, indeed the whole being, will have to take on attitudes and carry out the modifications suitable for this act; in the contrary case, the event or act will remain a local reality, even if there is a reverberation for the whole colony afterwards; individuality is marked with respect to a type of act or event determined by the possibility of reaction and thus of control of the usage of information in accordance with the state of the organism, and consequently the possibility of autonomy; the autonomous zone, i.e. the zone in which information has the time to propagate in a centripetal direction and then in a centrifugal direction quickly enough for the self-regulation of the act to be able to take place effectively, is the zone that belongs to the same individuality. What marks the limits of individuality is the recurrence of centripetal and then centrifugal information. This limit is functional by nature; but it can be anatomical, for anatomical limits can impose a critical delay to information. This criterion applies to colonies. A colony whose parts are linked only by circulatory pathways has no means other than chemical means to convey information. Chemical messages propagate either through convection (and the speed then depends on the speed of the currents, generally several centimeters per second) or through the diffusion of molecules in liquid; this diffusion depends on the temperature and the bodies present, but it is fairly slow (almost at the same order of magnitude as the speed of convection); in small organisms, this mode of information transmission can be quite fast; in organisms of several centimeters, it becomes quite slow. Therefore, the majority of the acts of defense and capture can only receive a self-regulation, the basis of autonomy, if information is conveyed by the nerves, within which the conduction speed of nervous impulses is generally several meters per second, and thus around five times faster than conduction by chemical means. Practically, for the life acts of relation in animals, the limits of the individual are also the limits of the nervous system. Yet it must always be specified that it is only for the life acts of relation that this individuality is limited by the nervous system. Certain other activities can require reactions slow enough such that the colony then behaves as an individual; this is the case, for example, when a toxic substance gets captured by an individualized part of a colony. This capture merely involves a local process, for example a reflex of contraction or relaxation when the toxic body has excited the individualized part; but, after several seconds, the chemical messages produce a global reaction of the whole colony that interrupts or reverses the movement of water pumping or retracts all the hydranths, without any contact with the toxin having taken place except in

the part in which the capture reflex occurred. In this case, it will have to be said that the colony is an individual in terms of alimentation but a society for the other functions. Individuality is essentially linked to the regime of information for each subset of vital activities.

Due to this criterion, we can see individuality establish itself progressively: in naidomorph oligochaetes, the new parts, which remain attached to their founder for quite a while, take on the appearance of a complete worm, while budding continues and other parts differentiate, such that it forms a chain of zooids; the new cerebral ganglion is grafted onto the sections of the pre-existing ventral chain. The nervous system forms a continuous whole along the chain that includes several heads with their respective ganglia; in the same way, the new intestinal tube is inserted into the old parts.

The physiological activity is perfectly coordinated; only the intestinal tube of the founder functions; all the movements of the animal are perfectly linked together: the peristaltic waves of the intestines regularly propagate back and forth without discontinuity. The circulation mutually belongs to the whole file; the bristles over the whole ensemble are animated by synchronous oscillations: consequently, we see that this ensemble of zooids includes nothing but a single zone of autonomy that is coextensive with the nervous system. This ensemble is therefore a single individual.

On the contrary, when the anatomical links that bind the parts begin to dissolve, the tissues enter into histolysis following the same line in which the nervous system of the founder is welded to the new cerebral ganglions. Muscular coordination then breaks down little by little; the contractions become incongruous, and the incongruities accelerate the separation. It can therefore be said that each zooid would already possess its own individuality before the separation, with its functional autonomy and particularly its nervous autonomy. Here individuality is not created by the anatomical separation; it is from the start individuality that appears as the independence of the regime of information and accelerates the separation when the movements are put into disarray. It is interesting to note that the nervous and circulatory connections would still partially exist at the moment in which the contractions would already become antagonistic. Thus independence, even the independence of the neural pathways, is not what creates individuality; instead, individuality is created by the regime of information conditioned by these pathways; it's because the zooid's nervous system is developed enough to have its own rhythmic activity and to inhibit the nervous impulses coming from the nervous system of the founder that individualization can be continued; the mark and foundation of individualization in the nervous system of the zooid is

the recurrent regime of information signals;<sup>29</sup> a certain individualization is required in order for this recurrence to be possible, but as soon as it is possible, this recurrence is established and accelerates individualization; the zooid's individualization can be dated the moment that it can inhibit the nervous messages coming from its parent. Let's note that a cyclical activity like that of an oscillation is the very type of nervous functionality that can be produced by the recurrence of signals in an element of the nervous system or in a completely different network in which signals propagate. Anatomical independence is therefore indeed far from constituting the criterion of individuality; what constitutes the criterion of individuality is independence, or better yet functional autonomy; in fact, autonomy is not synonymous with independence; autonomy exists before independence, since autonomy is the possibility of functioning according to a process of internal resonance that can be inhibitory with regard to the messages received from the rest of the colony and that can create independence.

The independence of individuals with respect to one another is moreover rare and almost impossible: even when individuals have no anatomical bond between one another, they undergo the influence of the milieu that surrounds them, and, among these influences, there are those originating from the other individuals, which are components of the milieu; each individual determines the reactions of the neighboring individual to a certain extent; this interaction, which is ongoing and unavoidable, establishes a certain rapport; but the individuals remain autonomous; there is no functional coordination among them; information does not pass from one individual to the other; the zone of the conservation and recurrence of information is limited to individuals; whatever the intensity of reciprocal action may be, each individual reacts in its own way, sooner or later, more slowly or more quickly, for longer or more briefly; in order for information to pass from one individual to another, the centripetal information signals that have detached from the centrifugal information signals within an individual would have to be received as centrifugal by the other individuals;<sup>30</sup> however, any information that emanates from an individual is received as centripetal by another individual, which responds to this information via its own centrifugal reaction; in order for the interaction to become communication, one of the individuals would have to govern the others, i.e. the others would have to lose their autonomy, and the centrifugal information signals emanating from one individual would have to remain centrifugal within the individuals that receive them; this organization, which implies that one individual becomes a leader, does not seem to exist in colonies.

When material obstacles persist and limit the displacements of individuals, functionally autonomous and anatomically distinct but materially interdependent organisms remain attached to the same support: they are nevertheless individuals; even if they are attached to one another, they play the role of a substrate with respect to one another.

In conclusion to the attempt at determining this functional criterion of individuality, it can be said that the hydranths of a colony of coelenterates possess the individuality of local and rapid reactions, such as the contractions and movements of cilia; there is no nervous system that establishes a functional synchronization between the hydranths. In contrast, the individuality of the slow reactions belongs to the colony; hydranths communicate with one another via the system of hollow canals in the coenosarc, canals that directly culminate in the various gastric cavities and thereby establish among the hydranths an obvious functional dependence:<sup>31</sup> the products of the digestion and assimilation of hydranths flow into a sort of mutual circulation; each hydranth is nourished by and also nourishes the ensemble of the others.

In certain cases, the individuality of the parts of a colony can become temporarily complete; this is the case of millepores and hydrocorals: all the hydranths are unified by a system of interlinked canals in a rich hollow network within the calcareous mass; but, since the hydranths do not stop expelling limestone, which accumulates around them, from time to time they dislodge from the bottom of the chamber, go back up toward its orifice, and lose all relation with the system of canals; but soon they again begin to proliferate and produce around them a series of buds linked together by a new system of canals. From then on, each hydranth becomes the center of a coenobium associated with other coenobia, each one originating from the complete yet fleeting individualization of hydranths detached from older coenobia.

In colonies of bryozoans, there can either be a simple juxtaposition of individuals or a circulatory unity of the ensemble, since each bryozoan lacks a heart.

In colonies of tunicates and golden star tunicates, the individuality of the parts is complete, despite the existence of a shared cloaca in the golden star tunicates; in fact, the shared cloaca cannot regularly convey information.

## *2. Regimes of Information and Rapports between Individuals*

Is individualization linked to specialization? This question can be posed by considering polymorphic colonies.

Polymorphism is often a consequence of budding, and if it is considered that individuality depends on conditions of reproduction, it indeed seems

that polymorphism must be considered as linked to individuality. In fact, it turns out that the various buds in a colony of coelenterates do not all develop in the same way. The colony is then composed of individuals that are different from one another due to their form and their mode of functioning. In some hydranths, like *Hydractinia* and *Clava*, the hydrorhiza spreads out on a support (a shell inhabited by a hermit crab) in a very tight network and in superposed strata; the hydranths are born directly from this inclined stolon and stand vertically; in the *Clava*, a short hydrocaulus serves as a peduncle for the hydranths. One part of the hydranths has a mouth and tentacles; these are the gastrozooids or nourishing individuals. The other parts, without a mouth, are sterile and very contractile and contort in a spiral (spiral zooids or dactylozooids) and then relax and strike the surrounding bodies with their extremity, which contains nematocysts; these would be the defenders of the colony; the others, which are short, sterile, and spine-shaped, are called acanthozooids and are considered to provide shelter; still others, the gonozooids, yield sexual products. These various parts form a continuous whole; the coenosarc, furrowed by canals, fills the hydrorhiza and binds together the various hydranths without any discontinuity. Gastrozooids, dactylozooids, and gonozooids are also distinguished in millepores. In siphonophores, polymorphism is taken even further: these are floating colonies whose various elements originate at the expense of an initial jellyfish, from which the manubrium extends and buds; nectozooids are found here, which are gastrozooids endowed with a large oscular orifice and very long tentacles; there are also dactylozooids, to which a defensive role is attributed, and gonozooids; sometimes a flat or leaf-like lamina, or phyllozooid, is supposed to protect the ensemble. According to Rabaud, the finality indicated in the names is too accentuated; the role of the zooids is not too clear.<sup>32</sup> It cannot be said that polymorphism results from a "physiological division of labor"; indeed, the majority of the functions have been attributed without a veritable examination of the mode of life of these colonies; the acanthozooids are completely useless and lacking in the majority of species; the "aviculars" of the bryozoans of the cheilostome group are merely simple abnormal variations and not defensive organs. Rabaud concludes by saying that the polymorphism of coelenterates amounts to localized variations dependent on the general metabolism of the siphonophore or hydractinia; thus, the difference between the life of a polymorphic colony and the life of a non-polymorphic colony is weak; the difference in look is considerable, but the mode of life and the functional properties are almost the same. Polymorphism arises neither from the influence of individuals on one another, nor from the necessity of

existence, nor from another influence that determines polymorphism; only the gastrozooids and gonozooids are individuals that fulfill a function; all the others result in nothing but a deficit.

Furthermore, it can be wondered if the relation among individuals allows us to define different degrees of individuality. Relative to reproduction, gestation, viviparity, and ovoviviparity represent different modes and different types of relation. It is important to note that these relations are also found in cases that do not concern reproduction but a certain form of association, like parasitism. There is even a profound functional analogy between the gestation of viviparous animals and cases of parasitism, like that of monstilloida or sacculina. There are even cases of association that are constituted by a reciprocal parasitism of two animals contemporaneous with one another. These cases are valuable for the theory of information systems; in some sense they allow us to establish identities (concerning the regime of information in the inter-individual relation) where a morphological examination would find nothing but superficial resemblances that we wouldn't dare to qualify as analogies, since the identity of rapports, which are constitutive for analogy, wouldn't appear to be very clear here. According to this path, it becomes possible to characterize quite a few relations relative to a single type of inter-individual rapports taken as a basis: that of reproduction. We are hypothetically treating the elementary forms of association (parasitism) as complements of reproduction. Indeed, when an individual has become completely autonomous, like an alevin that both swims and nourishes itself all on its own, this new individual is born absolutely; in contrast, when a relation continues to exist between the parent and the young in the form of humoral, nutritive interdependence, like when the fertilized ovule becomes implanted in the uterus according to a definite mode of placentation until birth properly speaking, a phase of association that diminishes the embryo's degree of individualization will be inserted between reproduction properly speaking (division of the egg) and the moment of full individuality. Even after birth, the young individual must be considered as still imperfectly individualized: the relation to the parent extends for a longer or shorter time in the suckling phase, sometimes in an ongoing means of transportation (the marsupial pouch; bats), which is still akin to parasitism with an external fixation. We should further note that certain cases of parasitism are made possible by the fact that several animals have organs, folds, or appendices that are meant to allow for the easy fixation of their young; there can then be a replacement of the young by an individual of another species, and in this case it produces, in place of the homophyseal<sup>33</sup> complex constituted by the union of the parent

and the young, a heterophyseal complex constituted by the assemblage of an individual and its parasitic host. The modifications of metabolism, as well as all the morphological modifications that accompany them, are approximately the same in the case of the heterophyseal complex and in that of the homophyseal complex: a sacculated male crab takes on a form comparable to that of a female. A pregnant female has the same reactions as a parasited animal. Moreover, the asymmetrical relation of parasitism leads the parasite to a regression; in the majority of parasitic species, it is impossible to speak of an "adaptation" to parasitism, since this adaptation is a destruction of the organs that guarantee the being's individual autonomy: for example, the loss of the intestines frequently occurs in animals that, after having sought a host, settle themselves and nourish themselves at the expense of their host; it is not a question of an adaptation in the absolute sense of the term, but of a regression of the parasite's level of organization that ends up transforming the entire heterophyseal complex into a being that does not have a level of organization superior to that of a veritable individual. It even seems that the level of organization of the heterophyseal complex is inferior to that of a single individual, since, in the parasited being, there is no progress, but instead phenomena of anamorphosis;<sup>34</sup> perhaps it should be said that in this case the general level of information of the heterophyseal complex is equal to the difference between that of the parasited individual and that of the parasite.<sup>35</sup> This parasite can also be a society of individuals; when the difference tends toward zero, the heterophyseal complex is no longer viable, and it dissociates either with the death of the parasited being and the liberation of the parasite or with the parasite's death. Thus, it would be necessary to consider a heterophyseal complex as being *less* than a complete individual. Should we consider the homophyseal complex in the same way? Rabaud tends to do so by assimilating gestation to a veritable illness; however, this point deserves to be examined; in fact, while the conclusion of the level of organization is approximately stable in the case of a heterophyseal complex, this conclusion is not always the same throughout the duration of the homophyseal complex; pregnancy can correspond in certain cases to a greater resistance to infectious diseases and to cold temperatures, as if a veritable heightening of vital functions were involved; sensitivity to chemical agents is greater, and reactions are more lively, which seems to indicate an increase in and an adaptive polarization of sensory activity. Motor activity can also be heightened, which seems paradoxical due to the thickening of the body and the greater expenditure of energy. It therefore seems that in this case the relation can be somewhat

additional and somewhat subtractive depending on the circumstances and the metabolism of the embryo and of the mother.

Ultimately, we must distinguish asymmetrical parasitism from the symmetrical forms of association that are symbioses, as can be seen in lichens, which are compounds of an alga that “parasites” a fungus and of a fungus that “parasites” an alga. Indeed, in this case the total quality of organization of the beings constituted in this manner exceeds that of a single individual; the morphological regression of each of the two beings is much less than in the case of pure parasitism, for a reciprocal causality binds the two beings according to a positive reaction; the activity of each being is translated by a greater capacity of activity for the partner;<sup>36</sup> on the contrary, parasitism is founded on a negative reaction that constitutes a mutual inhibition, or at the very least an inhibition exerted by the parasite on the host (thus, in the case where a parasited male presents the characteristics of a female, this analogy is due to the inhibitory influence exerted by the parasite on its host; the secondary sexual characteristics seem to be due to a dimorphism resulting from an inhibition in the female of corresponding characteristics that develop in the male alone; this inhibition, for example that which impedes the development of skin appendages, appears in parasitism).<sup>37</sup> In the reciprocal association of symbiosis, like that of an alga and a fungus, this double inhibition does not appear; here, the recurrent causality is positive, which leads to an increase in the capacities of the formed ensemble; lichens manage to thrive and prosper with a great luxuriance where no algae or fungus can, like on a smooth concrete block, exposed to frost and the intense sun in a dry atmosphere, subsisting between winter and summer in temperature differences of around 60°C and considerable differences in humidity.<sup>38</sup> We even encounter luxuriant lichens in the tundra, where the snow covers the ground for several months at a time. These kinds of associations also describe the relationship between the hermit crab ensconced in a shell and sea anemones that settle onto the shell; the anemones would have an influence on the crab’s prey, either because they attract them with their lively colors or because they paralyze them with their stinging elements, thus facilitating capture for the hermit crab, which is not very mobile when it is in a shell. Moreover, and inversely, the scraps of the hermit crab’s food are consumed by the sea anemones; this latter detail is more certain than that which concerns the usefulness of the anemones for the hermit crab. Nevertheless, we should note that the hermit crab has a tendency to put anemones on the shell it is sheltered in and, more generally, all objects, whether living or not, that it encounters

with a lively color; in captivity, this crab grabs all the colored scraps of paper offered to it and positions them on its back; should this reflex be considered finalized? It is quite difficult to say, and yet it seems that the crab itself is what constitutes the association, perhaps through a mimetic behavior (this is how certain zoologists interpret the reflex that ensures that this crab positions lively colored objects onto its back), but it should be recognized in this case that mimicry is quite clumsy, because on a background of gray or black sand the crab allows itself to be covered with red or yellow, which makes it quite visible; in fact, it can be supposed without irrationality that the hermit crab constitutes this association, and that, once inserted into this cycle of causality (whatever the type of reflex or tropism may be that makes the crab act), the sea anemone develops due to conditions of life that are richer than the ones offered to it by the crab's food; lastly, we should note that here it is not a question of veritable parasitism; the sea anemone does not degenerate, but on the contrary exhibits an outstanding development; indeed, it is nourished not due to the probosces or suckers that inhale the substance of its host, but in a normal and habitual way; the proximity of the crab's claws and feelers merely puts it in a milieu that is richer in small assimilable debris; but it remains a separate individual without any physiological continuity with the crab. Furthermore, the crab does not utilize the substances elaborated by the sea anemone, which is on the shell that the crab dwells in, and yet it could be on any other shell or on a rock. Between the crab and the anemone, there is water and the shell, and this is why in this case we have a veritable society; each individual remains individual but modifies the milieu in which the two individuals live; the relation between the individuals that form a society is established by way of the exterior milieu, and this is why there is a great difference between the cases of parasitism and those of association in the regime of causality and the exchange of information. The regime of inter-individual causality is completely different. We should also note that an alga and a fungus associated as a lichen are, in fact, for one another elements of the exterior milieu and not of the interior milieu; following Schwendener's theory, the alga assimilates carbon through its chlorophyll, which is beneficial to the fungus, and the fungus protects the alga against desiccation by means of its filaments, which shelter it and allow it to live where it would have certainly died alone.<sup>39</sup> This relation of two beings that are an equivalent of the exterior milieu through one another can include different topological modalities but always with the same functional role; the thallus is differentiated from the apothecia; in certain species, the fungal filaments can be more concentrated in the periphery, constituting what is called the lichen's "cortex," while the

center is the “medulla,” and the intermediate region is what contains the gonidia, cells of green algae analogous to those of rocks and soil; this lichen is called heteromeric. On the contrary, in homomeric lichen, such as gelatinous lichen, the distribution of the fungal filaments and algae cells is homogeneous. Lastly, it should be noted that this association goes up to the reproductive elements, including both the algae and the fungus: the soredia contain both the cells of the algae and the filaments of the fungus; these fragments detach from the lichen and are used for its multiplication; in contrast, the fructifications seem to belong to the fungus alone: they are composed of a hymenium, as in ascomycetic fungi, whose cells are asci intermixed with other sterile cells (the paraphyses) and are where spores form. Here, the association constitutes like a second individuality that is superposed on the individuality of the beings that are associated without destroying this individuality; here, there is a reproductive system of society qua society and a reproductive system of the fungus qua fungus; the association does not destroy the individualities of the individuals that constitute it; on the contrary, the parasitic type of relation reduces the individuality of the beings; that of placentation is intermediate; it can evolve in one of two directions, both toward that of society as well as that of parasitism; furthermore, it is highly evolutive and, in this sense, is transformed; like parasitism, the association is static; it is important to note this aspect both in the case of stable states as well as in the case of placentation, i.e. the homophyseal parasitism that tends to become a temporary society. It seems in this sense possible to consider all forms of association as mixtures of parasitism and of the perfect society that ends in the formation of a veritable secondary social individuality, a compound like the one that appears in the algae-fungus grouping; there is no association that is exempt from a certain parasitism and thus from a certain regression that reduces the individuality of the beings grouped together; but, moreover, pure parasitism is rare, since it tends to destroy itself through a sort of internal necrosis that it develops in the group within which parasitism takes place, making this group’s level of organization fall to a very low level. The concrete group can be considered as intermediate between complete society and pure parasitism, where the level of organization that characterizes the group is the difference between that of the parasited and that of the parasite.

### *3. Individuation, Information, and the Structure of the Individual*

A very important question that is yet to be posed is one that consists in knowing what the structure of individuality is: where does the organizing

dynamism of the individual reside? Is it consubstantial with the individual? Or instead, is it localized in some of the fundamental elements that would regulate the ensemble of the individual organism? This is the question that is posed for all individuals and also particularly for those that undergo metamorphoses, which is a sort of reproduction of the being on the basis of itself, a reproduction without multiplication, a reproduction of unity and identity but without similarity, during which the being becomes completely other while remaining an individual, which seems to show that individuality does not reside in self-resemblance and in the fact of not being modified, thus leading us to exclude the idea of an individuality fully consubstantial with the whole being.

The research conducted by biologists have borne either on the development of the egg (Dalcq's studies on the egg and its organizing dynamism) or on the metamorphoses of certain animals, particularly those of insects in which the passage through the nymph stage implies an important reorganization of the organism after a quite extensive dedifferentiation. In the first case, it seems that differentiation by far precedes the appearance of anatomically and cytologically distinct regions; in the stage of the division into macromeres and micromeres, an ablation of one part of the egg already produces the disappearance or atrophy of a particular part of the body, although we might think it would operate on a continuous mass: the continuum is already heterogeneous, as if a veritable polarity appeared in the egg barely beginning to be segmented. In the nymph, several "imaginal discs" direct the reorganization of a mass that has undergone a profound dedifferentiation. The individual structure can therefore be reduced to several elements starting from which it extends to the whole mass. This theory of "organizers" seems to indicate that living matter can be the basis of certain fields that are poorly known and that can neither be measured nor revealed by any currently known procedure; they can only be compared to the formation of crystals or rather crystalline figures in a supersaturated milieu or a milieu that is in other conditions favorable to crystallization;<sup>40</sup> but this case is not absolutely analogous, since the crystal is indefinite in its growth in principle, whereas the individual seems to have limits; truly speaking, the formation of crystals would instead be comparable to the growth of a colony, which doesn't develop in any specific direction and any specific way but according to directions that it favors during its development; there is an orientation at the basis of these two processes, a polarity that makes it such that the individual being is capable of growing and even reproducing with a certain polarity, i.e. analogically with respect to itself, based on its organizing germs, in a transductive way, insofar as this property of analogy is not exhausted; analogy relative to itself is

characteristic of the individual being, and it is the property that allows us to recognize the latter.<sup>41</sup> There is a preparation of individuality every time that a polarity is created, every time that an asymmetrical qualification, an orientation, and an order appear; the condition of individuation resides in this existence of potentials that allow matter to be polarized, whether living or not; furthermore, there is a reversibility between the condition of polarity and the existence of potentials; every field makes polarities appear in initially non-oriented milieus, like a field of mechanical forces in a portion of glass, which modifies its optical properties, for example. However, until now, studies on the polarization of matter, as interesting and suggestive as they may be, have remained fragmentary and partially uncoordinated; an entire theory of polarization is to be made that would no doubt further clarify the rapports of what we call living matter (or organized matter) and inert or inorganic matter;<sup>42</sup> it indeed seems that non-living matter is already organizable and that this organization precedes any passage to functional life, as if organization were a sort of intermediate static life between inorganic reality and functional life properly speaking. The latter would be that in which a being reproduces itself, whereas in non-living matter the individual indeed produces effects on other individuals but does not generally produce individuals similar to it: the physical individual does not convey any other message than its own capacity to grow; it is not "hereditary substance," to use the expression by which Rabaud designates the living individual; thus, a photoelectron falling onto a target can emit secondary electrons, which are many from a single photoelectron; but these secondary electrons are not the descendants of the first electron or photoelectron; they are the descendants of other electrons emitted at the moment of the photoelectron striking against a metal plate (photomultiplier tubes) or against a molecule of gas (ionization chamber).

In these conditions, the individuality and origin of the first electron hardly matters; it can involve a photoelectron, but also a thermoelectron (thyatron) or an electron emitted by some other procedure, for example with the ionization of a gas (a Geiger counter): the result does not change for the emission of secondary electrons, and, for example, there is no way to discriminate the secondary electrons originating from the multiplication of the electrons of the dark current of an ionization chamber or of a photomultiplier from those that originate from veritable photoelectrons; there is no individual marking of electrons and not even a specific marking in terms of their origin, at least with the procedures of measurement at our disposal. On the other hand, this marking is possible in physiology, and it seems to constitute one of the profound characteristics of individuality linking the individual back to its particular genesis. Regeneration, which supposes an immanence of

the organizing schema for each individual and a conservation within it of the dynamism by which it has been produced, does not seem to exist in physics; a sawed-off crystal does not regenerate when it is put back into a mother liquor; it continues to grow but without favoring the side that was amputated; on the contrary, a living being is activated or disturbed by a severance, and its growth occurs much more actively on the side of the amputation than on the surfaces that remain intact, as if the immanence of an organizing dynamism distinguished the surface that has undergone a severance.

Perhaps it is not possible to predict the point on which research would have to bear in order to clarify this relation between individuality and polarization; nevertheless, another aspect of the question is beginning to emerge that is different from the previous one but no doubt connected to it; a possible path of study is situated in the interval that separates these two directions and in the sector that they mark out without structuring it; this second research is the one that is preoccupied with determining the relation between quanta and life. The quantum aspect of physics is found in biology and is perhaps one of the characteristics of individuation; it could be that one of the principles of organization is a functional quantum law that defines the thresholds of the functioning of the organs and thus effectuates organization: the nervous system, whatever its degree of complexity may be, is not merely composed of an array of chemical conductors; between these electrochemical conductors there is a relational system on several levels, a systemics that presents characteristics of operation that are akin to what is called relaxation in physics and what is sometimes called in physiology the "all or nothing"; Anglo-American biologists and neurologists willingly use the expression *to fire* (to discharge like a gun) in order to characterize this operation, which supposes that a certain quantity of potential energy is accumulated and then exerts its effect completely and all of a sudden, not continuously. Not only do the different effectors appear to function according to this law, but the centers themselves, which are organized as an interconnection of relays that facilitate or inhibit one another, are regulated by this law. Thus, although in an organism everything is linked back to everything else physiologically speaking, various and structured regimes of causality can be established due to the laws of quantum functionalities. A quantity that does not reach a certain threshold is virtually null for all the relays that are temporarily at a certain level of triggering, and the message that is transmitted by this information is guided only down the paths where passage is possible with an operation of relays that have a threshold below the energetic level of the message considered; these characteristics of operation can furthermore be something besides

the pure quantity of energy; a temporal modulation can intervene, for example a frequency, but certainly less universally than Lapicque would think at the time when he established the theory of synaptic relays with the notion of chronaxie. It would seem that this operation, which creates a structured regime of information in an individual, should require a preliminary morphological differentiation with a nervous system in particular. Yet, it could be precisely that quantum actions exerted on the level of the large molecules of organic chemistry find a facilitation or an inhibition in certain directions according to a law of thresholds based on the quantum properties of energy exchanges, and then there would be a root of organization as a heterogeneity of paths of exchange in a mass that is nevertheless continuous. Before any anatomical differentiation, the heterogeneously continuous supplies (through a slight quantity of energy) the first elements of a regime of the conditioning of the exercise of a greater quantity of potential energy, which is the starting point of a regime of information in a milieu and makes possible the processes of amplification.

Perhaps the separation between the physical individual and the living individual could be established by means of the following criterion: information in the operation of physical individuation is not distinct from the supports of the potential energy that is actualized in the manifestations of organization; in this sense, there would be no remote relays without life; on the contrary, individuation in the living being would be founded on the distinction between the modulating structures and the supports of potential energy implied in the operations characterizing the individual; the structure and dynamism of relays would therefore be essential to the living individual; this is why according to this hypothesis it would be possible to define different levels in the regime of information for the physical individual and for the living individual: the living being is itself a modulator; it has a power supply in energy, an input or a memory, and an effector system; the physical individual requires the milieu as a source of energy and as an effector charge; the milieu supplies information, the received singularity.

#### IV. INFORMATION AND ONTOGENESIS

##### *1. Notion of an Ontogenetic Problematic*

The ontogenesis of the living being cannot be thought on the basis of the notion of homeostasis alone, i.e. the perpetuation of metastable equilibrium through self-regulations. This representation of metastability could be suitable for describing a fully adult being that would merely maintain itself in

existence, but it would not be sufficient for explaining ontogenesis.<sup>43</sup> This notion must be joined with that of an internal problematic of being. The state of the living being is like a problem to be resolved, to which the individual becomes the solution through successive assemblages of structures and functions. The young individuated being could be considered a system that carries information as pairs of antithetical elements linked together by the precarious unity of the individuated being whose internal resonance creates a cohesion. The homeostasis of the metastable equilibrium is the principle of cohesion that links these domains through an activity of communication and between which there is a disparation. Development could then appear as successive inventions of functions and structures that resolve, step by step, the internal problematic carried by the individual as a message. These successive inventions, or partial individuations which could be called stages of amplification, contain significations that ensure that each of the being's stages is presented as the solution of the previous states. But these successive and fractioned resolutions of the internal problematic cannot be presented as a nullification of the being's tensions. Gestalt theory, which uses the notion of equilibrium, supposes that the being seeks to discover its most stable state of equilibrium in the good form; Freud also thinks that beings tend toward a pacification of their internal tensions. In fact, a form is not a good form for the being unless it is constructive, i.e. unless it veritably incorporates the foundations of the previous disparation<sup>44</sup> in a systematic unity of structures and functions; an achievement that would merely be an unconstructive relaxation would not be the discovery of a good form but simply an impoverishment or a regression of the individual. What becomes a good form is that of the individual which is not yet individuated. Only death would be the resolution of all tensions; and death is not the solution to any problem. The resolving individuation is one that conserves the tensions in the equilibrium of metastability instead of nullifying them in the equilibrium of stability. Individuation makes tensions compatible but does not relax them; it discovers a system of structures and functions within which tensions are compatible. The equilibrium of the living being is an equilibrium of metastability, not an equilibrium of stability. Internal tensions remain constant as the cohesion of the being relative to itself. The being's internal resonance is the tension of metastability; it is what confronts the pairs of determinations between which there is a disparation that can only be significative through the discovery of a higher structural and functional ensemble.

It could be said that ontogenesis is a perpetuated problematic that rebounds from resolution to resolution up to complete stability, which is that of the

adult form; however, complete maturation is not reached by all the functions and structures of the being at the same time; many paths of ontogenesis are pursued sometimes in parallel with an alternation of activity that makes it such that the process of growth affects one set of functions, then another, and then a third, after which it ultimately returns to the first; it seems that this capacity of resolving problems is limited to a certain extent and appears as an operation of the being on itself, an operation that has a systematic unity and cannot affect all the aspects of the being simultaneously. According to Arnold Gesell, the ontogenesis of living individuals manifests a process of growth founded on the coexistence of a principle of unity and a principle of duality. The principle of unity is that of the *direction of development*, which is revealed as a gradient of growth. Somatic and functional development is effectuated by a series of successive waves oriented according to the cephalocaudal axis, which is fundamental, and radiates from the different levels of this axis following the secondary proximodistal schema. This first principle of unity through the polarity of development is completed by that of lateral dominance: the bilateral symmetry of the body, and particularly that of the sense organs and neuromuscular effectors, does not prevent the existence of a functional asymmetry both in the development and in the anatomo-physiological symmetry. On the other hand, there is a principle of duality, that of the bilateral symmetry of the majority of the organs and that of the sense organs and of the effectors in particular. Somatic and functional development (“development of behavior,” according to Gesell’s expression) is effectuated according to a process of reciprocal intertwining that blends unity and duality through a sort of weaving that separates, keeps together, organizes, differentiates, relates, and structures the different somatopsychic functions and assemblages. Development is a behavior upon behaviors, a progressive weaving of behaviors; the adult being is a dynamic web, an organization of separations and reunifications of structures and functions. A double movement of integration and differentiation constitutes this structural and functional web. A progressive individuating maturation divides up increasingly detached and precise schemata within the global unity of reactions and attitudes. But this detachment of schemata of action is only possible to the extent that these schemata are individuated, i.e. are formed as a synergistic unity that structures many elements which could be separate. A precise and adapted movement is, with respect to the whole organism, in fact the result of an individuating maturation, but this individuating maturation cannot constitute a functional unity through pure analysis: the individuation of what Gesell calls a *pattern*<sup>45</sup> (structural and functional schema) does not originate from the mere analysis of a

preexisting global whole, but also and simultaneously from a structuration that systematically integrates several functions. Each motion and each behavior implicate the whole body, but they are not obtained by the analysis and specialization of a global process that would implicitly contain them; the initial organismic unit does not act as the reservoir of all possible behaviors but as the power of cohesion, reciprocity, unity, and symmetry; maturation makes individuation possible, but individuation does not result from maturation. It is not a pure synthesis, a pure learning by way of the conditioning of responses entering into a natural and preformed relational schema. Development takes place through successive learning procedures, which are occasions for the integration of processes during the organism's maturation. The organism's relation to the world takes place through the self-regulating fluctuation of behavior, a schema of differentiation and integration more complex than learning through respondent conditioning alone. The resolution of the problems the individual bears takes place according to a process of constructive amplification.<sup>46</sup>

Gesell's description of human ontogenesis and the principles by means of which he interprets it extend, according to Gesell, the results of general embryology; these principles are not merely metaphorical and descriptive; according to the author, they translate a fundamental aspect of life. In truth, this duality, which is maintained by a unity that is manifested by the principles of bilateral symmetry and functional asymmetry, or better yet the direction of development and individuating maturation, is at the heart of the principle of ontogenesis in the chromosomal structure. Gesell cites Winch's theory according to which the chromosome is a *structure* constituted by two elements: long filaments of identical protein molecules, distributed parallel to one another, surrounded by groups of molecules of cyclized nucleic acid, all of which is interlinked like a weft. The symbol of the chain and of the weft could thus be invoked as the structural and functional foundation of development; ontogenesis would take place starting from the duality of the pairs of protein molecules. A hereditary characteristic would not be a predetermined element but a problem to be resolved, a pair of two distinguished and rejoined elements in a relation of disparation. The individuated being would therefore contain a certain number of disparation pairs that are generative of problematics. Structural and functional development would be a result of the resolution of problems: a stage of development is the solution to a problem of disparation; by way of the temporal dimension of the successive, which brings with it differentiation and integration, a stage of development supplies the unique signification within which the pair of disparate elements

constitutes a continuous system. Development is therefore neither pure analysis nor pure synthesis, nor a mixture of the two aspects; development is the discovery of significations, the structural and functional *realization* of significations. In the form of pairs of disparate elements, the being contains an implicit signification that is realized, discovered in development; but development is not merely an unfolding, an explication of characteristics contained in a complete individual notion that would be a monadic essence. There is no single essence of the individuated being, because the individuated being is not substance, not a *monad*: its entire possibility of development comes to it from what is not completely unified or systematized; a systematized being, which has an essence just like a series has its reason, could not develop. The being is not fully contained in its principle, or rather in its principles; the being develops on the basis of its principles, but its principles are not given in a system; there is no first essence of an individuated being: the genesis of the individual is a discovery of successive *patterns* that resolve the incompatibilities inherent to the basic pairs of disparation; development is the discovery of the dimension of resolution, or better yet of signification, which is the dimension not contained in the disparation pairs and due to which these pairs become systems.<sup>47</sup> Thus, each retina is covered with a two-dimensional image; the left image and the right image are disparate; they cannot overlap, because they represent the world seen from two different points of view, which creates a difference of parallaxes and of field overlaps; certain details hidden by a first field in the left image are, on the contrary, exposed in the right image and vice versa, such that certain details only figure on a single monocular image. However, a third image that would unify these two images is not optically possible; they are disparate by essence and not superposable in the axiomatic of bi-dimensionality. In order for them to make a coherence appear that incorporates them, they must become the foundations of a world perceived from within an axiomatic in which the disparation (condition of impossibility of the direct two-dimensional system) precisely becomes the index of a new dimension: there are no longer two images in the three-dimensional world, but the system integrates two images, a system that exists according to an axiomatic on a superior level to that of each of the images but which is not contradictory relative to them. Tri-dimensionality integrates bi-dimensionality; all the details of each image are present in the system of significative integration; details that are concealed by the overlap of fields and consequently only exist on a single image are retained in the system of integration and perceived completely, as if they belonged to both images; here, we wouldn't be able to think of a process of abstraction and generalization

that would merely conserve in the perceptive signification what is mutual to the two separate retinal images: far from retaining what is mutual, perception retains everything that is particular and incorporates it into the whole; furthermore, it utilizes the conflict between two particulars in order to expose the superior system within which these two particulars are incorporated; the perceptive discovery is not a reductive abstraction but an integration, an amplifying operation.

Yet, it is possible to suppose that perception is not fundamentally different from growth and that the living being operates similarly in every activity. As an activity, growth is amplification via differentiation and integration, not a simple continuity or unfolding. In every complete vital operation, the two aspects of integration and differentiation are joined together. Thus, perception would not exist without the differential utilization of sensation, which is sometimes considered as a proof of subjectivity and a justification of the critique of the validity of a knowledge obtained from perception; sensation is not what contributes a confused continuum to the *a priori* of the perceiving subject and matter for the *a priori* forms; sensation is the differential play of the sense organs indicating a relation to the milieu; sensation is the capacity of differentiation, i.e. the apprehension of relational structures between objects or between the body and objects; but this operation of sensory differentiation can only be coherent with itself if it is made compatible by another activity, the activity of integration, which is perception. Sensation and perception are not two activities that follow one another, with the former providing matter to the latter; they are two twin and complementary activities, two versions of this amplifying individuation that the subject operates according to its relation to the world.<sup>48</sup> Furthermore, growth is not a separate process: it is the model of all vital processes; the fact that it is ontogenetic truly indicates its central, essential role, but this does not mean that there is not a certain ontogenetic coefficient in each of the being's activities. An operation of sensation-perception is also a relative and restrained ontogenesis; but it is an ontogenesis that effectuates itself by utilizing preformed structural and functional models: it is supported by the already existing living being and oriented by the content of memory and activated by instinctual dynamisms. All the functions of the living being are ontogenetic to some extent, not just because they ensure an adaptation to an external world, but because they participate in this ongoing individuation that life is. The individual lives to the extent that it continues to individuate, and it individuates by way of the activity of memory as well as the imagination or abstract inventive thought. In this sense, the psychical is vital, and it is also true that the vital is psychical,

but on condition of understanding the *psychical* as the activity of the construction of systems of integration within which the disparation of pairs of elements takes on a sense. Adaptation, the particular case in which the disparation pair includes an element of the subject and a representative element of the external world, is an insufficient criterion for providing an account of life. Life includes adaptation, but for there to be adaptation, there must be an already individuated living being; individuation is anterior to adaptation, and the latter does not exhaust the former.<sup>49</sup>

## 2. *Individuation and Adaptation*

Adaptation is a correlate of individuation; it is only possible in accordance with individuation. The whole biologism of adaptation, upon which an important aspect of nineteenth-century philosophy depends and which persists in our day in the form of pragmatism, implicitly supposes the already individuated living being as a given; the processes of growth are partially set aside: this is a biologism without ontogenesis. In biology, the notion of adaptation represents the projection of the relational schema of thought with a dark zone between two clear terms, just like in the hylomorphic schema; furthermore, the hylomorphic schema itself appears in the notion of adaptation: the living being finds in the world certain forms that structure the living being; in addition, the living being gives form to the world in order to appropriate it for itself: adaptation, which is passive and active, is conceived as a complex and reciprocal influence based on the hylomorphic schema. However, since adaptation is taken for granted by biology as the fundamental aspect of the living being, it is quite natural that psychology and the poorly structured disciplines (which lack principles) have believed to borrow from biology a faithful and profound expression of life by utilizing the principle of adaptation in other domains. But if it were true that the principle of adaptation does not express vital functions in depth and does not account for ontogenesis, it would be necessary to reform all the intellectual systems founded on the notion of adaptation. It would be particularly advisable not to accept the consequences of Kurt Lewin's social dynamics, which represent a synthesis of German Gestalt theory and American pragmatism. Indeed, the personality is represented as the center of the tendencies; the milieu is essentially constituted by a goal toward which the being strives and by a set of forces opposed to the movement of the individual toward the goal: these forces constitute a barrier that exerts a reaction proportionate in strength to the intensity of the individual's action; consequently, the different possible attitudes are behaviors relative to this barrier that seek to attain the goal in spite

of this barrier (for example, detour is one of these behaviors). Such a conception appeals to the notion of force fields; behaviors and attitudes are understood as possible pathways within these force fields, these *hodological* spaces; animals and children project a simpler hodological space than that of adult humans; each situation can be represented by the structure of the force field that constitutes it. However, this doctrine supposes that the essential activity of the living being is adaptation, since the problem is defined in terms of the opposition of forces, i.e. a conflict between the forces emanating from the subject oriented toward the goal and the forces emanating from the object (from the object for the living subject) as a barrier between subject and object. The discovery of a solution is a new structuration of the field that modifies the topology of this field. However, what seems to be lacking in the topological and hodological theory is a representation of the being as capable of operating successive individuations *within it*;<sup>50</sup> for the topology of force fields to be modified, a principle must be discovered, and the old configurations must be incorporated into this system; the discovery of significations is necessary for the given to be modified. Space isn't just a force field, and it isn't merely hodological. For the integration of elements into a new system to be possible, there must be a condition of disparation in the mutual relation of these elements; if elements are as heterogeneous as Kurt Lewin supposes, if they were opposites like a barrier that repulses and a goal that attracts, the disparation would be too great for a mutual signification to be discovered. Action, the individuation enveloping certain elements of the milieu and certain elements of the being, can only occur starting from nearly similar elements. Action isn't just a topological modification of the milieu; it modifies the very weft of objects and subject much more finely and delicately; what is modified is not the abstract topological distribution of the object and the forces: in both a global but more intimate and less radical way, the incompatibilities of disparation are overcome and integrated due to the discovery of a new dimension; the world before actions isn't just a world where there is a barrier between the subject and the goal; it is above all a world that does not coincide with itself, because it cannot be seen from a single point of view. The obstacle is indeed rarely just one object among objects; it is only such symbolically and for the needs of a clear and objectifying representation; in real lived experience, the obstacle is the plurality of ways of being present in the world. Hodological space is already the space of the solution, the significative space that integrates the various possible points of view into systematic unity, the result of an amplification. Before hodological space, there

is this overlap of perspectives that does not allow for the apprehension of the determined obstacle, since there are no dimensions with respect to which the single ensemble would be organized. The *fluctuatio animi*<sup>51</sup> that precedes the resolute action is not a hesitation between several objects or even several paths, but an unstable collection of incompatible, almost similar, and therefore disparate, ensembles. The subject before action is caught between several worlds, between several orders; action is the discovery of the signification of this disparation, of that through which the particularities of each ensemble are integrated into a broader and richer ensemble, which has a new dimension. It is not by way of the dominance of one of the ensembles constraining the others that action manifests as organizing; action is contemporaneous with the individuation by which this conflict of planes is organized in space; the plurality of ensembles becomes a system. The schema of action is nothing but the subjective symbol of this new significative dimension that has just been discovered in the active individuation. Therefore, such an incompatibility can be resolved as a systematic signification by a schema of succession and conditioning. Action indeed follows paths, but these paths can only be paths because the universe becomes ordered by individuating: the path is the dimension according to which the life of the subject in the *here and now* is integrated into the system by individuating it and by individuating the subject: the path is simultaneously world and subject, it is the signification of the system that has just been discovered as a unity that integrates the different anterior points of view, the singularities borne. The perceiving being is the same as the acting being: action begins with a resolution of the problems of perception; action is the solution of the problems of the mutual coherence of perceptive universes; it takes a certain disparation between these universes for action to be possible; action is impossible if this disparation is too great. Action is an individuation above perceptions, not a function without links to perception and independent from it in existence: after perceptive individuations, an active individuation will give a signification to the disparations that appear between the universes resulting from perceptive individuations. The relation that exists between action and perceptions cannot be thought according to the notions of genus and species. Pure perception and pure action are the extreme terms of a transductive series oriented from perception toward action: perceptions are partial discoveries of significations that individuate a limited domain with respect to the subject; action unifies and individuates perceptive dimensions and their content by finding a new dimension, that of action: in fact, action is this course that is a dimension,

a manner of organizing; the paths do not preexist action: they are the very individuation that makes a structural and functional unity appear in this conflictual plurality.<sup>52</sup>

The notion of adaptation is poorly formed to the extent that it supposes the existence of terms as preceding that of relation; what deserves to be critiqued is not the modality of relation such as the theory of adaptation envisions it; what deserve to be critiqued are the very conditions of this relation coming after the terms. The theory of active adaptation according to Lamarck nevertheless presents an important advantage over that of Darwin: it considers the activity of the individuated being as playing an extremely important role in adaptation; adaptation is an ongoing ontogenesis. However, Lamarck's doctrine does not make enough room for this conditioning via the problematic aspect of vital existence. The striving of the living being is not simply conditioned by needs and tendencies; in addition to needs and tendencies, which have an individual and specific origin, there appear ensembles in which the individuated being is engaged by perception and which are not compatible with these needs and tendencies according to their internal dimensions. In both Darwin and Lamarck, there is the idea that the object is object for the living being, a constituted and detached object that represents a danger or a food or a refuge. In the theory of evolution, the world relative to which perception takes place is a world that is already structured according to a unitary and objective system of reference. Yet it is precisely this objective conception of the milieu that creates the notion of adaptation. There is not merely a food object or a prey object but a world pursuant to the search for nourishment and a world pursuant to the avoidance of predators or a world pursuant to sexuality. These perceptive worlds do not coincide but are nevertheless not that different from one another; they have some elements that belong to each (objects designated as predator, prey, mate, food), just as monocular images each possess several fringes that belong to each image.<sup>53</sup> Adaptation is a resolution to a superior degree that must engage the subject as the bearer of a new dimension. The objective dimensions are adequate for each perceptive universe: three-dimensional space pairs together two disparate two-dimensional images. But different perceptive universes cannot be reduced to a system of a superior dimensional axiomatic according to a principle of objectivity; the living being consequently enters into the axiomatic by supplying it with a new condition that becomes a dimension, i.e. action, the course, the succession of phases of the rapport to the objects that modifies the latter; the hodological universe integrates disparate perceptive worlds in a perspective that makes the milieu and the living being mutually correlative according

to the being's becoming in the milieu and the milieu's becoming around the being. The very notion of milieu is misleading: there is only a milieu for a living being that manages to integrate perceptive worlds in a unity of action. The sensory universe is not given all at once: there are nothing but sensory worlds waiting for action so that they can become significative. Adaptation creates the milieu and the being relative to the milieu, the being's paths; before action, there are no paths, there is no unified universe within which the directions and intensities of forces can be indicated in order to find a result: the physical paradigm of the parallelogram of forces is not applicable, for it supposes a single space, i.e. dimensions valid for this single space, axes of reference valid for every object that is in this field and for every movement that will take place there. In this sense, Gestalt theory and Kurt Lewin's dynamic Field Theory extending it are retroactive representations: it is easy to explain action when the being is given in a single structured milieu; but action is precisely the condition of the coherence of the axiomatic by means of which this milieu is singular: Adaptation theory, Gestalt theory, and the dynamics of fields reject, before action and in order to explain it, what action creates and conditions; these three doctrines suppose a structure of action before action to explain action: they suppose the problem resolved; however, the problem of the living being's action is precisely the problem of the discovery of compatibility. This problem is a problem of individuation to a superior degree. It cannot be resolved by means of notions which, like that of the stable state, suppose preliminary axiomatic coherence. What is common to the three notions of adaptation, good form, and hodological space is the notion of stable equilibrium. However, stable equilibrium, that which is realized when all potentials are actualized in a system, is precisely what supposes that there is no incompatibility, that the system is perfectly unified because all possible transformations are realized. The system of stable equilibrium is one that has attained the highest degree of homogeneity possible. It cannot explain action to any extent, for it is the system within which no transformation is possible, since all potentials have been exhausted: it is a dead system.

To account for the activity of the living, we must replace the notion of stable equilibrium with that of metastable equilibrium, and we must replace the notion of good form with that of information; the system in which the being acts is a universe of metastability; the preliminary disparation between perceptive worlds becomes a condition of structure and operation in a state of metastable equilibrium: the living being is what maintains, transposes, prolongs, and sustains this metastable equilibrium through its activity. The complete universe only exists so long as the living being enters into the axiomatic

of this universe; if the living being is removed or disengaged, the universe breaks down into perceptive worlds of new disparities. The living being, which enters among these perceptive worlds to transform them into a universe, amplifies the singularity that it bears. Perceptive worlds and the living being individuate together into a universe of vital becoming.<sup>54</sup>

Only this universe of vital becoming can be grasped as a veritable total system; but it is not given all at once; it is the meaning of life, not its condition or origin. Goldstein has indeed indicated the meaning of this systematics of the whole; but, by treating it as an organismic unity, he has been forced to a certain extent to take it as a principle and not as a meaning; whence the Parmenidean aspect of his conception of being; the whole is given at the origin, such that vital becoming is difficult to grasp as an effective dimension of this systematics. The structure of the organism would be understood better at the level of perceptive worlds in Goldstein's theory than at the level of activity properly speaking. Holistic dominance is at the beginning, such that totality is the totality of the living being, rather than the totality of the universe including the living being inserted through activity into the perceptive worlds that have taken on a meaning for the becoming of this activity. Sensory systems are difficult to think in their relative distinction; however, the structural and functional distinction of the senses is the basis for action, insofar as they are a basis for the significations residing in the pairs of forms that are the only ones starting from which information can exist. Sensibility, the plurality of sensations, therefore cannot be unified under a global function, since this plurality is the foundation for future significations as a plurality of points of contact based on which significations will be possible during the course of further individuations.

### *3. Limits of the Individuation of the Living. Central Characteristic of the Being. Nature of the Collective*

This theory does not suppose that all vital functions merge together and are identical; but it tends to designate all these functions by the operation of individuation that they carry out; thus, individuation would be a much more general and widespread operation than what is usually considered as an individuation. The fact that the living being is a separate individual in the majority of species is nothing but the consequence of the operation of individuation; ontogenesis is an individuation, but it is not the only individuation that is carried out in the living being or that takes the living being as a basis and incorporates it.<sup>55</sup> To live consists in being agent, milieu, and element of individuation. Perceptive, active, and adaptive behaviors are aspects of the

fundamental and perpetuated operation of individuation that constitutes life. According to such a conception, in order to think the living being, life must be thought as a transductive result of operations of individuation or, better yet, as an interlinking of successive resolutions, insofar as each previous resolution can be taken back up and reincorporated in subsequent resolutions. In this sense, we could take account for the fact that life in its entirety seems like a progressive construction of increasingly elaborate forms, i.e. forms capable of containing increasingly elevated problems. The vital axiomatic is complicated and enriched through evolution; evolution is not a perfecting properly speaking but an integration, the maintaining of a metastability that increasingly settles on itself and thereby accumulates potentials and assembles structures and functions. Individuation as generative of perishable individuals submitted to aging and to death is nothing but one of the aspects of this generalized neotenizing vital individuation that incorporates an increasingly rich axiomatic. In fact, the individual as a limited being submitted to the *here and now* and the precariousness of its isolated condition expresses the fact that it remains something unsolvable in the vital problematic; it is because life is the resolution of problems that it remains something residual, a detritus that cannot take on signification, a remainder after all the operations of individuation. What remains in the old being is what has been unable to be integrated, the unassimilated. From the ἀπειρον [ápeiron] before individuation to the ἀπειρον<sup>56</sup> after life, from the undetermined of the before to the undetermined of the after, from the first dust to the last dust, an operation is carried out that does not break down into dust; life is in its present, in its resolution, not in its remainder. And death exists for the living being in two senses that do not coincide: it is hostile death, that of the rupture of metastable equilibrium, which is only maintained through its own functioning and its capacity of ongoing resolution: this death construes the very precariousness of individuation, its confrontation with the conditions of the world, the fact that it is engaged and takes risks and cannot always succeed; life is like a posed problem that may not be resolved or may be resolved badly: the axiomatic collapses in the very course of the resolution of the problem: a certain risk or happenstance from outside therefore exists in every life; the individual is not self-enclosed, and there is no destiny contained in it, for what it resolves is simultaneously the world and itself, the system of the world and itself.

But death also exists for the individual in another sense: the individual is not pure interiority: it is burdened with the weight of the residues of its operations; it is passive by itself; it is to itself its own exteriority; its activity

weighs it down, charges<sup>57</sup> it with an unusable indetermination, an indetermination in stable equilibrium whose nature is exhausted, deprived of potentials, and can no longer be the basis for new individuations; the individual little by little takes on elements of stable equilibrium that charge it and prevent it from going toward new individuations. The entropy of the individuated system increases throughout the successive operations of individuation, particularly in those that are not constructive. The results of the past that lack potential accumulate without becoming the seeds for new individuations; this heatless dust and this unenergized accumulation are the rise of passive death within the being, a death which does not originate from confronting the world but from the convergence of internal transformations. It can nevertheless be wondered if aging is not the counterpart of ontogenesis. Tissues that are cultivated *in vitro* and transplanted frequently enough to never yield large masses live indefinitely; it is generally said that these tissues owe their unlimited longevity to the fact that transplantation prevents the accumulation of toxic waste products within the ensemble of the living matter. But it can also be noted that transplantation always maintains the portion of living tissue in a state of undifferentiated growth; as soon as the portion is large enough, it differentiates, and the differentiated tissues die after a certain period of time; however, differentiation is a structuration and a functional specialization; it is the resolution of a problem, whereas the undifferentiated growth of frequently transplanted tissues takes place before any individuation on the level of the portion: perpetual transplantation always brings the tissue back to the same point in its evolution as an ensemble that can be the support of an individuation. The tissue's longevity is no doubt due to this absence of individuation: there is an iteration of the growth process, an externally provoked iteration. The fact that a large enough ensemble differentiates and dies seems to show that every differentiation leaves behind a certain residue that cannot be eliminated and places a burden on the individual, thereby diminishing the chances for future individuations. Aging is indeed this lesser capacity of renewal, as studies on the healing of wounds show; the individual that is structured and specializes its organs or its automatic habitual frameworks becomes increasingly less capable of recreating new structures if the old ones are destroyed. It's as though the majority of initial potentials proceeded by diminishing and the inertia of the being proceeded by increasing: the being's viscosity increases through the effects of individuating maturation.<sup>58</sup> This increase in inertia, rigidity, and viscosity is apparently compensated by the increasingly pronounced richness of the acquired arrangements, i.e. of adaptation; but adaptation is precarious in the sense that if the milieu

is modified, new problems may not be resolved, and then the previously elaborated structures and functions will encourage an unhelpful iteration. In this sense, the fact that the individual is not eternal seems like something that should not be considered accidental; life in its entirety can be considered a transductive series; death as the final event is nothing but the consummation of a process of amortization that is contemporary with each vital operation insofar as they are operations of individuation; every operation of individuation deposits death in the individuated being, which is therefore progressively charged with something it cannot eliminate; this amortization is different from the degradation of the organs; it is essential to the activity of individuation. The being's inborn indetermination is little by little replaced by the indetermination of the past, deprived of tension, a pure inert charge; the being goes from the plurality of initial potentials to the indistinct and homogeneous unity of ultimate dissolution across successive structurations of metastable equilibria: individuated structures and functions make the two indeterminations between which life is inserted communicate.

If the individual has a meaning, it is certainly not just in terms of the being's tendency to persevere in its being; the individual being is transductive, not substantial, and the being's tendency to persevere in its being seeks the equivalence of a substantialization, even if the individual is only composed of modes. In fact, the meaning of the living being cannot be found in its unconditional integration into the species; the species is a reality that is as abstract as the individual would be if it were taken as substance. Between the substantialization of the individual being and its absorption in the superior continuum of the species—wherein it is like the leaves of a tree, according to the expression that Schopenhauer has taken up from Homer (Ὅμηρον φύλλων γένει, τοῖν δὲ καὶ ἀνδρῶν [the race of men is related to that of leaves])<sup>59</sup>—there is a possibility of grasping the individual, insofar as it is limited, as one of the sides of essential vital individuation; the individual is a transductive reality; through the span of its active existence in the temporal dimension, it increases life's capacity to solve problems; the individual bears an axiomatic or rather a dimension of the vital axiomatic; the evolution of individuation—this binding of a functional structuration and of an amortization paired together and constituting each active and perceptive operation—transforms the individual into a being that translates potentials which are incompatible with one another into metastable equilibria that can be maintained by means of successive inventions. Like any transductive series, the individual's existence must be grasped within its milieu in order to be comprehended in its full reality; the complete individual is not merely the being that goes from its birth

to its death: it is essentially the *being of maturity*, with the status of existence that is between two extremes and that gives meaning to the two extremes; birth and death and then ontogenesis and destruction (which are anabolic processes and catabolic processes) are extremes relative to the center of maturity; the real individual is the mature individual, the median individual. The individual continues in maturity, not by again becoming eternally young or by transmutating beyond an ultimate death; the individual corresponds to its function most fully in its center of existence via these individuations that resolve the world and resolve the individuated being. Young and old, the individuated being is isolated; mature, it is structured in the world and structures the world within it. The structures and functions of the mature individual link it back to the world and insert it into becoming; significations are not like individuated beings: they are not contained or enclosed in an individual circumference that will degrade; only realized significations, the paired structures and functions of the mature individual, surpass the *here and now* of the individuated being; the mature individual, the one that resolves perceptive worlds into action, is also the one that participates in the collective and creates it; the collective exists as the individuation of the charges of nature transported by individuals. What accumulates this translation of the structures and functions elaborated by the individuated being is not just the species as a phylum but also the collective unity of the being.<sup>60</sup> It could be said that a second birth in which the individual participates is that of the collective, which incorporates the individual itself and constitutes the amplification of the schema that it bears. The individual is translated into the collective as an effectuated signification, as a resolved problem, as information: it is therefore prolonged across and above but not in its individual enclosure. With respect to this discovered signification, the individual is itself in the *here and now*, a progressive amortization, a detritus, and it incrementally detaches from the movement of life. The individual is neither complete nor substantial; the individual has no meaning except in individuation and through individuation, which deposits it and stores it as much as assumes it by way of participation. Individuation does not merely occur in the individual and for it; it also occurs around it and above it. The individual is translated through its center of existence, converted into signification, perpetuated in information, whether implicit or explicit, vital or cultural, thereby waiting on successive individuals to reach maturity and resume the signs of information left behind by their predecessors: the individual encounters life in its maturity: entelechy is not merely internal or personal; it is an individuation in accordance with the collective. Lucretius represents living beings as relay runners

that pass on torches; this is no doubt how he understands the flame of life given at birth; but this can also be understood as what is passed on to the interior of the collective, recreated and renewed through time by successive individuals. For species in which complete and distinct individuals do not exist, this inactuality<sup>61</sup> of young and old never forms to the same extent; the colony or vital ensemble circulates a perpetual actuality in the different parts of the being. In superior species, accentuated ontogenesis and its correlate in old age phase-shift the individual from one end to the other with respect to this actuality of the collective: the individuated being is not in phase with life properly speaking except in its maturity. And this is precisely the resolution of the problem that only the individuation of separate beings can achieve: the colony is fixed in its perpetual actuality; it cannot detach from itself or phase-shift from end to end relative to its present; it can only react and develop according to continuity. Life, which comes up with ontogenesis and aging through the invention of the separated individual, creates this end-to-end phase-shift of each individuated being relative to the collective and to the actual.<sup>62</sup> The mode of being of the collective of individuals differs from the perpetual present of the colonies of primitive living beings due to the fact that it is the encounter of individual becomings in a present that dominates the advance of youth and the delay of old age and incorporates them into a real entelechy. The collective finds and realizes the signification of these two temporal decenterings that constitute the forward phase-shift of growth and the backward phase-shift of aging. The collective, the functional equivalent of the colony, is the signification of the two inverse and contradictory aspects of ontogenesis and destruction, which are incompatible in the individual. The individual finds the signification of perceptive disparations through action. By way of this superior analogue of action that is presence, the collective finds in the individual's signification of disparation the pair of anabolic processes and catabolic processes, of ontogenesis and degradation, a pairing of the ascent toward existence and of the descent toward the definitive stability of the equilibrium of death. The definitive and only metastability is that of the collective, since it is perpetuated without aging throughout successive individuations. Inferior species may not involve separate individuality: metastability can be immanent to the individual, or instead it can traverse the whole imperfectly portioned into individuals. In superior species, the permanence of life is also found on the level of the collective; but it is found there at a superior level; it is rediscovered there as signification, as the dimension within which the ascent and degradation of the individuated being is integrated; the collective is borne by the maturity of individuals, a maturity that is the

superior dimension relative to which youth and old age are organized and that is not a transitional state between youth and old age; the individual is mature to the extent that it is integrated into the collective, i.e. to the extent that it is simultaneously old and young, *prior to* and *coming after* relative to the present, thereby containing within itself both future potentials and traces of the past. Maturity is not a state but a signification that integrates the twin anabolic and catabolic sides of life. The individual finds its meaning in this phase-shift via which it offers the bi-dimensionality of time (coming to be then passing away, swelling with potentials toward the future, then being insularly structured in the past) to the integration of the collective; with the present, the collective is the resolution of the incompatible bi-dimensionality within the individual in accordance with the tri-dimensionality that coheres in the present. This is because there is a great difference between the future and the past as they are for the separate individual, and the future and the past as they are in the three-dimensional system of collective presence. The future and the past become dimensions *through the presence of the present*; before the individuation of the collective, the future is the isolated signification of anabolic processes, and the past is the isolated signification of catabolic processes. These two processes do not coincide: relative to one another, they are disparate and yet paired together, for each action implies both the one and the other. In the collective, individual action takes on a meaning because it is present. The present of the collective is comparable to the third dimension of space for perception; the future and the past of the individual find a coincidence in this dimension and are organized there into a system due to an axiomatic of a superior degree. The individual bears within it the conditions of temporal depth, but not this dimension of depth; alone, it would be held between its future and its past, which means that it would not be fully living. For any vital signification to be found, the temporal duality of the individual must be organized according to the tri-dimensionality of the collective. In the collective, the pairing of the future and the past becomes signification, for the individuated being is recognized as integrated: it is integrated not only according to its future or its past, but according to the direction of the condensation of its future and its past: the individual is present in the collective, it is *unified in the present* through its action. The collective is not a substance or a form anterior to the individuated beings that would compel them, penetrate them, or condition them: the collective is the communication that envelops and resolves individual disparities as a presence that is the synergy of actions, the coincidence of futures and pasts as an internal resonance of the collective. Indeed, collective synergy supposes

a unity that creates a domain of transductivity from what is not yet individuated within each individual being, something which could be called the charge of nature associated with the individuated being; the collective is that in which an individual action has a meaning for other individuals as a symbol: each action presented to the others is a symbol of the others; it belongs to a reality that individuates into totality as capable of accounting for the simultaneous and successive plurality of actions.

The collective is not merely the reciprocity of actions: within it, each action is signification, insofar as each action resolves the problem of separate individuals and is constituted as a symbol of other actions; the synergy of actions is not merely a *de facto* synergy, an interdependence that ends in a result; it is due to the fact that it is structured as symbolic of the others that each action has this capacity of making the individual past coincide with the individual present. In order for the dimension of presence to exist, it requires not only several individuals gathered together: it also requires this union to be inscribed in their own dimensionality and requires that, within them, present and future be correlative of the dimensions of other beings through this unity of the present; the present is that in which there is signification, that through which a certain resonance of the past toward the future and of the future toward the past is created: the exchange of information from one being to another passes through the present; each being becomes reciprocal with respect to itself to the extent that it becomes reciprocal with respect to the others. Intra-individual integration is reciprocal with transindividual integration. The category of presence is also the category of the transindividual. A structure and a function exist both in individuals and from one individual to another, without them being able to be defined as merely external or internal. This relation between individuals and through individuals expresses the fact that individuals are amplified in a vaster reality via the intermediary of something that is a problematic tension within them, i.e. information: this reality can be called the pre-individual charge within the individual. Action, the resolution of perceptive pluralities into a dynamic unity, implies the intervention of this pre-individual reality: the being qua pure individuated being has nothing within it to go beyond perceptive worlds in their plurality. The individual being would remain incompatible with itself if it had nothing but perception, and it would have nothing but perception if there were nothing available to resolve these problems than what the being is, qua individuated individual, as the result of an anterior operation of individuation. The being must be able to appeal in it and outside it to a not yet individuated reality: this reality is the information that it contains relative to a pre-individual real:

this charge is the very principle of the transindividual; it communicates directly with other pre-individual realities contained in other individuals, just as the links of a network communicate with one another by each link being surpassed in the following link.<sup>63</sup> Participating in an active reality within which it is nothing but a link, the individuated being acts in the collective: action is this networked exchange between the individuals of a collective, an exchange that creates the internal resonance of the system formed in this way. The group can be considered as substance with respect to the individual, but only in an inexact fashion. Indeed, the group is reached starting from the charge of pre-individual reality of each of the grouped individuals; the group does not directly incorporate individuals but their charges of pre-individual reality: it is through the latter, and not as individuated individuals, that beings are included in the transindividual relation. The transindividual is that which (in non-provisional individuals) is equivalent to the transformation of provisional beings used for genetic transfer into colonies or to the seed's development into a plant.

#### *4. From Information to Signification*

It could then be questioned how we should represent the function of individuation when it develops in the living being. It would be necessary to be able to define a notion that would be valid for thinking individuation in physical nature as well as in living nature and, afterwards, for defining the internal differentiation of the living being that extends its individuation by separating vital functions into physiological and psychical functions. However, if we take up again the paradigm of technological form-taking, we find a notion that seems to be able to pass from one order of reality to another due to its purely operative nature, which is not linked to any particular matter and is only defined relative to an energetic and structural regime: the notion of information. Form, for example the rectangular parallelepiped, does not act on matter directly; it does not even act after being materialized as the parallelepipedic mold; the mold only intervenes as a modulator of the energy that bears the clay in a particular way at a particular point; the mold is the bearer of information signals; the form must be translated into information signals to be able to effectively encounter the matter when it is originally external to the latter. Individuation is a modulation. Yet, the notion of information is delivered separately by certain technologies, known as information technologies, on whose basis information theory has been built. But it is difficult to extract a univocal notion of information from these multiple technologies in which the notion of information is utilized and which have led to the usage

of quantities. Indeed, the notion of information appears in two almost contradictory ways. In the first case, information, as Norbert Wiener says, is what is opposed to the degradation of energy or the increase of entropy in the system; it is essentially negentropic. In a system in which all possible transformations would have been effectuated, in which all potentials would be actualized, no other transformation would be possible; nothing would be distinguished from anything else. Thus, in the transmission of a message, information is what is opposed to the general flattening of energy modulated by the signal; it is what guarantees that it is possible to distinguish in a Morse code transmission between the moment when the current passes and the moment when the current does not pass. If during the course of the system's electrical inertia of transmission (*self-inductance*)<sup>64</sup> the current is established very slowly and diminishes very slowly, it becomes impossible to discern if the current passes or not, or if we are dealing with a dash, a dot, or an interval between a dot and a dash; the information signal is the decision between two possible states (for example, current or non-current in the aforementioned case); to transmit a message in Morse code clearly, one must manipulate slowly enough at the start so that, despite the inertia of the apparatus, the signals are still distinct to the receiver, i.e. so that one can clearly distinguish the moments of the current passing and the moments without a current, the indecisive periods of establishment and rupture remaining brief relative to the total duration of a sign or an interval between signs. The information signal provides the decision among possibilities in this first sense; it supposes a possible variety of states, non-confusion, and distinction. It is opposed in particular to background noise, i.e. to what occurs randomly, like the thermal agitation of molecules; when the energetic medium of the signal is essentially discontinuous, like an electrical current consisting of elementary charges in transit, each element of the signal must modulate a large number of elementary units of carried energy in order for the message to be transmitted correctly; an electronic tube of small dimensions has a higher background noise than one with large dimensions, since it allows less electrons to pass per unit of time; in order not to be inconvenient, this quantum discontinuity due to the type of carried energy in use must remain extremely inferior to the significative variations that have a meaning for the transmission of information. The information signal is therefore the capacity to decide, and the "quantity of information" that can be transmitted or registered by a system is proportionate to the number of significative decisions that this system can transmit or register. In this sense, a fine-grained photographic emulsion has a power of resolution greater than that of a coarse-grained emulsion; for the

same unreeling speed of the recording head and playback head, a fine-grained magnetic strip can register the sound more faithfully by reproducing the high-pitched sounds and the harmonics of the low-pitched sounds (which is analogous to fine details for photography).

In this sense the information signal is what is not predictable and what sections off the predictable to the point that the energy that conveys this signal or the supports that record it must have states that, compared to the order of magnitude of the information signal (long or wide according to the case), can be considered as predictable, such that the unpredictability of the states of the support or of the modulated energy does not interfere with that of the information signal. If we wanted to transmit a background noise considered as a signal by means of an apparatus that already has a background noise, it would be necessary that the background noise belonging to the system of transmission be extremely slight relative to the background noise to be transmitted as a signal. An area of fine, very flat, and uniformly lit sand is very difficult to photograph: the grain of the photographic film must be much smaller than the average magnitude of the image of a grain of sand on the film, or else the granulation of the developed film could equally be due to the image or to the grain of the film: decision, which is characteristic of the information signal, will no longer exist. One cannot duplicate the image of the grain of a photographic film by means of the same type of film; a more fine-grained film must be used.

However, in another sense, information is what implies regularity and periodic occurrence, i.e. predictability. The more easily predictable the signal is, the more easy it is to transmit; thus, when an oscillator has to be synchronized by means of another oscillator, the more the oscillators are stable on their own, the easier it is to synchronize one of the oscillators by means of the other: even if the synchronization signal is very weak and almost on the same level as the background noise, it is possible to receive this signal without error by means of the phase comparison apparatus, which supposes that the time during which the receptive oscillator is sensitive to the signal is extremely reduced within the total duration of a period. That is because in this case the signal is not just emitted or transmitted by the modulation of an energy: it is also received by an apparatus that has its own operation and that must integrate the information signal within its own operation by making it perform the role of effective information: the information signal is not merely what is to be transmitted without a deterioration caused by the background noise and the other aspects of chance and the degradation of energy; it is also *what must be received*, i.e. take on a signification and have an effectiveness for

an ensemble that has its own operation. Since the problems related to information are problems of transmission in general, the only aspects of information retained and submitted to technological evaluation are those related to the non-degradation of signals during transmission; the problem of the signification of signals is not posed, since the non-degraded signals have upon arrival the signification that they would have had at the point of departure if they had not been transmitted but delivered directly; the human subject is the receiver at the end of the transmission relay, just as it would be if there were no distance separating it from the origin of the signals. In contrast, the problem is quite different when the signals are not simply technologically transmitted but also technologically received, i.e. received by a system endowed with its own operation and which must integrate them into this operation. It is then seen that the physical dimensions relative to the *transmission* of signals and those relative to their *signification* are antagonistic. Signals are transmitted better when they merge less with the uniformization of the predictable; but in order for signals to be received and integrated into the operation of a system, they must present an analogy as perfect as possible with those that could be emitted by the receptive apparatus if it were used as an emitter; they must be almost predictable; two oscillators synchronize more easily when the signals emitted by one and by the other are closer in frequency and in form (sinusoidal signals, relaxed signals, sawtooth waves, pulse train). This possible aspect of reciprocity is illustrated by the coupling of oscillators: when two oscillators allowed to radiate a part of their energy are brought closer to one another, they mutually synchronize in such a way that it can only be said that one guides the other; they no longer form anything but a single oscillating system. In addition to the quantity of information signals transmissible by a given system, one must therefore consider their aptitude for being received by a receptive apparatus; this aptitude cannot be expressed directly in terms of quantity. It is also difficult to call it quality, since quality seems to be an absolute property of a being, whereas here it is a question of a relation; a certain modulated energy can become information signals for a defined system and not for some other system. This aptitude of information, or rather what founds this aptitude, could be called the haecceity of information: the latter is what makes it such that *this* is information and received as information, while *that* is not received as information;<sup>65</sup> the term quality is overly indicative of generic characteristics; that of haecceity overly particularizes and shuts into a concrete characteristic what a relational aptitude is. It is only important to indicate that this relational aptitude is attached to the schema of the predictability of information signals; in order

for signals to take on a meaning in a system, they must not contribute anything entirely new to it; a set of signals is only significant on a background that almost coincides with it; if signals expose the local reality exactly, they are no longer information but merely an external iteration of an internal reality; if they differ from it too much, they are no longer grasped as having a meaning, are no longer significant, and cannot be integrated. In order to be received, signals must encounter the *preliminary forms* with respect to which they are *significant*; signification is relational. This condition for the reception of information signals could be compared to what creates the binocular disparation in depth perception. In order for the relief and layering of fields in depth to be effectively perceived, it merely requires the image formed on the retina of the left eye to be different from the image formed on the retina of the right eye; if the two images are completely independent (like when we look at one side of a sheet of paper with one eye and the other side with the other eye), no image appears, because then there is no point in common; the two images must not be superposable, but their difference must be slight and they must be able to become superposable by means of a certain number of actions fractioned on a number of finite planes corresponding to simple laws of transformations. Relief intervenes as a signification of this duality of images; the duality of images is neither felt nor perceived; only the relief is perceived: it is the meaning of the difference of the two givens. In the same way, for a signal to receive a signification not only in a psychological context but also in an exchange of signals between technical objects, there must be a disparation between a form already contained in the receiver and an information signal provided from the outside. If the disparation is null, the signal corresponds to the form exactly, and the information, as a modification of the state of the system, is null. On the contrary, the more the disparation increases, the more the information increases, but only up to a certain point, for beyond certain limits and depending on the characteristics of the receiving system, information becomes null abruptly when the operation through which disparation is assumed qua disparation can no longer be carried out. By increasing the gap between the lenses in a stereoscopic shoot, the impression of relief and the successive staggering of fields are increased, since the disparation is increased (this apparatus is also used for direct observation at a distance: the sights are produced by means of two periscopes whose lenses can be separated as far apart as desired, which ends up increasing the gap between both eyes): but if the gap between the lenses exceeds a certain limit (which is variable with the real gap between the first field and the second field), the subject perceives two different images that

blur together, with a fleeting dominance sometimes for the left eye, sometimes for the right eye, in an indefinite instability of perception that no longer conveys information as a staggering of the fields and relief of objects. Similarly, a synchronizable oscillator that receives signals strictly of the same frequency as the local oscillation and without any phase difference does not receive any signal properly speaking, since there is an absolute coincidence of the local operation and the external operation translated by the signals. If the difference of frequency increases, information grows due to the effectively integrated signals; but if the received signals have a frequency that is too different from the local frequency, there is no longer any synchronization; signals are no longer utilized as mediums of information and can be nothing more for the oscillator than what amount to irregular external disturbances (feedback or background noise, the electronic noise of thermal agitation). The condition of frequency is fundamental, but there are other conditions that can be reduced to the following: the integration of signals into a functioning system is easier when the distribution of energy in a single period of the signal is more closely related to the distribution of energy in local exchanges; thus, a relaxation oscillator is more easily synchronized by the steep-front impulse voltages originating from another relaxation oscillator than by a sinusoidal signal of the same frequencies as the impulses. We can call *signal* that which is transmitted, *form* that with respect to which the signal is received in the receiver, and *information* properly speaking that which is effectively integrated into the functioning of the receiver after the experience of disparation involving the extrinsic signal and the intrinsic form. A recording of information is in fact a determination of signals, not a veritable recording of information; the magnetic strip or photographic film records signals as a set of local states but without an experience of disparation; the magnetic strip or the film then must be used as a secondary source of signals in front of a veritable receiver that will or will not integrate them according to the existence or nonexistence within it of adequate forms for the experience of disparation; the magnetic strip must be reactualized as signals, and the photographic film must be exposed to light; the film then modulates the light point by point in the same way the photographed objects modulated the film. If the disparation between two external signals is necessary for perception, the recording must deliver two sets or series of signals separately: it takes two separate photographs to produce the perception of depth, and it takes two tracks on the magnetic strip to produce depth of sound. This necessity of two truly separate recordings shows that the recording conveys *signals* but not directly integrable *information*: disparation is not made and

cannot be made, since it is not on the level of signals and does not give rise to a *signal* but to a *signification*, which only has meaning in an operation; an operating receiver is required for disparation to take place; what's needed is a system with structures and potentials. The conditions for the good transmission of signals should no longer be confused with a system's conditions of existence. The signal does not constitute relation.

### 5. *Topology and Ontogenesis*

To this day, the problem of the rapports between life and inert matter has above all focused on the problem of the fabrication of living matter from inert matter: the properties of life have been situated in the chemical composition of living substances; many synthetic bodies have been elaborated since the synthesis of urea; not only can chemical synthesis produce rather small molecular bodies from catabolic transformations, it can also produce bodies that participate directly in anabolic functions. Nevertheless, there is still quite a gap between the production of substances utilized by life and the production of the living being: to say that we are getting closer to life, we would need to produce the topology of the living being, its particular type of space, the relation between a milieu of interiority and a milieu of exteriority. The bodies of organic chemistry do not bring with them a different topology than that of the usual physical and energetic relations. However, perhaps the topological condition is primordial in the living being qua living being. There is no evidence that we can think the living being adequately by way of Euclidean rapports. Perhaps the space of the living being isn't a Euclidean space; the living being can be considered in Euclidean space, where it is then defined as one body among other bodies; the very structure of the living being can be described in Euclidean terms. But nothing proves that this description is adequate. If there were a set of topological configurations necessary for life and if they were untranslatable into Euclidean terms, then every attempt to make a living being with the matter elaborated by organic chemistry would have to be considered insufficient: perhaps the essence of the living being is a certain topological arrangement that cannot be known based on the physics and chemistry that typically use Euclidean space.

Currently, we can do nothing but remain content with conjectures in this domain. It is nevertheless interesting to observe that the properties of living matter manifest more as the maintaining and self-sustaining of certain topological conditions than as pure energetic or structural conditions. In this sense, one of the properties at the basis of all the functions—be it the conduction of nerve impulses, muscular contraction, or assimilation—is the

polarized asymmetrical nature of cellular permeability. The living membrane, which is anatomically differentiated or merely functional when no particular formation materializes its limit, is characterized as what separates a region of interiority from a region of exteriority: the membrane is polarized and therefore allows the passage of some particular body centripetally or centrifugally while blocking the passage of some other particular body. No doubt the mechanism of this permeability can function in a single direction for a definite type of chemical substance; this is how we have explained the activation of the muscles through the intermediary of the neuromuscular junction by an unleashing of acetylcholine, which momentarily breaks down the potential of the polarized membrane; but this just pushes the problem back, since the membrane is living precisely in the sense that it always repolarizes, as if it were, according to Gellhorn's expression, a "sodium-potassium pump" that recreates the polarization of the membrane after functioning; an inert membrane would very quickly be reduced to the neutral state in its functioning as a selective membrane; on the contrary, the living membrane conserves this property; it regenerates this characteristic asymmetry of its existence and functioning. It could be said that the living substance within the membrane regenerates the membrane but that the membrane is what guarantees that the living being is alive each moment, since this membrane is selective: it is what maintains the milieu of interiority as a milieu of interiority relative to the milieu of exteriority. It could be said that *the living being lives at the limits of itself, on its limit*; in a simple and unicellular organism, there is a direction toward the inside and a direction toward the outside relative to this limit. In a multicellular organism, the existence of the interior milieu complicates topology in the sense that there are several stages of interiority and exteriority; thus, an endocrine gland empties the products of its activity into the bloodstream or some other organic liquid: the typical organism's interior milieu is in fact a milieu of exteriority relative to this gland. Likewise, the intestinal cavity is an exterior milieu for the assimilating cells that perform selective absorption within the intestinal tract. According to the topology of the living organism, the interior of the intestines is in fact exterior to the organism, even though within this space a certain number of transformations conditioned and controlled by the organic functions are performed; this space is an annexed exteriority; thus, if the contents of the stomach or the intestines are harmful to the organism, the coordinated movements that aid in expulsion will empty these cavities and evacuate into the completely exterior (independent) space the harmful substances that were in the exterior space annexed to the interiority. Similarly, the progression of chyme is

regulated by the different successive degrees of the biochemical activities of this chyme, which is controlled by interoceptors that are in fact sense organs that would more appropriately be called medioceptors, since they apprehend an information relative to the exterior annexed space and not relative to veritable interiority. We therefore find various levels of interiority in an organism; the space of the digestive cavities is a space of exteriority with respect to the blood that floods the intestinal walls; but the blood in turn is a milieu of exteriority with respect to the endocrine glands that empty the products of their activity into the blood. It can therefore be said that the structure of a complex organism is not just integration and differentiation; it is also this establishment of a transductive mediation of interiorities and exteriorities going from an absolute interiority to an absolute exteriority through different mediators of relative interiority and exteriority; organisms could be classified according to the number of mediations of interiority and exteriority that they utilize to carry out their functions. The simplest organism, which can be called elementary, is the one that does not possess a mediate interior milieu but merely an absolute interior and an absolute exterior. For this organism, the characteristic polarity of life is on the level of the membrane; it's here that life essentially exists as an aspect of a dynamic topology that itself maintains the metastability through which it exists. Life is the self-sustaining of a metastability, but this metastability requires a topological condition: structure and function are linked together, since the deepest and most initial vital structure is topological. The structure of integration and differentiation only appears in complex organisms with the appearance of the nervous system and the distinction between sense organs, effectors, and neural centers; this non-topological structure of integration and differentiation appears as a means of mediation and organization in order to support and extend the first structure, which remains not only subjacent but also fundamental. Thus, we do not grasp the structure of the organism when we start from the organismic unity of the complex ensembles of evolved organisms, since we run the risk of attributing a privilege to the organization of integration and differentiation. We can no longer account for the veritable structure of the living being by considering the cells that compose a complex organism, according to the atomistic method, as architectonic units of this organism. The totalizing vision and the elementary vision are equally inadequate; we have to start with the basic function that depends on the first topological structure of interiority and exteriority, and then we have to see how this function is mediated by a chain of intermediary interiorities and exteriorities. At the two ends of the chain, there is still the absolute interior and the absolute exterior; the functions of

integration and differentiation are in the function of metastable asymmetry between absolute interiority and absolute exteriority. This is why living individuation must be thought according to topological schemata. Furthermore, topological structures are those by means of which the evolving organism's spatial problems can be resolved: thus, the development of the neocortex in superior species essentially occurs through a folding of the cortex: this is a topological solution, not a Euclidean solution. It is then understood why the cortical homunculus is nothing but a very approximate representation of the cortical areas of projection: projection in fact converts a Euclidean space into a topological space, such that the cortex is not adequately represented in a Euclidean fashion. All things considered, we should not speak of projection for the cortex, even though there is, in the geometrical sense of the term, projection for the small regions; we should say: a conversion of Euclidean space into topological space. The basic functional structures are topological; the corporeal schema converts these topological structures into Euclidean structures through a mediate system of relations that is the very dimensionality of the corporeal schema.

If living individuation is a process that essentially unfolds according to topological structurations, then it is understood why the borderline cases between inert matter and the living being are precisely cases of processes that unfold according to the dimensions of exteriority and interiority. These cases include the individuation of crystals. The difference between the living being and the inert crystal consists in the fact that the interior space of the inert crystal does not serve to keep extending the individuation carried out at the limits of the crystal undergoing growth: there is only interiority and exteriority from one molecular layer to another, from an already deposited molecular layer to a layer about to be deposited; a crystal could be deprived of an important part of its substance without stopping its growth; the interior is not homeostatic in its entirety relative to the exterior or, more exactly, relative to the limit of polarity; in order for the crystal to individuate, it must continue to grow; this individuation is superficial; the past doesn't serve a purpose in the crystal's mass; it merely plays a role of bare support and does not provide the availability of an information signal: the succession of time is not condensed. Conversely, in the living being the space of interiority with its content plays a role for the perpetuation of individuation throughout the whole being; there is and can be resonance because what has been produced by individuation in the past belongs to the content of the interior space: the whole content of the interior space is topologically in contact with the content of the exterior space at the limits of the living being; indeed, there is no

distance in topology; the whole mass of living matter in the interior space is actively present to the exterior world at the limit of the living being; all the products of the past individuation are present immediately and without distance. The fact of belonging to the milieu of interiority does not merely signify "being inside" in the Euclidean sense but being on the interior side of the limit without a delay in functional efficacy, without isolation, without inertia. The living being doesn't just interiorize by assimilating; it condenses and presents everything that has been elaborated in the successive: this function of individuation is spatiotemporal; in addition to a topology of the living being, it would be necessary to define a chronology of the living being associated with this topology, which would be as elementary as it and as different from the physical form of time as topology is different from the structure of Euclidean space. In the same way that there are no distances in topology, in chronology there is no quantity of time. This in no way means that the time of vital individuation is continuous, as Bergson claims; continuity is one of the possible chronological schemata, but it is not the only one; schemata of discontinuity, contiguity, and envelopment can be defined in chronology as well as in topology. Whereas Euclidean space and physical time cannot coincide, the schemata of chronology and of topology are applicable to one another; they are not distinct, and they form the first dimensionality of the living being: every topological characteristic has a chronological correlate, and vice versa; thus, for living substance, the fact of being within the interior of the selective polarized membrane means that this substance has been held in the condensed past. The fact that a substance is in the milieu of exteriority means that this substance can come forth,<sup>66</sup> put itself forward for assimilation, and possibly breach or harm the living individual: the substance is to come [*à venir*]. The interior past and the exterior future confront each other at the level of the polarized milieu: this confrontation in the operation of selective assimilation is the present of the living being, which is formed by this polarity of passage and obstruction between past substances and substances to come that are present to one another via the operation of individuation; the present is this metastability of the rapport between interior and exterior, past and future; the exterior is exterior and the interior is interior relative to this mutual allagmatic activity of presence. Topology and chronology coincide in the individuation of the living being. It is only later on and according to psychical and collective individuations that the coincidence can be broken. Topology and chronology are not *a priori* forms of sensibility, but the very dimensionality of the living being undergoing individuation.

We would therefore need a word to designate this initially singular dimensionality that later splits into a separate temporal dimensionality and a separate spatial dimensionality. If not only this word but also the set of unified representations allowing for it to have a precise meaning existed, it would perhaps be possible to think morphogenesis, to interpret the signification of forms, and to understand this first relation of the living being to the universe and to other living beings that can be understood neither according to the laws of the physical world nor according to the structures of the complicated psyche; even before sensorimotor structures, there must be chronological and topological structures, namely the universe of tropisms, tendencies, and drives; the psychology of expression, which is still too detached and arbitrary albeit grounded in its research, would perhaps find a path for axiomatization in a similar topological and chronological research.

Furthermore, this type of research could perhaps allow us to understand why there are intermediary processes between those of the inert world and those of the animate world, like the formation of crystallizable viruses, such as, for example, the mosaic virus of tobacco. This virus develops like a living being within the sap of the plant: it assimilates, because if the tobacco plant is inoculated with a certain quantity of this virus, the quantity of virus increases; after extracting sap from the plant and then crystallizing the virus, we obtain a greater quantity of crystallizable virus. In contrast, when this virus is crystallized, nothing allows us to say that it is alive: it is no more alive than hemoglobin or chlorophyll. If chemical bodies are found that are capable of assimilating into the state of the solution without requiring a crystalline germ in a supersaturated or supercooled solution, a part of the gap that separates living processes from physicochemical processes would be bridged. The case of viruses indeed seems to be intermediary between the two orders of processes; however, it should be noted that the mosaic virus of tobacco only assimilates into a living milieu; the potentials of the living plant can therefore be utilized by the virus, a virus which in this sense would not be veritably alive if its activity of assimilation is in reality a borrowed activity sustained and nourished by the plant's activity. The problem has not been resolved to this day: it can just be said that it would certainly be necessary to consider this problem as implying a formation of an axiomatic according to chronology and topology and not merely according to physicochemical knowledge. The study of elementary operations does not imply an atomism. It is regrettable that the holistic systematics of biology, such as it is presented by Goldstein, is conceived necessarily as macrophysical and is fixated on the totality

of a complex organism. Goldstein's Parmenidean ontology prevents any relation between the study of the living being and the study of inert beings, whose processes are microphysical. There can be an intermediary order of phenomena between fragmentary microphysics and the macrophysical organismic unit; this order would be that of genetic, chronological, and topological processes, i.e. processes of individuation belonging to all the orders of reality in which ontogenesis takes place: an axiomatic of ontogenesis remains to be discovered, at least if this axiomatic is definable. It could be that ontogenesis is not able to be axiomatized, which would explain the existence of philosophical thought as perpetually marginal with respect to all other studies, since philosophical thought is what is driven by the implicit or explicit research of ontogenesis in all orders of reality.

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# Psychical Individuation

## I. SIGNIFICATION AND THE INDIVIDUATION OF PERCEPTIVE UNITS

### *1. Segregation of Perceptive Units; the Genetic Theory and the Theory of Holistic Grasping; Determinism of Good Form*

From the outset, a problem of individuation can be defined relative to perception and knowledge taken in their totality. Without prejudging the nature of perception, which can be considered as an association of elements of sensation or as the grasping of a figure on a ground, it is possible to contemplate how the subject perceives separate objects and not a confused continuum of sensations and how it perceives objects as having an already given and consistent individuality. The problem of the segregation of units is solved neither by associationism nor by Gestalt psychology, since the former does not explain why the individualized object possesses an internal coherence, a substantial bond that gives it a veritable interiority that cannot be considered the result of association. Habit, which is then invoked to guarantee the coherence and unity of perception, is in fact a dynamism that can communicate to perception only what it possesses by itself, namely this temporal unity and continuity inscribed in the object as a static unity and static continuity of the *perceptum*. Associationism, which is the genetic theory of pure appearance, involves the recourse to habit (or, more indirectly, a link of resemblance or analogy, i.e. a dynamism grasped statically) and in fact borrows from a hidden innatism. Association alone via contiguity was not able to explain the internal coherence of the object individualized in perception. The latter would remain a mere accumulation of elements without cohesion, without mutual attractive force, and these elements would remain *partes extra partes* relative to one another. But the perceived object doesn't merely have the unity of a sum or a result passively constituted by a "*vis a tergo*," i.e. habit and the series of repetitions. Far from being passive, the perceived object has a dynamism

that allows it to transform without losing its unity; it has not only a unity but also an autonomy and a relative energetic independence that renders it a system of forces.

Gestalt theory has replaced the genetic explanation of the segregation of perceptive units with an innatist explanation: unity is grasped immediately by virtue of a certain number of laws (like the laws of pregnancy or of good form), and this psychological phenomenon shouldn't be surprising, insofar as the living world with its organisms and the physical world in general manifest phenomena of totality.<sup>1</sup> Seemingly inert matter contains the virtuality of forms. A supersaturated solution or a liquid in a state of supercooling will allow crystals to appear whose form is predestined in the amorphous state. However, Gestalt theory leaves an important problem up for debate, which is precisely that of the genesis of forms. If form were truly given and predetermined, there would be no genesis, plasticity, or uncertainty relative to the future of a physical system, an organism, or a perceptive field; but this is precisely not the case. There is a genesis of forms just as there is a genesis of life. The state of entelechy is not fully predetermined in the bundle of virtualities that precede it and preform it. What Gestalt theory and associationism both lack is a rigorous study of individuation, i.e. this critical moment when unity and coherence appear. A veritable sense of totality forces us to assert that Gestalt theory does not consider the *absolute ensemble*. In the physical world, the absolute ensemble is not just the solvent and the dissolved body; it is the solvent, the dissolved body, and the ensemble of forces and potential energies characterized by the word metastability, which is indicative of the state of the supersaturated solution at the moment when crystallization takes place. In this moment of metastability, there is no determinism of "good form" that can sufficiently predict what occurs: phenomena such as epitaxy show that at the critical instant (the moment when the potential energy is maximum) there is a sort of relative indetermination of the result; the presence of the smallest external crystalline germ, even the presence of another chemical species, can then initiate crystallization and orient it. Before the appearance of the first crystal, there is a state of tension that leaves a considerable amount of energy available for the slightest local accident. This state of metastability is comparable to a state of conflict in which the instant of highest uncertainty is precisely the most decisive instant, the source for determinisms and genetic sequences that find their absolute origin in this instant. In the living world, a genesis of forms also takes place that supposes a calling into question both of prior forms and their adaptation to the vital milieu. Not

every transformation can be considered a genesis of form, because a transformation can also be a degradation. When crystals form, erosion, abrasion, crumbling, and calcination modify the crystal's form, but they are not in general geneses of form; some consequences of the form generated during crystallization can remain, such as, for example, the privileged directions of the cleavage due to the crystal's reticular structure, which consists of a large number of elementary crystals; but then we are observing a degradation of form and not a genesis of forms. In the same way, not all the transformations of a living species can be interpreted as geneses of forms. There is a genesis of forms when the relation of a living ensemble to its milieu and to itself passes through a critical phase rich in tensions and virtuality, a phase that ends with the disappearance of the species or the appearance of a new life-form. The situation in its entirety is constituted not only by the species and its milieu, but also by the tension of the ensemble formed by the relation of the species to its milieu wherein the relations of incompatibility become increasingly strong. Moreover, the species isn't the only thing that is modified, for the entire ensemble of the vital complex formed by the species and its milieu also discovers a new structure. Finally, in the psychological domain, the ensemble in which perception takes place—and which, following Kurt Lewin, can be called the psychological field—is constituted not just by the subject and the world, but also by the relation between the subject and the world. Lewin indeed says that this relation, with its tensions, conflicts, and incompatibilities, is integrated into the psychological field. But, according to our theory, this is precisely where Gestalt theory reduces to two terms what is an ensemble of three independent, or at the very least distinct, terms: it is only after perception that tensions are effectively incorporated into the psychological field and become part of its structure. Before perception, before the genesis of the form that perception precisely is, the relation of incompatibility between the subject and the milieu only exists as a potential, similar to the forces that exist in the phase of metastability of the supersaturated solution or the supercooled solid, or even in the phase of metastability of the relation between a species and its milieu. Perception is not the grasping of a form but the resolution of a conflict, the discovery of a compatibility, the *invention* of a form. This form that perception is modifies not only the relation between the object and the subject, but also the structure of the object and the structure of the subject. Like all physical and vital forms, it is susceptible to degrading, and this degradation is also a degradation of the whole subject, because each form is part of the subject's structure.

2. *Psychical Tension and Degree of Metastability. Good Form and Geometrical Form; the Different Types of Equilibrium*

Perception would therefore be an act of individuation comparable to those in physics and biology. But for us to be able to consider perception in this way, we must introduce a term that could be called "psychical tension" or, better yet, degree of metastability, because the first expression has already been used to designate a reality that is quite different, insofar as it does not begin with the notion of crisis. Consequently, the laws of good form are not sufficient to explain the segregation of units in the perceptive field; indeed, they do not consider that perception is a solution contributed to a problem. These laws apply for the transformation and degradation of forms more so than their genesis. In particular, many laboratory experiments that use a fairly relaxed, perfectly secure subject do not produce the conditions under which the genesis of forms takes place. We should note the ambivalent characteristic of the notion of "good form." A form like the circle or the square easily emerges from a web of incoherent lines upon which it is superimposed as an image. But, in spite of their simplicity, is the circle or square superior to a form invented by an artist? If this were true, the most perfect column would be a cylinder. On the contrary, according to da Vinci's *Orders*, the most perfect column is a rotating figure that is both narrowed down and reduced at both ends as well as non-symmetrical relative to its center, with the largest diameter situated below the middle of its height. The author of this work considers the proportions he gives to be the result of a veritable invention that was unachievable for the Ancients. The ancient architects also thought of themselves as inventors, and Vitruvius shows how the three classical orders were successively invented under conditions in which the prior forms were inadequate. It is necessary to establish a distinction between *form* and *information*; a form like the square can be quite stable (pregnant) and contain a small quantity of information, in the sense that it can only very rarely incorporate different elements of a metastable situation; it is difficult to discover the square as a solution to a perceptive problem. The square or the circle, or more generally all simple and pregnant forms, are structural schemas rather than forms. It may be that these structural schemas are innate, but they are not sufficient to explain the segregation of units in perception; the human figure with its friendly or hostile expression and the form of an animal with its typical external characteristics are just as pregnant as the circle or the square. In his work *Animal Forms and Patterns*, Portmann notes that the perception of a lion or a tiger does not fade away, even if it takes place only once and in a

young child. This supposes that the simple geometrical elements do not matter much: it would be very difficult to define the form of the lion or tiger and the patterns of their skin using geometrical figures. In reality, there is a relation between a very young child and an animal that does not seem to borrow from the “good forms” of perceptive schemata: the child shows an astonishing aptitude for recognizing and perceiving the different parts of the body in animals that he sees for the first time, even though the very slight similarity between the human form and the form of these animals forces us to rule out the hypothesis of an external analogy between the human form and animal forms. What is in fact engaged in this perception is the corporeal schema of the child in a situation deeply suffused with fear or sympathy. What is structured into a perception of the animal’s corporeal schema is the tension (the degree of metastability) of the system formed by the child and the animal in a determined situation. Here, perception grasps not just the form of the object, but its orientation within the ensemble, its polarity, which determines whether it is lying down or standing on its legs, whether it stands tall or takes flight, and whether it adopts a hostile or trusting attitude. If there were no preliminary tension (potential), perception wouldn’t be able to produce a segregation of units that is simultaneously the discovery of the polarity of these units. The unit is perceived when the reorientation of the perceptive field can be effectuated in line with the object’s own polarity. To perceive an animal is to discover the cephalocaudal axis and its orientation. To perceive a tree is to see in it the axis that goes from its roots to the end of its branches. Every time the tension of the system cannot be resolved into a structure, into an organization of the subject’s polarity and of the object’s polarity, an uneasiness remains that habit is hard pressed to destroy, even if every threat has been removed.<sup>2</sup>

*3. Relation between the Segregation of Perceptive Units and the  
Other Types of Individuation. Metastability and Information  
Theory in Technology and Psychology*

The psychological problem of the segregation of perceptive units indicates a fact that had been perfectly revealed by the founders of Gestalt theory: individuation is not a process that is restricted to a single domain of reality, for example that of psychological reality or physical reality. This is why any doctrine is insufficient if it limits itself to privileging a field of reality in order to turn it into the principle of individuation, whether it be the domain of psychological reality or that of material reality. It may even be possible to say that there is individualized reality only in a mixture. In this sense, we will

attempt to define the individual as transductive reality. By transductive reality, we mean that the individual is neither a substantial being like an element, nor a pure rapport, but the reality of a metastable relation. There is no veritable individual except in a system in which a metastable state occurs. If the appearance of the individual makes this metastable state disappear by reducing the tensions of the system in which it appears, the individual becomes in its entirety a motionless and non-evolving spatial structure: the physical individual. On the other hand, if this appearance of the individual does not destroy the system's potential of metastability, then the individual is a living being, and its equilibrium is that which maintains metastability: in that case, it is a dynamic equilibrium, which generally supposes a series of new successive structurations, without which the equilibrium of metastability could not be maintained. A crystal is like the fixed structure left by an individual that lived for a single instant, the instant of its formation, or rather the instant of the formation of the crystalline germ around which successive layers of macroscopic crystalline network have clustered. The form that we encounter is merely the vestige of individuation that was already achieved in a metastable state. The living being is like a crystal that would maintain an ongoing metastability around it and in its relation to the milieu. This living being can be endowed with an indefinite life, as in certain extremely elementary forms of life, or on the contrary it can be limited in its existence because its own structuration is opposed to the upkeep of an ongoing metastability of the ensemble formed by the individual and the milieu. Little by little the individual loses its plasticity, its capacity to render situations metastable, to turn them into problems with multiple solutions. It could be said that the living individual increasingly structures within itself and therefore tends to repeat its previous conditions as it moves further from its birth. In this sense, the limitation of a lifespan is not absolutely linked to individuation; it is merely the consequence of very complex forms of individuation, wherein the consequences of the past are not eliminated from the individual and provide it with an instrument for resolving future difficulties and also with an obstacle for accessing new types of problems and situations. The successive characteristic of learning, the utilization of successiveness in the fulfillment of different functions, provides the individual with superior possibilities of adaptation but requires an internal structuration of the individual that is irreversible and forces it to conserve within itself, along with the schemas discovered in past situations, the determinism of these very situations. Only an individual whose transformations would be reversible could be considered immortal. From the moment the functions of the succession of behaviors and the

temporal sequences of acts appear, an irreversibility that specializes the individual becomes the consequence of this appearance of temporal laws: for each *type* of organization, there is a threshold of irreversibility beyond which all progress made by the individual (every acquired structuration) is a chance of death. Only beings with a superficial innervation and a barely differentiated structure have no limit to their lifespan. These beings are generally also the ones for which it is the most difficult to determine the limits of the individual, particularly when several individuals live in clusters or symbiotically. The degree of structural individuality, which corresponds to the notion of a limit, to that of a boundary of one being with respect to other beings or to that of an interior organization, is consequently to be put on the same level as the characteristic of temporal structuration that involves irreversibility, even though the former is not the direct cause of the latter; the common origin of these two aspects of the individual's reality seems to be in fact the process according to which metastability is conserved or increased in the individual's relation to the milieu. The essential problem of the biological individual would thus be relative to this characteristic of the metastability of the ensemble formed by the individual and the milieu.

The physical problem of individuality is not just a problem of topology, for what topology lacks is the consideration of potentials; precisely because they are potentials and not structures, potentials can be represented as graphical elements of the situation. The situation in which physical individuation arises is spatiotemporal, since it is a metastable state. Under these conditions, physical individuation (and more generally the study of physical forms) involves a theory of metastability that contemplates the processes of exchange between spatial configurations and temporal sequences. This theory can be called allagmatics. Allagmatics must be related to information theory, which contemplates the translation of temporal sequences into spatial organization or vice versa; yet, since it proceeds on this point like Gestalt theory, information theory instead contemplates already given sequences or configurations and can hardly define the conditions of their genesis. On the contrary, what must be contemplated is absolute genesis, like the mutual exchanges of forms, structures, and temporal sequences. Such a theory could then become the shared foundation of Information theory and Gestalt theory in Physics. These two theories in fact cannot be used in the study of the individual, since they employ two mutually incompatible criteria. On the one hand, Gestalt theory privileges the simplicity and pregnancy of forms; on the contrary, the quantity of information defined by information theory rises with the number of decisions involved; corresponding to an elementary mathematical law, the more

predictable the form, the easier it can be transmitted with a small quantity of signals. On the contrary, what is hard to transmit and requires an elevated quantity of information is anything that avoids all monotony and stereotypy. The simplification of forms, the elimination of details, and the increase of contrasts correspond to a loss in the quantity of information. However, the individuation of physical beings is neither assimilable to simple geometrical good form nor to the high quantity of information understood as a large number of transmitted signals: it consists of two aspects (form and information) joined together in a unity; no physical object is merely a good form, but, moreover, the cohesion and stability of the physical object are not proportional to its quantity of information, or more exactly to the quantity of information signals that must be utilized to correctly transmit a knowledge to its subject. Whence the necessity of a mediation; the individuation of the physical object is neither that of the pure discontinuous (like the rectangle or the square) nor that of the continuous, i.e. structures that require almost an infinite number of information signals to be transmitted.

#### *4. Introduction of the Notion of Quantum Variation into the Representation of Psychical Individuation*

It seems that a research path can be discovered in the notion of quantum. Subjectively, it is possible to quite paradoxically increase the quantity of useful signals by introducing a quantum condition, which in fact diminishes the system's veritable quantity of information within which there is information. Thus, by increasing the contrast of a photograph or a television image one enhances the perception of objects, although one loses information in the sense of information theory.<sup>3</sup> What humans perceive in objects when they grasp them as individual is therefore not an indefinite source of signals, an inexhaustible reality, like matter, which allows itself to be analyzed indefinitely; what they perceive is the reality of certain thresholds of intensity and of quality maintained by objects. If it were pure form or pure matter, the physical object would be nothing; if it were an alliance of form and matter, it would merely be a contradiction; the physical object is an organization of thresholds and of levels that is maintained and transposed throughout various situations; the physical object is a bundle of differential relations, and its perception as individual is the grasping of the coherence of this bundle of relations. A crystal is an individual not because it possesses a geometrical form or an ensemble of elementary particles, but because all of its (optical, thermal, elastic, electrical, piezo-electrical) properties undergo an abrupt variation when we pass from one facet to another; without this coherence of

a multitude of properties with highly variable values, the crystal would be nothing but a geometrical form associated with a chemical species and not a veritable individual. Hylomorphism here is radically insufficient, since it cannot define this characteristic of unified plurality and pluralized unity consisting of a bundle of quantum relations. This is why at the very level of the individual the notion of polarity is prominent; without it, the unity of these quantum relations could not be understood. Moreover, it could be that this quantum condition allows us to understand why the physical object can be perceived directly in its individuality: an analysis of physical reality cannot be separated from a reflection on the very conditions of knowledge.

*5. The Perceptive Problematic; Quantity of Information,  
Quality of Information, Intensity of Information*

It is necessary to define more precisely what can be understood by quantity of information and by form. Two fairly different senses are presented by information theory and Gestalt theory. Gestalt theory defines good forms by pregnancy and simplicity: the good form, the one that has the capacity to impose itself, prevails over forms that have less coherence, clarity, and pregnancy. Thus, the circle and the square are good forms. By contrast, information theory responds to an ensemble of technical problems which are contemporary with the usage of low currents in the transmission of signals and in the usage of the different modes of the recording of light and sound signals. When a scene is recorded via photography, film, tape recorder, or video tape, the overall situation must be decomposed into a set of elements that are recorded by a modification imposed upon a very large number of physical individuals ordered according to a spatial, temporal, or mixed (i.e. spatio-temporal) organization. Photography can be taken as an example of spatial organization: in its active part, a photographic surface, which is the support of signals, is constituted by an emulsion that contains a multitude of silver grains in the basic form of a chemical combination. If the optical system were supposed as perfect and given that the optical image is projected onto this emulsion, we obtain a more or less accentuated chemical transformation of the chemical combination that constitutes the emulsion; but the capacity of this emulsion to record small details depends on the fineness of the particles: the translation of a continuous optical line into chemical reality within an emulsion is constituted by a discontinuous trail of sensible grains; the rarer and coarser these grains are, the more difficult it is to pin down a small detail with sufficient fidelity. Examined under a microscope, an emulsion that should reveal new details (if it had a continuous structure) shows nothing

but an unformed mist of discontinuous grains. What is known as an emulsion's degree of definition or resolving power can thus be measured by the number of distinct details capable of being recorded on a determined surface; for example, on a current type of emulsion, one square millimeter can contain five thousand distinct details.

On the other hand, if we consider a sound recording on a covered strip of magnetic iron oxide coating, on steel wire, or on disc, here we see that the order becomes an order of succession: the distinct physical individuals whose modifications translate and transmit the signals are oxide grains, steel molecules, or clusters of plastic ordered in a line that unreels in front of the air gap of a polarized electromagnet or under the sapphire or diamond of a turntable. The quantity of details that can be recorded per unit of time depends on the number of distinct physical individuals that unreel during this unit of time in front of the place where the recording is carried out: the details engraved on a disc must be smaller than the order of magnitude of the molecular chains that constitute the plastic; furthermore, frequencies cannot be recorded on a magnetic tape when the number of details (particles magnetized to variable degrees) is larger than the number of particles; lastly, the variations of a magnetic field cannot be recorded on a steel wire whose sections are too small to receive a magnetization particular to each one. If we attempt to go beyond these limits, the sound would coincide with the background noise constituted by the discontinuity of the elementary particles. On the contrary, if an adequately high unreeling speed is adopted, this background noise is pushed back into the higher frequencies; this noise corresponds quite exactly to the indistinct fog of silver grains that appears when a photograph is examined under a microscope;<sup>4</sup> the sound is recorded as a series of particle masses that are more or less magnetized or arranged in a groove, similar to the way photography consists of a juxtaposition and distribution of more or less concentrated silver grain masses. The limit to the quantity of signals is in fact the discontinuous characteristic of the information support, i.e. the finite number of distinct representative elements organized according to space or time and in which information finds its support.

Ultimately, when a movement is to be recorded, the two types of signals (the spatial and the temporal) enter into a sort of conflict, such that one type of signal can be obtained only by partially sacrificing the others and such that the result is a compromise: cinematography or television can be used to break movement down into fixed images or to transmit it; in both cases, temporal sequences are cut into a series of snapshots that are then successively fixed or transmitted; in television, each separate view is transmitted

point by point using the exploring movement of an analyzing “spotlight” that scans the entire image, generally according to successive straight-line segments, just like we read with our eyes. The faster the movement to be transmitted, the higher the number of images required to render it correctly; for a slow movement (e.g. a man walking), five to eight images per second suffice; for a more rapid movement, such as that of an automobile, the rate of twenty-five complete images per second is insufficient. Under these conditions, the quantity of signals to be transmitted is represented by the number of details to be transmitted per unit of time, similar to the measurement of a frequency. Thus, in order to make full use of all the advantages of its definition, the 819-line television needed to be able to transmit around fifteen million details per second.

This technical notion of quantities of information conceived as a number of signals is therefore quite different from what Gestalt theories have elaborated: good form is distinguished by its structural quality, not by a number; by contrast, what requires a high quantity of signals in order to be transmitted correctly is a datum's degree of complication. In this respect, the quantity of signals required for the transmission of a determined object does account for the characteristic of “good form” that it may have: the transmission of the image of a heap of sand or the irregular surface of granite requires the same quantity of signals as the transmission of the image of a well-aligned regiment or the columns of the Parthenon. The measurement of the quantity of signals that must be utilized neither allows us to define nor compare the different contents of objective data: there is a considerable gap between information signals and the form. It could be said that the quantity of signals appears to increase as the qualities of the form are lost; it is technically easier to transmit the image of a square or a circle than that of a heap of sand; in terms of the quantity of signals, there is no difference between the transmission of an image of text with a meaning and that of an image of text composed of randomly distributed letters.<sup>5</sup>

It would therefore seem that neither the concept of “good form” nor that of the quantity of pure information are perfectly adequate for defining the reality of information. Above information as quantity and information as quality, there is what could be called information as intensity. The simplest and most geometrical image is not necessarily the most expressive; the image that has the most meaning for the perceiving subject is not necessarily the image that is most elaborated and meticulously analyzed in its details. The entire subject (with its tendencies, drives, and passions) must be considered in a concrete situation and not as a subject in the laboratory, i.e. a situation

that generally has little emotive value. It then appears that the intensity of information can be increased using a voluntary reduction of the quantity of signals or of the quality of the forms: a high-contrast photograph with extreme light and dark areas or one that is slightly out of focus can have more value and intensity than the same photograph with perfect gradation for every detail or a geometrically centered and undistorted photograph. The geometrical rigor of a contour often has less intensity and meaning for the subject than a certain irregularity. A perfectly round or oval face that would embody a good geometrical form would be lifeless and remain cold for the subject who would perceive it.

The intensity of information supposes a subject oriented by a vital dynamism: information is then what allows the subject to be situated in the world. Every received signal in this sense possesses a coefficient of possible intensity due to which we constantly correct our situation relative to the world we inhabit. Pregnant geometrical forms do not allow us to orient ourselves; they are innate schemata of our perception, but these schemata do not introduce a preferential meaning. Information takes on an intensive, predominant meaning at the level of the various gradients (whether they be luminous, colored, dark, olfactory, thermal, etc.). The quantity of signals only produces an unpolarized ground; the structures of good forms only provide frameworks. It does not suffice to perceive details or ensembles organized in the unity of a good form: these details and ensembles must have meaning with respect to us and be grasped as intermediaries between the subject and the world, as signals that allow for the coupling of the subject and the world. The object is an exceptional reality; what is usually perceived is not the object but the world, which is polarized in such a way that the situation has a meaning. The object properly speaking only appears in an artificial situation that is somewhat exceptional. However, the very rigorous and absolute consequences of Gestalt theory relative to the spontaneous nature of perceptive processes deserve to be examined with more precision. It is undoubtedly true that the grasping of forms takes place immediately without a learning process or without resorting to a formation that would be carried out due to habit. But perhaps it is not true that grasping the meaning of a situation is this primitive and that no learning process intervenes. Affectivity can be qualified, transposed, and modified. In certain cases, it can also be inverted: one aspect of defeatist behavior is the general negativism of subsequent behavior; everything that attracted the subject before its failure is rejected; all spontaneous movements are refused and transformed into their opposite. Situations are grasped backwards and read in reverse. Failure neuroses manifest this

inversion of polarity, but the training of an animal that presents definite tropisms or taxes already shows this possibility of the inversion of polarity.

This existence of a perceptive polarity plays a dominant role in the segregation of perceptive units; neither good form nor the quantity of signals can account for this segregation. The subject perceives in such a way as to be oriented relative to the world. The subject perceives to increase not the quantity of information signals nor the quality of information, but the intensity of information, i.e. the information potential of a situation.<sup>6</sup> As Norbert Wiener puts it, to perceive is to struggle against the entropy of a system, to organize, maintain, or invert an organization. It is not enough to simply say that perception consists in grasping organized wholes; in fact, perception is the act that organizes wholes; it introduces organization by analogically linking the forms contained in the subject to the signals received: to perceive is to retain the greatest possible quantity of signals inside the forms most deeply rooted in the subject; perception is not merely grasping forms or recording multiple juxtaposed or successive data; neither quality, quantity, the continuous, nor the discontinuous can explain this perceptive activity; perceptive activity is the mediation between quality and quantity; it is intensity, the grasping and organization of intensities in the relation of the world to the subject.

Several experiments on the perception of forms through vision have shown that quality does not suffice for perception; it is very difficult to perceive forms represented by colors with the same luminous intensity; on the contrary, these same forms are quite easily perceived if they are marked by a slight difference in intensity, even when the colors are identical or absent (shades of gray). The differential thresholds of intensity are remarkably low for vision (6/1000), but the thresholds of frequency are even lower in differential perception; the phenomenon mentioned above thus cannot be attributed to peripheral organic conditions. What is at stake is the central perceptive process of the grasping of forms. In the same way, a weak frequency modulation of a sound cannot be easily distinguished from a modulation of intensity or from very short interruptions in the sound's emission, which could be called phase modulation: the different types of modulation converge toward the modulation of intensity, as if the dynamisms involved in perception essentially retained this type of modulation.

If to perceive consists in increasing the information of the system formed by the subject and the field in which it is oriented, the conditions of perception are analogous to those of every stable structuration: a metastable state must precede perception. Kant wanted to explain perception through the synthesis of the manifold of sensibility, but in fact there are two types of

manifold: the qualitative manifold and the quantitative manifold, the heterogeneous manifold and the homogeneous manifold; Gestalt theory showed that perception cannot be explained by the synthesis of the homogeneous manifold: a cloud of elements cannot produce a unity through simple addition. But there is also an intensive diversity that renders the subject-world system comparable to a supersaturated solution; perception is the resolution that transforms the tension that affected this supersaturated system into an organized structure; it could be said that every veritable perception is the resolution of a problem of compatibility.<sup>7</sup> Perception reduces the number of qualitative tensions and makes them compatible by transforming them into a potential of information, a mixture of quantity and quality. A figure against a ground is not yet an object; the object is the provisional stabilization of a series of dynamisms that proceed from tensions to the aspects of the determination that characterizes a situation. By orienting in this situation, the subject can unify the aspects of qualitative and intensive heterogeneity and carry out the synthesis of the homogeneous manifold; this act of orientation indeed reacts on the milieu, which becomes simplified; the multiple world, a problem posed to the subject of perception, and the heterogeneous world are merely aspects of the time that precedes this act of orientation. Through its perceptive activity, the subject constitutes the unity of perception in the system formed by the world and the subject. To believe that the subject immediately grasps already fully constituted forms is to believe that perception is a pure knowledge and that forms are fully contained in the real; in fact, a recurring relation is instituted between the subject and the world in which it must perceive. To perceive is literally to take through; without this active gesture, which supposes that the subject is part of the system in which the perceptive problem is posed, perception could not take place. Borrowing from the language of axiomatics, it could be said that the world-subject system is an overdetermined or supersaturated field. Subjectivity is not deforming, because it is what effectuates the segregation of objects according to the forms that it contributes; subjectivity could only be hallucinatory if it is detached from the signals received from the object. The perceptive act institutes a provisional saturation of the axiomatic of the system that is the subject plus the world. Without this coupling<sup>8</sup> of the subject to the world, the problem would remain absurd or undetermined: by establishing the relation between supersaturation and indetermination, the subject of perception introduces a finite number of necessary solutions; in some cases, the problem can involve several solutions (as in reversible figures), but it generally only has one, and this uniqueness constitutes the stability of perception.

It is however necessary to distinguish the stability of perception from its pregnancy. The perception of a circle or a square is not pregnant, and yet it can be very stable; this is because the pregnancy of perception is due to its degree of intensity, not its quality or the number of signals; a certain perception can be pregnant for a certain subject, and some other perception for some other subject: the perception will be more pregnant in proportion to how dynamic the prior state of incompatibility is; fear or intense desire yield a great intensity for perception, even if this perception is not very clear; the perception of a smell is often confused and does not include solidly structured elements; nevertheless, a perception that incorporates olfactory data can be very intense. Certain tonalities, certain colors, and certain timbres can be part of an intense perception without even constituting a good form. It thus seems necessary to distinguish between the clarity and the pregnancy of a perception; pregnancy is veritably linked to the dynamic nature of the perceptive field; it is not just a consequence of the form alone, but also and more importantly a consequence of the range of the solution that it constitutes for the vital problematic.

What has been said about the segregation of perceptive units can also be applied to the genesis of concepts. The concept does not result from the synthesis of a certain number of perceptions under a relational schema that gives them a unity. In order for the formation of the concept to be possible, there must be an interperceptive tension that involves the meaning of the relation of the subject to the world and to itself. An assemblage of perceptive data cannot be constituted with perceptions alone; nor can it be constituted by the conjunction of perceptions on the one hand and an *a priori* form on the other, even if it is mediated by a schematism. The mediation between the *a priori* and the *a posteriori* cannot be discovered starting from either the *a priori* or the *a posteriori*; the mediation is not of the same nature as the terms: it is the tension, potential, and metastability of the system formed by the terms. Furthermore, *a priori* forms do not rigorously preexist perceptions: just as each perception has its own form, there is already something of this capacity of syncrystallization that manifests at a higher level in the birth of concepts: it could be said in this sense that conceptualization is to perception what syncrystallization is to the crystallization of a single chemical type. Furthermore, like perception, the concept requires an ongoing reactivation in order to be maintained in its integrity; it is maintained by the existence of quantum thresholds that sustain the distinction of concepts; this distinction is not an intrinsic property of each concept but a function of all the concepts present in the logical field. The entrance of new concepts into this logical

field can lead to the restructuration of the set of concepts, which is what every new metaphysical doctrine does; before this restructuration, it modifies the threshold of the distinction of all concepts.

## II. INDIVIDUATION AND AFFECTIVITY

### 1. *Consciousness and Individuation; the Quantum Nature of Consciousness*

Such a study requires us to pose the problem of the rapport between consciousness and the individual. This problem seems to have been obscured above all by the fact that Gestalt theory has privileged the perceptive relation over the active relation and the affective relation. If equilibrium is restored by reintroducing the consideration of all the aspects of relation, it becomes clear that the subject effectuates the separation of units in the world object of perception, which is a support for action or responds to sensible qualities insofar as this subject realizes within itself a progressive individualization through successive leaps. This role of consciousness in individuation has been poorly defined because the psyche has been considered as an undefined plurality (in the atomistic doctrine) or as a pure, indissoluble, and continuous unity (in the doctrines opposed to atomistic psychologism, whether this be Bergsonism or Gestalt theory in its beginnings). In fact, if it is supposed that the individuality of states of consciousness, of acts of consciousness, and of qualities of consciousness is that of a quantum type, it is possible to discover a mediation between absolute unity and infinite plurality; a regime of intermediary causality thereby appears between the obscure determinism that results in the psyche as stripped of interiority and consistency and the tensed and limpid finality that allows for neither exteriority nor accident. The psyche is neither pure interiority nor pure exteriority, but an ongoing differentiation and integration according to a regime of associated causality and finality that we shall call transduction, a regime that seems to us to be a process that is more fundamental than causality and finality, which express the borderline cases of a fundamental process. The individual individuates insofar as it perceives beings, constitutes an individuation through action or through a productive construction, and belongs to the system that includes its individual reality and the objects that it perceives or constitutes. Consciousness would thus become a mixed regime of causality and efficiency, insofar as it links the individual to itself and to the world. Affectivity and emotivity would thus be the transductive form of the psyche *par excellence*, the intermediary

between clear consciousness and subconsciousness, a continual link of the individual to itself and to the world, or rather the link between the relation of the individual to itself and the link of the individual to the world. At the level of affectivity and emotivity, the relation of causality and the relation of finality are not opposed: every affectivo-emotive movement is simultaneously judgment and preformed action; it is really bipolar in its unity; its reality is that of a relation that has a value of auto-position with respect to its terms. Affectivo-emotive polarization feeds on itself insofar as it includes or is a result of an intentionality; it is at once auto-position and hetero-position.

Thus, the individual would be neither a pure relation of exteriority nor an absolute substantiality; it could not be identified with the residue of the analysis that fails when confronted with the indivisible or with the first principle that contains everything in its unity from whence everything follows.

## *2. Signification of Affective Subconsciousness*

The intimacy of the individual should not be sought at the level of pure consciousness or that of organic unconsciousness; it should be sought at the level of affectivo-emotive subconsciousness. In this sense, the thesis that we are presenting here would diverge from the doctrine that is broadly called psychoanalysis. Psychoanalysis has noted that there is indeed an unconscious in the individual. But it considered this unconscious as a complete psyche that is somewhat copied from a consciousness that can be grasped. On the contrary, we shall suppose that there is a fundamental layer of the unconscious that is the subject's capacity for action: the sequences of action can hardly be grasped by clear consciousness; the subject errs to the greatest extent with respect to what it wants or wills and does not want or will; the succession of acts of will ensues in such a way that the markers of the process appearing to consciousness is quite rare and in no way suffices to constitute a valid foundation. By contrast, representation is much clearer; the unconscious representative elements are not rare but summary, barely sketched out, and generally incapable of veritable invention and progress: they remain fairly crude stereotypes that lack representative reality. At the limit between consciousness and the unconscious, on the contrary, there is the layer of subconsciousness, which is essentially affectivity and emotivity. This relational layer constitutes the center of individuality. The modifications of this layer are the modifications of the individual. Affectivity and emotivity are capable of quantum reorganizations; they proceed through abrupt leaps according to degrees and obey a law of thresholds. They are the relation between the continuous and

the pure discontinuous, between consciousness and action. Without affectivity and emotivity, consciousness seems like an epiphenomenon, and action seems like a discontinuous series of consequences without premises.

An analysis of what can be called psychical individuality should therefore be centered on affectivity and emotivity. Here as well, psychoanalysis acted appropriately, although without always using a theory that is adequate to its operative appropriateness, because when the psychoanalyst addresses the individual, he is acting within the affectivo-emotive regime. What Jung discovers in his analysis of the unconscious (or the subconscious) are the affectivo-emotive themes at the basis of myths. If one can speak in a certain sense of the individuality of a group or of a people, it is not by virtue of a community of action, which is too discontinuous and cannot be a solid basis, nor by virtue of an identity of conscious representations, which are too broad and too continuous to allow for the segregation of groups; collective groupings are constituted at the level of affectivo-emotive themes, which are a mixture of representation and action. Interindividual participation is possible when affectivo-emotive expressions are the same. Thus, the vehicles of this affective community are not merely symbolic elements but also effective elements of the life of groups: the regime of sanctions and rewards, symbols, the arts, and collectively esteemed and unappreciated objects.

Finally, it can be noted that this doctrine, which places the quantum regime of affectivity and emotivity at the center of the individual, is in agreement with the teaching of research on the structure and genesis of species and organisms: no living being seems to be deprived of affectivo-emotivity, which has a quantum nature for highly complex beings such as humans and also for beings that are only partially organized. The oldest layers of the nervous system (particularly the midbrain) are the centers of this regulation. Pathology also shows that the dissolution of individuality can occur quite profoundly when the organic foundations of this regulation are affected, particularly in the case of tumors of the midbrain, wherein it seems that the very foundations of the personality are destabilized. Whereas a weakening of the functions of representative consciousness or of the capacities of action alters the personality without destroying it, and often in a reversible manner, alterations to affectivity and emotivity are rarely reversible.

### *3. Affectivity in Communication and Expression*

Ultimately, this theory of the individuating role played by the affectivo-emotive functions could serve as a basis for a doctrine of communication and expression. Affectivo-emotive instances form the basis of intersubjective

communication; the reality that is called the communication of consciousness could more correctly be called the communication of subconsciousness. Such a communication is established through the intermediary of participation; neither the community of action nor the identity of the contents of consciousness suffice to establish intersubjective communication. This explains why intersubjective communication can be established between individuals that are very dissimilar, such as that between a human and an animal, and why very strong sympathies or antipathies can arise between very different beings; however, here beings truly exist as individuals and not as specific realities: a certain animal can be in a relation of sympathy with some other animal and not with all the animals of that same species. The profound bond between two draft animals has often been noted, a bond so strong that the accidental death of one animal leads to the death of its companion. To express this relation of lived sympathy, which is at once so strong and nevertheless silent, the Greeks used, even for the human couple, the term *συζυγία* [syzygy], the community of the yoke.

No doubt, such an observation does not allow us to fully define what content can be transmitted in interindividual communication. Nor does it completely determine eschatological reality in advance. However, certain metaphysical consequences are inevitable: the conservation of personal identity after death does not seem possible in the simple form of a continuation of existence. Spinoza's "sentimus experimurque nos aeternos esse" (we feel and know by experience that we are eternal) certainly corresponds to a real feeling, but the tenor of this experience is affectivo-emotive and should not be transposed into a representative definition or into a voluntary decision; we can neither demonstrate eternity (or even conceive it, properly speaking) nor wager on eternity's existence; both would be unsatisfactory ways of reasoning that would be inadequate to their veritable object. The experience of eternity must be left at the level of what it veritably is: the basis of an affectivo-emotive regime. If there is a certain sort of reality that is eternal, it is the individual as a transductive being and not as a subject-substance, body-substance, consciousness, or active matter. Already during its objective existence, the individual, insofar as it experiences, is a being-in-relation. It is possible that something of the individual is eternal and is somehow reincorporated into the world with respect to which it was individual. When the individual disappears, it is annihilated only relative to its interiority; but for it to be annihilated objectively, it would have to be supposed that the milieu is also annihilated. The individual continues to exist and even to be active as an absence with respect to the milieu.<sup>9</sup> By dying, the individual becomes an anti-individual,

it changes sign but is perpetuated in being as an absence that is still individual; the world is made up not just of actively living individuals, which are real, but also of “holes of individualities,” veritable negative individualities composed of a kernel of affectivity and emotivity existing as symbols. At the moment an individual dies, its activity is incomplete. One could say that it will remain incomplete for as long as individual beings survive that are capable of re-actualizing this active absence, this seed of consciousness and of action. The responsibility of maintaining dead individuals in being through a perpetual *vékuia* [nékuia] (the evocation rites of the dead) depends on living individuals. The subconsciousness of living beings is fully traversed by this responsibility of maintaining in being the dead individuals that exist as absence, as the symbols with which living beings are reciprocal. Many religious dogmas have been constructed around this fundamental feeling. Religion is the domain of the transindividual; the sacred does not have its full origin in society; the sacred is fueled by the feeling of the being’s perpetuity, a vacillating and precarious perpetuity with which living beings are burdened. It is fruitless to seek the origin of sacred rites as arising from a fear of the dead; such a fear is founded on the internal feeling of a lack that emerges when the living being feels that it abandons this reality of absence within it, this real symbol. The dead seem to become hostile when they are abandoned not as dead but as living beings of the past whose perpetuation is entrusted to posterity. This feeling was deeply ingrained in the Romans, which is why they wanted an heir.<sup>10</sup> The strong belief in substantial identity that is attached to Christian theology did not destroy this fundamental feeling. In the individual’s will to serve some purpose, to do something real, there is in a certain sense the idea that the individual cannot merely consist in itself. An absolute aseity, an absolute closure that could yield a perfect eternity would not be a livable condition for the individual: to subsist would not mean to exist eternally, because this would not be to exist. The study carried out by Franz Cumont in *Lux Perpetua* concerning the beliefs of the beyond is not just an analysis of eschatological mythology but a veritable study of the collective or individual subconscious; myth takes on a profound meaning here, because it is not merely a representation that is useful for action or a facile mode of action; myth can be accounted for neither through representation nor through action, because myth isn’t just an uncertain representation or a procedure for acting; the source of myth is affectivo-emotivity, and the myth is a bundle of feelings relative to the becoming of being; these feelings convey representative elements and active movements, but these realities are secondary and not essential to myth. Plato understood this value of

myth, and every time the becoming of being was called into question, he made use of myth as an adequate mode for the discovery of becoming.

#### 4. *The Transindividual*

One can wonder to what extent such a conception of individuation can account for knowledge, affectivity, and, more generally, spiritual life. Spiritual life is spoken of in a sort of abstraction. Yet this adjective does have a meaning; it indicates a value and shows that a certain mode of existence is given priority over other modes; it perhaps should not be said that there is a biological or purely bodily life and then another life, which would be spiritual life in opposition to the first. Substantialistic dualism must be kept outside of a theory of individuation. But it is nevertheless true that spirituality exists and that it is independent of metaphysical and theological structures. When Thucydides speaks of a work of the mind [*esprit*] saying “κτῆμα ἐς αἰῖ” (a possession for all time) and when Horace says “exegi monumentum aere perennius” (I have raised a monument more permanent than bronze), these men are experiencing as authors an impression of eternity: the idea of the work’s immortality is merely the sensible symbol of this internal conviction, of this faith that traverses the individual being and through which the individual feels that it surpasses its own limits. When Spinoza writes “sentimus experimurque nos aeternos esse,” he reveals a very profound impression that the individual being experiences. And yet we also feel that we are not eternal, that we are fragile and transitory, that we will no longer exist when the sun will still be shining on the rocks next spring. Facing natural life, we feel that we are as perishable as the leaves of a tree; within us, the aging of the being that passes makes tangible the precariousness that responds to this upsurge, this emergence of life radiating in other beings; the ways are diverse in the paths of life, and we intersect with other beings of all ages that are themselves in all periods of life. And even the works of the mind [*esprit*] age. The κτῆμα ἐς αἰῖ crumbles like the walls of dead cities; the monument more durable than bronze follows the crown of laurels into universal desiccation. More slowly or more quickly—prematurely, like Marcellus and cut lilies, or in the fullness of old age and a completed career—beings ascend and descend the slope without remaining long on the plateau of the present. It is only due to illusion, or rather semi-blindness, that spiritual life provides the unique experience of the being’s eternity. The *massa candida*, the only tangible remainder of martyrs burned with quicklime, is also a testimony of spirituality through its symbolism of pitiful fragility; it is just like the monument more durable than bronze, the law engraved in tablets, or the

mausoleums of the past. Spirituality is not merely what remains, but also what shines forth in the instant between two indefinite depths of obscurity, and then is covered over forevermore; the desperate, unknown gesture of the slave in revolt is just as much spirituality as Horace's writing. Culture gives too much weight to written, spoken, expressed, or recorded spirituality. This spirituality, which tends toward eternity through its own objective forces, is nevertheless not the only one; it is only one of the two dimensions of lived spirituality; the other, that of the spirituality of the instant, which does not seek eternity and shines like the light of a glance only to fade away afterwards, also really exists. Spirituality would have no signification if there were not this luminous adherence to the present, this manifestation that gives an absolute value to the instant and consummates within itself sensation, perception, and action. Spirituality is not another life, nor is it the same life; it is other and same, it is the signification of the coherence of the other and the same in a superior life. Spirituality is the signification of the being as separate and attached, as alone and as a member of the collective; the individuated being is both alone and not alone; it must possess both dimensions; in order for the collective to be able to exist, separated individuation must precede it and still contain the pre-individual, that through which the collective will be individuated by joining the separated being. Spirituality is the signification of the relation of the individuated being to the collective and therefore also the signification of the foundation of this relation, i.e. the fact that the individuated being is not entirely individuated but still contains a certain charge of non-individuated, pre-individual reality that it preserves and respects, living with the awareness of its existence instead of retreating into a substantial individuality, a false aseity. Spirituality is the respect of this relation of the individuated and the pre-individual. It is essentially affectivity and emotivity; pleasure and pain, sadness and joy are the extreme disparities involved in this relation between that which is individual and pre-individual in the subject being; one should not speak of affective states but rather of affective exchanges, exchanges between the pre-individual and the individuated within the subject being. Affective-emotivity is a movement between the natural undetermined and the *here and now* of actual existence; it is that through which this rise of the undetermined toward the present occurs within the subject, a rise that will incorporate the subject into the collective. Pleasure and pain are generally interpreted as signifying that a favorable or unfavorable life event emerges and affects the being; in fact, this signification does not exist at the level of the pure individuated being; there may be purely somatic pains and pleasures; but affective-emotive modes also have a signification in

the accomplishment of the relation between what is individual and pre-individual: positive affective states indicate the synergy between the constituted individuality and the movement of the actual individuation of the pre-individual; negative affective states are states of conflict between these two domains of the subject. Affectivo-emotivity is not merely the reverberation of the results of action within the individual being; it is a transformation, it plays an active role: affectivo-emotivity expresses the rapport between the two domains of the subject being and modifies action in accordance with this rapport, harmonizing it with this rapport and attempting to harmonize the collective. The expression of affectivity in the collective has a regulative value; pure action would not be able to regulate the manner in which the pre-individual is individuated in different subjects in order to found the collective; emotion is this individuation on the way to being effectuated in transindividual presence, but affectivity itself precedes and follows emotion; within the subject being, it is what translates and perpetuates the possibility of individuation in the collective: affectivity is what leads the charge of pre-individual nature to become the support of collective individuation; it is mediation between that which is pre-individual and that which is individual; it is the manifestation and reverberation in the subject of the encounter and emotion of presence, of action. Without presence and action, affectivo-emotivity cannot be expressed and accomplished. Action doesn't just resolve the perceptive problem through the encounter of perceptive worlds; action qua emotion resolves the affective problem, which is that of the incompatible bi-dimensionality of pleasure and joy; emotion, the individualized side of action, resolves the affective problem that parallels the perceptive problem action resolves. Action is for perception what emotion is for affectivity: the discovery of a superior order of compatibility, of a synergy, of a resolution through the passage to a higher level of metastable equilibrium. Emotion implies the presence of the subject to other subjects or to a world that calls the subject into question as subject; it is thus parallel to action, linked to action; but it assumes affectivity, it is the point where affective plurality is inserted into a unity of signification. Emotion is the signification of affectivity in the same way that action is the signification of perception. Affectivity can therefore be considered as the foundation of emotivity, just as perception can be considered as the foundation of action. Emotion is that which, within action, is turned toward the individual participating in the collective, whereas action is that which, within the same collective, expresses the individual being in the actuality of the realized mediation: action and emotion are correlative, but action is collective individuation grasped from the side

of the collective in its relational aspect, while emotion is the same individuation of the collective grasped in the individual being insofar as it participates in this individuation. In the individual being, or rather in the subject, perception and affectivity are more separate than action and emotion are in the collective; but the collective only establishes this reciprocity of action and emotion in presence; in the subject, affectivity has a content of spirituality greater than that of perception (at least seemingly), because perception reassures the subject and essentially makes use of the structures and functions already constituted within the individuated being; on the contrary, affectivity indicates and comprises this relation between the individualized being and pre-individual reality: thus, to a certain extent affectivity is heterogeneous relative to individualized reality and seems to bring to it something from the outside, indicating to it that it is not a complete and self-enclosed ensemble of reality. The problem of the individual is that of perceptive worlds, but the problem of the subject is that of the heterogeneity between perceptive worlds and the affective world, between the individual and the pre-individual; this problem is that of the subject qua subject: the subject is individual and other than individual; it is incompatible with itself. Action cannot resolve the problems of perception nor can emotion solve the problems of affectivity unless action and emotion are complementary, symbolic with respect to one another within the unity of the collective; for there to be a resonance of action and emotion, there must be a superior individuation that envelops them: this individuation is that of the collective. The subject can only coincide with itself in the individuation of the collective, because the individuated being and the pre-individual being within it cannot coincide directly: there is disparation between perceptions and affectivity; even if perceptions could find their unity in an action that would systematize them, this systematization would remain foreign to affectivity and would not satisfy the search of spirituality; spirituality is neither in pure affectivity nor in the pure resolution of perceptive problems; even if emotion could resolve affective problems, even if action could resolve perceptive problems, there would still be an impossible gap for the being to bridge between affectivity and perception, which would have become a unity of emotion and a unity of action. But the very possibility of these syntheses is problematic; in their respective isolation, these syntheses would be much more so common perceptions and affective results—common feelings—rather than veritable actions or veritable emotions with their own internal unity. What creates the condition of the unity of veritable action and veritable emotion is the reciprocity between perceptions and affections within the nascent collective. Action and emotion arise

when the collective individuates; for the subject, the collective is the reciprocity of affectivity and perception, a reciprocity that unifies these two domains each in itself by giving them an additional dimension. In the active course of the universalized world of action, there is an immanence of possible emotion; emotion is the polarity of this world both vis-à-vis the subject and objects; this world has a meaning and direction because it is oriented, and it is oriented because the subject orients itself in the world according to its emotion; emotion is not just an internal change, a turmoil of the individuated being and modification of structures; it is also a certain momentum across a universe that has a meaning and direction; it is the meaning and direction of action. Inversely, in emotion, even internal to the subject, there is an implicit action; emotion structures the being topologically; emotion is prolonged in the world as action, just as action is prolonged in the subject as emotion: a transductive series goes from pure action to pure emotion; this has nothing to do with psychical types, isolated operations, or isolated states; this is the very reality that we grasp abstractly in its two extreme terms by believing that they suffice unto themselves and can be studied. In fact, it would be necessary to be able to grasp action-emotion at its center, at the limit between the subject and the world, at the limit between the individual being and the collective. One would then understand that spirituality is the union of these two opposite sides (of action and emotion) ascending toward the same summit. The side of action expresses spirituality insofar as it emerges from the subject and is established in objective eternity, in a monument more durable than bronze, through language, an institution, art, or an oeuvre. The side of emotion expresses spirituality insofar as it penetrates the subject, flowing back into it and filling the subject in the instant, rendering it symbolic relative to itself, reciprocal relative to itself, comprehended relative to what engulfs it. To oppose the humanism of constructive action with the interiority of a withdrawal into emotion is to divide the subject, to fail to grasp the conditional reality of the collective within which this reciprocity of emotion and action exists. After this division, all that remains is the impoverished image of action, its structure transformed into nothing more than the residual sediment of a monument of indifferent eternity, i.e. science; facing science, internalized emotion, separated from its support and its condition of appearing, which is the collective undergoing individuation, becomes faith, emotion deprived of action, something maintained by means of the voluntary renewal of the collective subjugated to this function of sustaining emotion via rituals or spiritual practice. The rupture between action and emotion creates science and faith, which are two separate existences, two irreconcilable existences,

because no individuation can reunite them, and no transductive series can reconnect them; only external rapports can exist between these two ways of being that deny transindividuality in its real form. Science and faith are the debris of a spirituality that has failed and that divides the subject and pits the subject against itself instead of leading the subject to discover a signification relative to the collective. Spiritual unity resides in this transductive rapport between action and emotion; this rapport could be called wisdom, on condition of not thereby understanding it as humanist wisdom. Neither an appeal to immanence nor an appeal to transcendence, neither naturalism nor theology can account for this transductive relation; the being must be distinguished in its own milieu; the individual man does not produce his works starting from his human essence, from man as species according to a classification through common genus and specific differences. Nor is spiritual unity a power that is fully external to man and that would be expressed through man by depriving him of his consistency and interiority. This opposition is futile; it translates the problematic characteristic of the complete human being, but it does not go far enough; it substantializes into terms of an initial bipolarity instead of seeking the meaning of this bipolarity; in the examination of the human being, there are possible foundations for a humanism or for a theory of transcendence, but both of these positions are halting points in the examination that provides these two divergent paths. One exploits man as the subject of science, while the other exploits man as a theater of faith.

### 5. Anxiety

We can also reflect on the signification of certain feelings that seem to be at the same time emotions, such as anxiety. Anxiety can neither be identified with a feeling nor with an emotion alone; as a feeling, anxiety indicates the possibility of a separation between the nature associated with the individuated being and this individuated being; in anxiety, the subject feels itself to be a subject to the extent that it is negated; it bears its own existence in itself, it is weighed down by its existence as if it had to carry itself—a burden of the earth (ἄκθος ἀρούρης) [ákhthos aroúres], as Homer says, but also a burden to itself, since the individuated being, instead of having the ability to find the solution to the problem of perceptions and the problem of affectivity, feels all problems flowing back into it; in anxiety, the subject feels as if it exists as a problem posed to itself, and it feels its division into pre-individual nature and individuated being; the individuated being is *here and now*, and this *here and now* prevent an infinity of other *here and nows* from coming into existence: the subject becomes conscious of itself as nature, as undetermined

(ἄπειρον) [ápeiron], and as something that it will never be able to actualize into a *here and now*, that it will never be able to live; anxiety is diametrically opposed to the movement through which one takes refuge in one's individuality; in anxiety, the subject would like to resolve itself without going through the collective; it would like to come to the level of its unity by way of a resolution of its pre-individual being into an individual being, a direct resolution without mediation or delay; anxiety is an emotion without action, a feeling without perception; it is the pure reverberation of the being within itself. Of course, waiting and the passing of time can appear in anxiety, but it cannot be said that they produce anxiety, because, even when anxiety is not present, it is in preparation; the charge of anxiety is in the process of being aggravated before spreading throughout the whole being; the anxious being requests to itself, requests this silent and concealed action that can only be emotion, because it does not have the individuation of the collective to be resolved as a problem; the subject becomes conscious of itself as subject suffering anxiety, calling itself into question, without being able to really unify itself. Anxiety is always taking itself back up and does not advance or construct, but it profoundly calls upon the being and makes it become reciprocal with respect to itself. In anxiety, the being is like its own object, but an object as important as itself; it could be said that the subject becomes object and witnesses its own expansion according to dimensions it cannot assume. The subject becomes world and fills all this space and time in which problems emerge: there is no longer a world nor problem that is not a problem of the subject; this universal counter-subject that develops is like a night that constitutes the very being of the subject in every point; the subject adheres to everything as it adheres to itself; it is no longer localized, it is universalized according to a passive adhesion that makes it suffer. The subject dilates painfully by losing its interiority; it is here and elsewhere, detached from here by a universal elsewhere; it assumes all space and all time, becomes coextensive with being, spatializes, temporalizes, becomes uncoordinated world.

This immense expansion of the being, this limitless dilation that removes all refuge and all interiority, expresses the fusion, within the being, between the charge of nature associated with the individual being and its individuality; the structures and functions of the individuated being are mixed with one another and dilated, because they receive from the charge of nature this power of being without limits; the individuated is suffused by the pre-individual; all the structures are attacked, and the functions are animated by a new force that renders them incoherent. If the experience of anxiety could be adequately supported and endured long enough, it would lead to a new individuation

within the being itself, to a veritable metamorphosis; anxiety already contains the premonition of this new birth of the individuated being starting from the chaos that spreads out; the anxious being feels that it might be able to be reconcentrated within itself in an ontological beyond that supposes a change in all dimensions; but in order for this new birth to be possible, the dissolution of the previous structures and the reduction of the previous functions in potential must be complete, which is an acceptance of the annihilation of the individuated being. This annihilation as an individuated being implies a contradictory movement through the dimensions according to which the individuated being poses its perceptive and affective problems; anxiety begins with a sort of inversion of significations; close things appear distant without a link to the contemporary and the actual, whereas distant beings are abruptly present and all-powerful. The present becomes hollowed out while losing its actuality; the plunge into the past and into the future dissipates the weft of the present and deprives it of its density as something lived. The individual being flees itself, deserts itself. And yet in this desertion there is a sort of underlying drive to go recompose oneself elsewhere and otherwise by reincorporating the world such that everything can be lived. The anxious being becomes universe to find another subjectivity; it exchanges itself with the universe, plunges into the dimensions of the universe. But this contact with the universe does not pass through the intermediary of action and the emotion correlative with action, and this contact lacks recourse to the trans-individual relation as it appears in the individuation of the collective. Anxiety expresses the condition of the solitary subject being; it goes as far as this single being can go; it is a sort of attempt to replace transindividual individuation (which is impossible due to the absence of other subjects) by an exchange with the non-subject being. Anxiety realizes the highest achievement of the solitary being qua subject; but this realization seems to remain merely a state and does not seem to lead to a new individuation, since it is deprived of the collective. However, there can be no absolute certainty on this point: the transformation of the subject being towards which anxiety tends is perhaps possible in several extremely rare cases. In anxiety, the subject feels that it does not act as it should, that it is moving further and further from the center and direction of action; emotion becomes amplified and internalized; the subject continues to be and operate an ongoing modification within itself, but without acting, without being inserted into or participating in an individuation. The subject becomes distanced from the individuation that is still felt to be possible; it takes the inverse paths of the being; anxiety is like the inverse course of ontogenesis; it unravels what has been woven, it goes

backwards in every sense. For the individuated being submerged by pre-individual being, anxiety is a relinquishment and the acceptance to cross the destruction of individuality to venture toward another unknown individuation. It is the being's departure.

#### 6. *The Affective Problematic: Affection and Emotion*

Affectivity has a problematic status because it does not merely consist in pleasure and pain; pleasure and pain are perhaps the dimensions according to which the initial polarity of affectivity operates on the world and on the subject, but affectivity can no more be reduced to pleasure and pain than sensation can be reduced to lines and angles; there are sensations in a world that is oriented and polarized according to lines and angles, just as affectivity consists in affective qualities that are oriented according to pleasure and pain; however, we can no more extract affective qualities from pleasure and pain than we can produce sensations from the dimensions according to which they are organized; the dimensions of sensations are the field of movement that are in harmony with them, just as pleasure and pain are the field of insertion of affective qualities into the living being; pleasure and pain are the taking-root of actual experience in the existence of the living being, in the structures and potentials that constitute it or that it possesses. Pleasure and pain are not just the reverberation of what the being has experienced; they are not just effect, they are also active mediations that have a functional sense; even by considering affectivity as a reaction, it can be asserted that the sense of this reverberation is the dimension according to which the affective state polarizes the living being; for each affective experience, pleasure and pain are the sense of affectivity; affections have a sense, just as sensations have a sense; sensation is organized according to the bipolarity of light and darkness, up and down, interior and exterior, right and left, warm and cold; affection is organized according to the bipolarity of joyful and sad, happy and unhappy, exhilarating and depressing, bitterness or bliss, the degrading and the ennobling. Pleasure and pain are already secondary aspects elaborated from affection; they are dimensions relative to the whole being, whereas the primary affective qualities may not be strictly compatible among one another without mutual integration according to pleasure and pain; to put this relation into the vocabulary of critique, pleasure and pain are the "*a priori* forms" of affectivity, rather than the affective given. Each affection is polarized simply according to a directivity internal to a qualitative dyad. Multiple qualitative dyads are initially uncoordinated; they each constitute a relation between the subject and the initial experienced; a coordination between the different

experiences makes possible an integration into the subject that proceeds according to frameworks (or rather, dimensions) constituting a veritable affective universe. However, affective universes (or rather, nascent affective universes) lead only to distinct subsets that do not coordinate together, as long as action, or the analogue of action in its aspect of interiority, does not intervene. The coordination of the initial affective dimensions cannot be fully accomplished in the subject without the intervention of the collective, since the collective is necessary for emotion to be actualized; in affectivity, there is a continual pre-emptivity, but emotion cannot emerge from affections by means of simplification or abstraction; abstracting from affectivity could only lead to an inferior synthesis that would be impoverishing and reductive; affections, no more than sensations, do not contain their own key within themselves; an extra-being [*plus-être*] or a new individuation is necessary for sensations to be coordinated into perceptions; an extra-being of the subject is also required for affections to become an affective world; sensations not only give rise to perception, but also something of the subject, something of the being of the subject; similarly, the condition of the initial integration relative to pleasure and pain or the different affective categories are not affections alone, but something of the subject; sensation and affection correspond to two types of the being's calling into question by the world; sensations correspond to the being's calling into question as an individuated being with sense organs, and a being which therefore can be oriented according to various polarities in a world, that which corresponds to unidimensional and bidirectional tropism; sensation is this presence to the world of gradients, and its correlate is the response to tropism, not reflex. For tropism is total and corresponds to a calling into question of the entire individuated individual; but tropism does not correspond to a calling into question by the singular world; there are several worlds of tropisms, contradictory or divergent worlds that incite tropisms without a common vanishing point. Perception seeks the sense or direction of tropisms, i.e. the sense or direction of responses coordinated with sensations; sensation is the basis of tropism; it is a calling into question of the living being by the world according to a presupposed unidimensional schema; the unidimensional structure of the response is already prefigured in the nature of the calling into question, in the structure of sensation; the problematic that exists on the level of sensation is a problematic of orientation according to an axis that is already given. The structure of the sensorial world, and consequently also of the tropism that corresponds to it, is the indefinite dyad of cold and hot, heavy and light, dark and bright; sensation is the expectation of tropism, an information signal for tropism; it

is what orients the living being vis-à-vis the world; sensation does not contain the object, since it does not localize, it does not attribute to a definite being the power of being the source of the effects experienced in sensation; there is a manner in which the being is called into question by the world that is anterior to any consistency of the object; objectivity is not first, nor is subjectivity or syncretism; what is first is orientation, and what contains the sensation-tropism couple is the totality of orientation; sensation is the grasping of a direction, not of an object; it is differential, which implies the recognition of the sense or direction according to which a dyad manifests; thermal, tonal, or chromatic qualities are differential qualities anchored around a center that corresponds to an average state, to a maximum of differential sensibility. For each type of reality there is a center relative to which the relation is deployed. There is not just the highest pitched and the lowest pitched, the hottest and the coldest; there is higher pitched and lower pitched than the human voice, hotter and colder than the epidermis, lighter and darker than the optimal lighting needed by the human eye, more yellow and greener than the yellow-green of the maximum sensitivity of human chromatic sensation. The real *medium*<sup>11</sup> of each species is in each dyad, and the polarity of the world of tropism is grasped with respect to this *medium*. The constant error that has distorted the relational theory of sensation consisted in thinking that relation was the grasping of two terms: in fact, the polarity of tropism implies the simultaneous grasping of three terms: the *medium* of the living being between the hottest and the coldest, the brightest and the darkest. The living being seeks in the gradient the *optimal* zone; the living being evaluates the two directions of the dyad relative to the center in which it resides and which it occupies. The first usage of sensation is more *transductive* than relational: sensation allows to grasp how the *medium* extends into the colder of one side and into the hotter on the other; the *medium* of temperature is what extends and splits directionally into hotter and colder; the dyad is grasped starting from its center; it is not synthesis but transduction; hotter and colder are deployed symmetrically relative to the center; in the same way, green and yellow occur symmetrically with respect to the *medium* of color; and the qualities of the dyad proceed in both directions toward the extreme terms beyond which there is merely pain or the absence of sensation. Sensation relates to the state of the living being grounded in an *optimal* region of each qualitative dyad, coinciding with a gradient of the world; it is the grasping of the middle [*milieu*] of a bipolarity. *Medium* and bipolarity are part of the same unity of being, which is that of sensation and tropism, that of sensation for the orientation of tropism; sensation is already tropism, for it grasps the

structure according to which tropism is actualized; for there to be tropism, it is not required that a disadaptation produce the necessity of a movement; there is tropism in immobility as well as in readjustment. Sensation is tropistic in itself, it makes the living being coincide with the *medium* of a gradient and indicates the sense or direction of this gradient to the living being. In sensation, there is no intention to grasp an object in itself for it to be known, nor the rapport between *an object* and the living being; sensation is that through which the living being adjusts its insertion into a transductive domain, into a domain that includes a transductive reality, the polarity of a gradient; sensation is part of an ensemble that in a certain sense splits into pure sensation and pure reaction but that normally includes tropistic unity, i.e. sensation, which is tropism actualized. A psychology of behaviors leads to ignoring the role of sensation because this type of psychology only considers separate reactions as reflexes; reflex is an abstract element of reaction grasped in the tropistic unity, just as sensation is an abstract relational element grasped in the same tropistic unity from which the active side has been removed.

Comparable to the structures of veritable sensation, affectivity contains structures involved in tropistic unity. Affection relates to a subjective transductive reality (belonging to the subject) in the same way that sensation relates to an objective transductive reality. There are modes of the living being that are not modes of the world and that develop according to their own dimensions without implying a causal reference to this world and without directly organizing according to the dimensions of a gradient, i.e. without being part of sensation. An interoceptive sensation is often treated as a type of reality that does not consist in sensations and that in reality consists in affectivity. Affections constitute an orientation of a part of the living being with respect to itself; they bring about a polarization of a particular moment of life relative to other moments; they make the being coincide with itself through time, but not with the totality of itself and the totality of its states; an affective state is one that has a unity of integration into life; it is a temporal unity is part of a whole according to what could be called a gradient of becoming. The pain of hunger is not just what is felt and what reverberates within the being; it is also and above all the way hunger as a psychological state endowed with the power of being modified is inserted into the subject's becoming; affectivity is the self-constitutive integration into temporal structures. Desire, the onset of fatigue, and the intensification of cold are aspects of affectivity; affectivity is much more than just pleasure and pain; it is a way for the being at an instant to be situated according to a vaster becoming; affection is the index of becoming, just as sensation is the index of gradients; each mode,

each instant, each action, and each state of the living being are between the world and the living being; this being is polarized in accordance with the world on the one hand and in accordance with becoming on the other. And just as the different dimensions according to which orientation in the world is effectuated do not necessarily coincide together, the different affective aspects constitute insertions into the subsets of the living being's becoming, not into a single becoming. Both an affective problem and a perceptive problem remain; the plurality of tropistic orientations calls for perceptive unification and knowledge of the object, just as the plurality of affective subsets calls for the birth of emotion. Emotion arises when the integration of the current state into a single affective dimension is impossible, just as perception arises when sensations call for incompatible tropisms. Emotion is affective contradiction overcome, just as perception is sensorial contradiction. Moreover, we shouldn't speak of *affective* contradiction and *sensorial* contradiction, for sensations and affections in themselves are not what are contradictory with respect to other sensations or affections: what are contradictory are the tropistic subsets and the subsets of becoming that compose these sensations and these affections with respect to other sensorial and tropistic subsets. There is no contradiction on the level of sensations properly speaking or affections properly speaking; they cannot be apperceived if this encounter of subsets does not take place; sensations and affections are incomplete realities taken outside the subsets to which they belong and in which they operate. The non-coincidence of affections fosters emotion, just as the non-coincidence of sensations fosters perception. Emotion is a discovery of the unity of the living being, just as perception is a discovery of the unity of the world; these are two psychical individuations that extend the individuation of the living being, completing it, perpetuating it. The interior universe is emotive, just as the exterior universe is perceptive. It shouldn't be said that affection flows from emotion felt facing the object, for emotion is integrative and richer than affection; affection is like emotion in slow motion, i.e. emotion not yet constituted in its unity and in the capacity to become the master of its own development; emotion is characterized by the fact that it is like an insular temporal unity with its own structure: it drives the living being, gives it a direction, polarizes it, takes up its affectivity, and unifies it; emotion unfolds, whereas affectivity is merely felt as the belonging of the current state to one of the modalities of the living being's becoming; emotion responds to a being's calling into question that is more complete and more radical than affection; it tends to take time for this calling into question, it presents itself as a totality and possesses a certain internal resonance that allows it to perpetuate itself,

to sustain itself, and to prolong itself; it imposes itself as a self-maintained state, whereas affection does not have any active consistency and allows itself to be penetrated and to be driven off by another affection;<sup>12</sup> there is a certain closure of emotion, whereas there is no closure of affection; affection returns, presents itself again, but does not resist; emotion is totalitarian, just as much as perception, which, after having discovered forms, perpetuates them and imposes them as a system that acts as its own support; there is a tendency of the being to persevere in its being on the level of perception and on the level of emotion, but not on the level of sensation or affection; sensation and affection are realities that befall the individuated living being without assuming a new individuation; these states are not self-sustained; they are not determined in themselves by a self-conditioning; on the contrary, perception and emotion are metastable: a perception clings to the present, resists other possible perceptions, and is exclusive; an emotion also clings to the present and resists other possible emotions; the disruption of this metastable equilibrium is what allows for one perception to replace another; one emotion only comes after another emotion due to a sort of internal breakage. There is a relaxation from one emotion to another. In emotion, what disorganizes the living being is not emotion itself, since emotion is the organization of affections; what disorganizes it is the passage from one emotion to another. However, it could be said that perception also brings about a disorganization: but this disorganization is less appreciable, since it is merely a rupture between two successive perceptive organizations relative to the world; since the disorganization that exists between two emotions involves the living being, it is more appreciable than the one that separates two perceptions. Nevertheless, perception and emotion are still activities that correspond to a transitory mode of activity; due to their plurality, perception and emotion require a higher integration, an integration that the being cannot effectuate with its pure constituted individuality; in the perceptive contradiction and in the emotional ruptures, the being experiences its limited nature facing the world through perception and becoming through emotion; perception imprisons the being in a point of view, just as emotion imprisons it in an attitude. Points of view and attitudes are mutually exclusive. To unlock the possibility for the formation of a network of key points that integrates all possible points of view and for the formation of a general structure of the manner of being that integrates all possible emotions, a new individuation must occur that includes the rapport to the world and the rapport of the living being to other living beings: emotions must go toward the perceptive points of view, and the perceptive points of view must go toward emotions; a mediation between perceptions

and emotions is conditioned by the domain of the collective, i.e. the trans-individual; for an individuated being, the collective is the mixed and stable kernel within which emotions are perceptive points of view and within which points of view are possible emotions. The unity of the modification of the living being and the modification of the world depends on the collective, which brings about a convertibility of the orientation relative to the world into an integration into vital time. The collective is the stable spatiotemporal; it is a milieu of exchange, the principle of conversion between these two sides of the being's activity (perception and emotion); by itself, the living being could not go beyond perception and emotion, i.e. perceptive plurality and emotive plurality.

### III. PSYCHICAL INDIVIDUATION AND THE PROBLEMATIC OF ONTOGENESIS

#### 1. *Signification as Criterion of Individuation*

The difference between signal and signification is important because it constitutes an accurate and essential criterion for the distinction between a veritable individuation or individualization and the functioning of a non-individuated subset. Static criteria (like those of material limits and those of the body of each individual) are not sufficient. Certain cases (e.g. association, parasitism, and gestation) cannot be studied using spatial or purely somatic criteria in the usual (i.e. anatomico-physiological) sense of the term. According to the distinction between signals and signification, we will say that there is an individual when there is a process of real individuation, i.e. when significations appear; *the individual is that through which and in which significations appear*, whereas there are only signals between individuals. The individual is the being that appears when there is signification; reciprocally, there is signification only when an individuated being appears or persists in the being undergoing individualization; the genesis of the individual corresponds to the resolution of a problem that could not be resolved in accordance with the previous data, since they had no axiomatic in common; *the individual is the self-constitution of a topology of the being that resolves a previous incompatibility via the appearance of a new systematics*; what was tension and incompatibility becomes functioning structure; fixed and fruitless tension becomes an organization of functioning; instability is transformed into an organized metastability that is perpetuated and stabilized in its capacity to change; the individual is therefore a spatiotemporal axiomatic of the being that makes compatible previously antagonistic data in a system with

temporal and spatial dimensions; the individual is a being that becomes—according to its structure, in time—and is structured according to its becoming; tension becomes tendency; what merely depended on the instant, before individuation, becomes order in the successiveness of the continuous; the individual is what introduces a system according to space and time, with a mutual convertibility of order according to space (structure) and of order according to time (becoming, tendency, development, and aging; in a word, function). Signals are spatial or temporal; a signification is spatiotemporal; it has two senses, one with respect to a structure and the other with respect to a functional becoming; significations constitute something of the individual being, although they require a preliminary existence of the partially individuated being; a being is never completely individualized; to exist, it must have the power to continue individualizing by resolving the problems of the milieu that surrounds it and that is its milieu; the living being is a being that perpetuates itself by exerting a resolving action on the milieu; it brings with it the initiations of resolution, since it is alive; but when it effectuates these resolutions, it effectuates them at the limit of its being and thereby continues the individuation: this individuation after the initial individuation is individualizing for the individual to the extent that it is resolving for the milieu. According to this manner of viewing individuation, a specific psychical operation would be a discovery of significations in an ensemble of signals, since signification would extend the being's initial individuation and, in this sense, have a rapport both to the ensemble of exterior objects as well as to the being itself. Insofar as it contributes a solution to a plurality of signals, a signification has a bearing toward the exterior; but this exterior is not foreign to the being as the result of an individuation; this is because before the individuation this being was not distinct from the ensemble of the being that separated into milieu and individual. In the same way, the discovery of a significative solution has a bearing toward the interior of the being and increases for it the intelligibility of its relation to the world; the world is merely the individual's complementary with respect to an initial indivision; individualization continues individuation. Each thought, each conceptual discovery, each affective emergence is a recurrence of the initial individuation; each develops as a recurrence of this schema of the initial individuation of which it is a distant, partial, but faithful rebirth. If knowledge rediscovers the lines that allow the world to be interpreted according to stable laws, this is not because in the subject there are *a priori* forms of sensibility whose coherence with the raw data emerging from the world through sensation would be inexplicable; this is because the being as subject and the being as object arise from the same

initial reality, and because the thought that now seems to establish an inexplicable relation between the object and the subject in fact merely extends this initial individuation; the *conditions of possibility* of knowledge are in fact the individuated being's *causes of existence*. Individualization differentiates beings with respect to one another, but it also weaves relations among them; it links them to one another, because the schemata according to which individuation follows its course are shared by a certain number of circumstances that can be reproduced for several subjects. The *de jure* universality of knowledge is indeed a *de jure* universality, but this universality passes through the mediation of conditions of individualization, which are identical for all beings placed in the same circumstances and with the same foundations of individuation from the start; because individuation is universal, just like the foundation of the relation between subject and object, knowledge is validly given as universal. The opposition of the empirical subject and the transcendental subject overlaps that of the subject reached *here and now* at a certain result of its personal individualization and that of the same subject as expressing a single act—carried out once and for all—of individuation. The subject as the result of an individuation that it incorporates is a milieu of *a priori*; the subject as the milieu and agent of the progressive discoveries of signification in the signals that come from the world is the principle of the *a posteriori*. The individuated being is the transcendental subject, and the individualized being is the empirical subject. However, it is not absolutely legitimate to attribute to the transcendental subject a responsibility in the choice of the empirical subject's character; the transcendental subject does not operate a choice; it is itself choice, the concretization of a founding choice of the being; this being exists to the extent that it is a solution, but it is not the being qua individual that existed prior to the choice and that is the principle of choice; this is the ensemble, the system from which this being has emerged and in which it did not preexist as individuated. The notion of transcendental choice introduces individuality too far upstream. There is no transcendental character, and this is precisely why knowledge is universalizable; problems are problems for the transcendental ego, and the sole character, the empirical character, is the set of these problems' solutions. The schemata according to which problems can be resolved are true for every individuated being relative to the same mode of individuation, whereas the particular aspects of each solution contribute to constructing the empirical character. The only character that is constituted is the empirical character; the transcendental subject is that through which there is a problem; but for there to be problems, there must be experience, and the transcendental subject cannot operate a

choice before all experience. There can be no choice of the principles of choice before the act of choice. One could call personality everything that connects the individual qua individuated being to the individual qua individualized being. The individualized being tends toward singularity and incorporates the accidental as singularity; the individual qua individuated being itself exists relative to the system of being from which it arises, on which it is formed, but it is not opposed to other individuals formed according to the same operations of individuation. The being insofar as it is individualized diverges from other beings that are individualized; by contrast, this mixture of individuation and individualization that constitutes personality is the differentiated and asymmetrical relation with others. A relation on the level of individuation is a relation of the sexuality type; a relation on the level of individualization is of the type concerning the contingent events of everyday life; lastly, a relation on the level of personality is one that integrates sexuality and the events of the individual's history into a single situation. What constitutes the human concretely is neither pure individuation nor pure individualization, but a mixture of the two. The character that pure individualization would be is never a detached result; it only becomes so if this relational activity that the permanence of personality constitutes stopped being able to join individuation and individualization. In this sense, the unstable person [*le caractériel*] is not one who has troubles concerning their character, but one in whom the character tends to become detached, since the personality can no longer assume its dynamic role; what is ill in the unstable person is the personality, not the character. Personality is thus a relational activity between principle and result; personality is what produces the being's unity between its foundations of universality and the particularities of individualization. The interindividual relation is not always interpersonal. It is quite insufficient to appeal to a communication of consciousnesses to define the interpersonal relation. An interpersonal relation is a common mediation between the individuation and individualization of a being and the individuation and individualization of another being. In order for this single mediation that is valid for two individuations and two individualizations to be possible, there must be a separate community of individuations and individualizations; the interpersonal relation does not exist on the level of constituted personalities but on the level of the two poles of each of these personalities: the community cannot intervene after the personalities are constituted; a preliminary community of the conditions of the personality allows for the formation of a single mediation, of a single personality for two individuations and two individualizations. This is why it is rare that the domain of the interpersonal is in fact veritably

coextensive with the entire reality of each of the personalities; the interpersonal relation only involves a certain zone of each of the personalities; but the particular coherence of each of the personalities makes it seem like the community exists for the whole ensemble of the two personalities; the two personalities have a part that is veritably in common but also a part that is not: the two parts that are not in common are joined by the part in common; this is a question of partial identity and of the connection through this identity, rather than a question of communication. Consciousnesses would not suffice to guarantee a communication; there must be a communication of the conditions of consciousnesses for there to be a communication of consciousnesses.

## *2. The Relation to the Milieu*

The interpersonal relation shares some resemblance with the relation to the milieu; however, the relation to the milieu forms either on the level of individuation or on the level of individualization. It is established on the level of individuation through emotion, which indicates that the individual being's principles of existence are called into question. Fear and cosmic admiration affect the being in its individuation and situate it within itself once again relative to the world; these states consist of forces that challenge and call on the being to affirm its existence as an individuated being. This relation is situated on the level of individualization when it touches the being in its particularity through the property of familiar things or habitual and regular events, i.e. things and events that are integrated into the rhythm of life, are unsurprising, and can be integrated into prior frameworks. The impression of deep participation or normal perception are the aspects of these two rapports. These two types of relation rarely combine but instead succeed one another in life. On the contrary, the personality involves the presence of the two aspects, and the experience that corresponds to the personality is relative to two conditions: it partially involves challenging and questioning individuation as well as a modification of individualization, thereby resulting in an integration into acquired frameworks. The relation to others calls us into question as an individuated being; it situates us in an encounter with other people as being young or old, sick or healthy, weak or strong, male or female: however, one is not absolutely young or old in this relation but younger or older than another; and one is also stronger or weaker; to be man or woman is to be man in a rapport to a woman or woman in a rapport to a man. To speak of simple perception is insufficient here. To perceive a woman as a woman is not to introduce a perception into preestablished conceptual frameworks

but to situate oneself both in terms of individuation and individualization with respect to her. This interpersonal relation involves a possible relation of our existence as an individuated being with respect to her own. The perceived and the felt are only split off from one another in the illness of the personality. Minkowski brings up the case of a young schizophrenic who wonders why seeing a woman in the street causes him a specific emotion: he sees no relation between the perception of the woman and the emotion he feels. However, the specific characters cannot suffice to explain the unity of the felt and the perceived, no more than habit or any other principle of exterior unity. The being's individuality can be effectively perceived: a woman can be perceived as having a specific particularity that distinguishes her from every other person; but it isn't as a woman that she is distinguished in this way: she is distinguished qua human being or living being. The concrete knowledge corresponding to a complete haecceity (this woman here, this very woman) is that in which individuation and individualization coincide; it is a certain expression, a certain signification that makes it such that this woman is this very woman; all the aspects of individuality and of individuation are incorporated into this fundamental expression that the being cannot have unless it is really unified. Gestalt psychology, which developed into a psychology of expression, considered signification as a basic reality; signification is in fact given by the coherence of two orders of reality, that of individuation and that of individualization. The expression of a being is indeed a veritable reality, but it is not a reality that is graspable otherwise than as expression, i.e. as personality; there are no elements of expression, but there are bases of expression, since expression is a relational unity maintained in the being by an incessant activity; this is the very life of the individual manifested in its unity. On the level of expression, the being is to the extent that it manifests itself, which is something that is not true for individuation and individualization.

### *3. Individuation, Individualization, and Personalization. Bi-substantialism*

It could be asked if there are individuals other than physical or living individuals and if it is possible to speak of psychical individuation. In fact, it actually seems that psychical individuation is an individualization rather than an individuation, if we agree to designate by individualization a type of process that is more restricted than individuation, insofar as it requires the support of the already individuated living being in order to develop; psychical functioning is not a functioning separate from the vital, but, after the initial individuation that provides a living being with its origin, there can

be in the unity of this individual being two different functions, functions which are not superposed but which are (functionally) relative to another, just like the individual with respect to the associated milieu; thought and life are two complementary, rarely parallel functions; everything happens as if the living individual could once again be the theater of successive individuations that divide it into distinct domains. It is correct to assert that thought is a vital function with respect to a living being that would not be individualized by separating into a physiological being and a psychical being; the physiological and the psychical are like the individual and the complement of the individual at the moment in which a system individuates. Individualization, which is the individuation of an individuated being and results from an individuation, creates a new structuration within the individual; thought and organic functions are the vital split along an asymmetrical rift that is comparable to the first individuation of a system; thought is like the individual of the individual, whereas the body is the complementary associated milieu of thought with respect to the already individuated σύνολον [súnolon] that the living being is. When the individuated living system is in the state of internal resonance, it individualizes by splitting into thought and body. Before individualization, psychosomatic unity is a homogeneous unity; after individualization, it becomes a functional and relational unity. Individualization is merely a partial splitting (in normal cases), for the psycho-physiological relation sustains the unity of the individuated being; furthermore, certain functions never become solely psychical or solely somatic, and, in this way, they maintain in the living being the status of the individuated but not individualized being: this is the case for sexuality; this is also generally the case for the concrete interindividual functions (like social relations) that concern the individuated being. According to this path of study, the ensemble of psychical contents could be considered as the result of the resolution of a series of problems posed to the living being, problems the latter must resolve by individualizing; psychical structures are the expression of this fractured individualization that has separated the individuated being into a somatic domain and a psychical domain. There is no identity of structures between the somatic and the psychical; but there are pairs of complementary realities that constitute living subsets on the level of the individuated being; the individuated being is expressed in partially coordinated, successive somatopsychic pairs. Initially, the individuated being does not have *a* soul and *a* body; it is constructed as such by individualizing, by gradually splitting. There is no psychical individuation properly speaking, but there is an individualization of the living being that gives rise to the somatic and the psychical; this

individualization of the living being is expressed in the somatic domain by specialization and in the psychical domain by the schematization that corresponds to this somatic specialization; each psychical schema corresponds to a somatic specialization; the body can be called the ensemble of the specializations of the living being to which psychical schematizations correspond. The psychical is the result of an ensemble of sub-individualizations of the living being, and this holds for the somatic as well; each individuation reverberates within the living being by partially splitting it in a way that produces a pair formed by a psychical schema and a somatic specialization; the psychical schema is not the form of the somatic specialization but the individual that corresponds to this complementary reality relative to the anterior living totality. If the living being were to individualize completely, its soul would be a society of schemas, and its body would be a society of specialized organs, each carrying out a specific function. The unity of these two societies is maintained by that which does not individualize in the living being and consequently resists splitting in two. Individualization is all the more accentuated as the living being is subjected to increasingly critical situations in which it manages to triumph by splitting within itself. The individualization of the living being is its real historicity.

Personality appears to be more than relation: it is what maintains the coherence of individuation and of the ongoing process of individualization; individuation takes place only once; individualization is as continual as perception and everyday behaviors; by contrast, personality concerns the domain of the quantum, of the critical: structures of personality are established that last a certain amount of time, resist the difficulties that they must take on, and then, when they can no longer maintain individuation and individualization, collapse and are replaced by others; personality is constructed by successive structurations that are replaced, with the new structurations integrating the subsets of the old ones and also leaving a certain number of the latter aside as unusable debris. Personality is constructed via successive crises; its unity is increasingly strong the more this construction resembles a maturation in which nothing of what has been built is definitively rejected but is, sometimes after a latency period, reintroduced into the new edifice. Individuation is unique, individualization continual, and personalization discontinuous. But the discontinuity of the genesis includes the unity of the process of organizational construction; in the actual expression of the harmonious personality, one can identify the anterior stages that it takes back up by integrating them into its functional unity. Saint Augustine's expression *etiam peccata* ("even sins") is true solely on the level of the personality's construction. Indeed,

it can be said that the personality integrates *even sins* without supposing that there is the occasional aspect of the *felix culpa* ("blessed fault"), which is inexplicable without resorting to a transcendence.

The foundation of the problem of transcendence lies in the successive rapport of these phases of personality; all the schemata that seek to explain the inherence of a transcendent principle in man or, on the contrary, that want to show that everything emerges genetically from experience, ignore the initial reality of the operation of individuation. It's true that the being, to the extent that it is individuated, does not have and will never have the complete course of its explication within it; the individuated being cannot account for itself or for everything that is within itself, no more than it can account for its emotion facing the starry sky and the moral law within it or the principle of true judgment. This is because in its ontogenetic limits the individuated being has not retained within it the whole real from which it has emerged; it is an incomplete real. But it also cannot search outside itself for another being that would be complete without it. Whether according to creation or procession, the being that has allowed the individual to form has split, i.e. has become the individual and the complement of the individual. The first reality anterior to individuation cannot be recovered whole outside the existing individual. The genesis of the individual is not a creation, i.e. an absolute advent of the being, but an individuation within the being. The concept of transcendence mistakes anteriority for exteriority. The complete being, which is the origin of the individual, is both within the individual and outside it after individuation; this being has never been outside the individual, for the individual did not exist before the being individuated; it cannot even be said that the being has individuated: there has been individuation within the being and individuation of the being; the being has lost its unity and its totality by individuating. This is why the study of transcendence finds outside the individual and before it another individual that both has the appearances of the individual and those of actual and contemporaneous nature, i.e. this complement of the individual. But the image of the Supreme Being cannot become coherent because it is impossible to make coincide or even to render compatible aspects like the personal character of the Supreme Being and its character of positive eternity and omnipresence, which give it a cosmicity. The study of immanence is doomed to the same ultimate failure, for it would like to recreate a world starting from what is found in the individuated being; the aspect of personality is then predominant, but the cosmicity is obscured; the individuated being is thus found to be relative to the ensemble of the world in a double relation, as a being that includes nature qua naturing nature and

as a being that is a mode of natured nature. The relation of natured nature and of natured nature is graspable with just as much difficulty in the study of the immanence within the individuated being as that of God as personal being, active agent, and God as omnipresent and eternal, i.e. as endowed with cosmicity. Both the search for transcendence and the search for immanence aim to recreate the whole being with one of these two symbols of the incomplete being that individuation separates. Before posing the critical question prior to any ontology, philosophical thought must pose the problem of complete reality, which is anterior to the individuation from whence the subject of critical thought and of ontology emerges. Veritable first philosophy is not that of the subject, nor that of the object, nor that of a God or Nature searched for according to a principle of transcendence or immanence, but that of a real anterior to individuation, a real that cannot be sought in the objectified object or in the subjectified subject but at the limit between the individual and what remains outside it, i.e. according to a mediation suspended between transcendence and immanence. The same reason that makes the study according to transcendence or immanence futile also makes the search for the essence of the individuated being in the soul or in the body futile. This search has led to materializing the body and spiritualizing consciousness, i.e. to substantializing both terms after having separated them. The term *body* after this separation conserves elements and functions of individuation (like sexuality); it also conserves aspects of individualization, like wounds, illnesses, and infirmities. Nevertheless, it seems that individuation dominates in the body insofar it is a separated body, one that has its life and its death apart from other bodies and that can be wounded or diminished without another body being wounded or diminished. Conversely, consciousness grasped as spirit contains the basis of personal identity, first as an independence of consciousness with respect to the known material elements or objects of action; body and consciousness then in some sense become two separate individuals between which a dialogue is established, and the total being is conceived as a reunification of two individuals. The materialization of the body consists in seeing in it nothing but a pure given, a result of the capacity of the species and of the milieu's influences; the body is then like an element of the milieu; it is the closest milieu for the soul, which becomes the being itself, as if the body enveloped the soul (this is what Saint Augustine calls *carneam vestem*, "fleshly clothing"). Consciousness is spiritualized in the sense that expression becomes clear, deliberate, and reflective thought, willed according to a spiritual principle; expression is fully uprooted from the body; in particular, the gaze—which is perhaps what conveys the most

profound and refined expression of the human being—becomes “the eyes of the flesh”; however, the eyes as the seat of the gaze’s expression cannot be said to be of flesh; they are the support and milieu of expression, but they are not of flesh in the way that a stone is of quartz or of mica; they are not merely organs of a body but the intentional transparency of one living being to other living beings. The body can only be said to be of flesh as a possible corpse and not as a real living being. Every somatopsychic dualism considers the body to be dead, which is what allows it to be reduced to a matter: *soma sema* (“the body-prison”), as Plato calls it (*Cratylus*, 400b). The spiritualization of consciousness operates inversely to that of the materialization of the body. The body is materialized to the extent that it is identified with its instantaneous and consequently unexpressive physical reality; consciousness is spiritualized to the extent that it is identified with a timeless reality; while the body is drawn toward the instant and reduced to it, consciousness expands into eternity; it becomes spiritual substance tending toward the state of non-becoming; death, which severs the soul from the body, leaves the body to essential instantaneity, whereas the soul is freed into absolute eternity. To consider that death is the separation of the soul and the body, to know the being through the prescience of its death, and to preface the knowledge of the being with the description of its bi-substantiality after death is in some sense to consider the being as already dead during its very existence. For bi-substantialism would only be true in the hypothesis of a death that would conserve consciousness intact. This reductive reversal of time that permits seeing the living being in terms of what it will be after death implies begging the question, insofar as one sets out, despite everything, from the living being, from this edifice of life that the expression of a personality in somatopsychic unity is. The experience of what is rarest and most elevated in vital becoming is what’s used to enact this dissociation of the soul and the body. The bi-substantialist reduction broadly makes use of vital experience at first, then turns its back on this initial experience and turns back against it by way of the abstract schema of the dead being. The notion of body and the notion of soul are two reductive notions, since they replace the individual being (which is not a substance) with a pair of substances; but adding as many substances together as one likes with schemata of interaction as subtle as one could imagine will not succeed in recreating the initial broken unity. The somatopsychic distinction cannot go further than that of the pair of symbols.<sup>13</sup> In the living individual, there are almost purely somatic structures and functions, at least in the sense in which materialism could understand it; there are also almost purely psychical functions;

but above all, there are psychosomatic functions; the model of the living being is the psychosomatic; the psychical and the somatic are merely borderline cases that are never available in the pure state. What is eliminated from the living being via bi-substantialist reduction is precisely the set of median structures and functions, like the unitary functions of expression and integration. Thus, Bergson's bi-substantialism has led to the bisection of a function, like that of memory in the distinction between pure memory and habit-memory. But the same study of memory shows that pure memory and habit-memory are merely borderline cases. Pure memory and habit-memory are subtended by a network of significations that are valid for the living being and other living beings. The opposition of sensation and perception still expresses the bi-substantialist preoccupation: sensation would be sensorial, i.e. somatic, while perception would involve a psychical activity that collects and interprets sense data. This opposition even extends to that between feeling and affection. However, this opposition is not caused by their belonging to two separate substances but by two types of functioning. On the contrary, if one compares science to perception, perception is what becomes somatic, while science is psychical. Both science and perception are in fact psychosomatic; they both suppose an initial encounter of the subject being and the world in a situation that calls the being into question; the only difference involves the fact that perception corresponds to the resolution of an encounter without a preliminary technical elaboration, while science stems from an encounter by way of the technical operation: science is technical perception, and it extends vital perception in a circumstance that supposes a preliminary elaboration but actually responds to a new engagement; when water rises into the barrel pump, technics suffices; but when water stops rising, science is necessary. Technical excess is profitable for the development of the sciences, just as the *élan* of the tendencies is necessary for the development of perception, since this excess and this *élan* place man before the necessity of once again stabilizing the rapport between subject and world by way of perceptive signification or scientific discovery. Finally, the opposition between man and animal, which is erected into a dualistic principle, originates within the somatopsychic opposition itself. With respect to man who perceives, the animal perpetually seems to feel without being able to elevate itself to the level of the representation of the object separated from contact with the object. However, in the animal there is also a relative opposition between instinctual behaviors (which draw their direction and their orientation from pre-given schematisms) and behaviors of organized reaction, thus revealing the establishment of a definite presence to the world, along with the possibility of

conflict. Instinctual behaviors are those that unfold, not without adaptation—since behavior does not negate adaptation—but without preliminary conflict; it could be said that instinctual behavior is one in which the elements of the solution are contained in the structure of the ensemble constituted by the milieu and the individual; on the contrary, a behavior of organized reaction is one that implies the invention of a structure on behalf of the living being. Nevertheless, organized reactions suppose drives, but they add something to the situation on the level of the resolution; drives, with the tendencies that derive from them if objects are present, always play the role of motors. The difference from so-called human behaviors resides in the fact that motivation by instincts generally remains visible in behaviors when an animal is concerned and the observer is a human, whereas motivations that drive human behavior cannot be easily detected for another human as an observer. The difference is more so of level than of nature. By conflating simple instinctual behaviors in the animal with the conflictual reactions that overcome them, we improperly join the aspects of individuation and the aspects of individualization. However, it is correct that the behaviors arising from individuation are more numerous and more easily observable than the behaviors of individualization, but it is incorrect that the former are the only behaviors; every individualization supposes an individuation, but the former adds something to the latter. The error stems from the fact that we search for behaviors that would not be instinctual; nevertheless, when an absolute absence of drives leaves the being in an anorexic state, no further behavior is possible; the finality of behaviors is replaced by absolute indistinction, prostration, and the absence of orientation. This opposition between man and animal, which is unfounded, adds a new implicit substantialism to the basic substantialism by means of which we give individuality to the body and the soul in man.

Furthermore, there is a form of monism that is merely a bi-substantialism in which one of the terms has been obliterated. To say that only the body is determinative or that only the mind [*esprit*] is real is to suppose implicitly that there is another term in the individual, a reduced term deprived of its whole consistency but nevertheless real as a useless or negated understudy. The loss of the role is not the loss of the being, and this being exists sufficiently to subtract from the dominant term a certain number of functions and to expel them back outside the representation of the veritable individual; materialist monism or spiritual monism are in fact asymmetrical dualisms: they impose a mutilation of the complete individual being. The only veritable monism is the one in which unity is grasped at the time when the possibility of a diversity of functioning and structures is perceived. The only

veritable monism is that which, instead of following an implicit dualism that it seems to refuse, contains the dimension of a possible dualism but against a background of the being that cannot be overshadowed. This monism is genetic, for genesis alone presupposes unity that encompasses plurality; becoming is grasped as a dimension of the individual starting from the time in which the individual did not exist as an individual. Dualism can only be avoided if one starts from a phase of the being anterior to individuation in order to relativize individuation by situating it among the phases of the being. The only compatibility of duality and unity is in the genesis of the being, in ontogenesis. In a certain sense, it can thus be said that the different notions of monism and of pluralism arise from a shared postulate, one according to which the being is substance in the beginning, i.e. exists as individuated before every operation and every genesis. Both monism and dualism therefore put themselves in the impossible situation of rediscovering an effective genesis, since they wish to make a genesis emerge from the already individuated being as a result of individuation; nevertheless, the individual emerges from individuation, but the former neither contains the latter nor fully expresses it. This does not mean that the individual must be devalued relative to an initial reality that is richer than it; but the individual is not the only aspect of the being; it is only the whole being when it is associated with its complement, the milieu, which is engendered at the same time as the individual. Furthermore, the irreversibility of the ontogenetic process prohibits one from going back from the system posterior to individuation toward the system anterior to individuation. There are two errors in substantialism: that of mistaking the part for the origin of the whole by seeking in the individual the origin of individuation, and that of wanting to reverse the course of ontogenesis by making individuating existence emerge from individuated substance.

#### *4. Insufficiency of the Notion of Adaptation to Explain Psychical Individuation*

One of the most characteristic traits of modern psychology and psychopathology is that they contain an *implicit sociology* that is inherent particularly to the normativity of their judgments. Certainly, these disciplines claim not to be normative and want to be merely objective; they are objective no doubt, but from the moment that the necessity of the distinction between the normal and the pathological appears, from the moment that it is merely necessary to determine a hierarchy by classifying behaviors or states according to a scale of levels, normativity once again arises. If we define this implicit

normativity, it is not to argue against it in this part of our study, but because it obscures a whole aspect of the representation of the individual. If dynamics is included in the implicit normativity, one will be able to construct a psychological theory of the individual within which it will seem that no dynamics is presupposed; in fact, this dynamics is present in implicit normativity, but it does not appear as a dynamics inherent to the object studied. If we analyzed the complete content of the dynamic notions employed by modern psychology (such as the normal and the pathological, high level states and low-level states, states of elevated psychical tension and states of low psychical tension), we would find that this implicit normativity conceals a sociology and even a sociotechnics that do not belong to the explicit foundations of psychology. Perhaps this remark would even be valid for the psychological doctrines of previous centuries, since they seem to be exempt from any theory of society and because sociology had not been constituted as an autonomous discipline; in Malebranche for example, we can discover a certain conception of human freedom and of individual responsibility founded on the fact that each being has "movement to always go further"; in Maine de Biran, the hierarchy of three lives supposes a certain representation of inter-individual relation. Lastly, even in the work of Rousseau, whom we are taking as a general example of the authors that sought to construct a doctrine of the individual grasped in his solitude, virtue and consciousness involve an implicit presence of relation.

But this incapacity of psychological thought facing the analysis of its presuppositions is particularly notable in the most recent developments of this discipline. As an example, if we take the address of Dr. Kubie to the 1949 Macy Conference of Cybernetics, we find that the author legitimizes his distinction of the normal and the pathological in individual behavior through the criterion of adaptation. This is indicated by the title of his study, "The Neurotic Potential and Human Adaptation"; he attempts to show that a behavior governed by neuropathic forces and presenting certain analogies with a normal behavior is ultimately exposed due to the fact that the subject cannot be satisfied with any of his successes. Neuropathic potentials are distinguished from normal forces by the continual disadaptation of the subject that they animate; this subject is neither happy nor satisfied, even if, seen from outside, his behavior seems to involve success. As the author states, this is because there is an immense gap between the goal pursued by the neuropathic potentials and the conscious goal that the subject seeks and can effectively attain. When the overarching and consciously sought goal is finally reached, the subject understands that he has been the victim of an illusion and that this

is not yet his true goal; he is not satisfied, and he sees that he never will be. This may then be the moment of despair, which is incomprehensible for someone who sees from outside this drama of the neuropathic quest. At the height of their career, an engineer or a writer commit suicide without any apparent cause; their success was not a veritable adaptation.<sup>14</sup> At least for a time, neurotics often seem to excel normal subjects; this is because they work and act under the influence of neuropathic potentials. But sooner or later, neurosis manifests. Dr. Kubie cites several cases to illustrate his thesis, particularly the case of a man who, during World War II, was awarded several military medals for his heroic conduct and his remarkable aggressiveness; he had managed to leave the desk job to which he was assigned in order to partake in battle in an extremely courageous way. However, after the end of the war, this man's severe neurosis manifested and forced him to seek psychiatric help. Similarly, according to the author, one often finds in universities certain "campus heroes" (an expression whose literal meaning is "heroes of the university grounds," but this expression has a value similar to phrases like "heroes of the honor roll" or "heroes of the court of honor"). These heroes are neurotics who mask their inability to adapt by excelling in the intellectual or athletic domain and who find in the laurels they receive a provisional means of ensuring their integration into the society in which they live. Later on, neurosis manifests.

Nevertheless, this criterion of adaptation or adaptability, which is taken by Dr. Kubie as a principle of distinction between the normal and the pathological, presents a very serious possibility of confusion. Should adaptation be grasped in the relation of the individual to the group or in the relation of the individual to himself? At the beginning of his address, Dr. Kubie establishes the nature of the logical and physical necessity of this criterion by assimilating it with the law of gravitation; it would be absurd to ask if any norm whatsoever requires matter to attract matter, for without this natural law, the world would not exist. Similarly, it is absurd to ask whether there is a norm that requires man to adapt to society: the very fact that the human world exists proves the existence of this norm of adaptation; it is a norm because it is a law that expresses the existence of a human world whose condition of possibility it is. However, this analogy is much too condensed to be considered a principle. Indeed, the physical world is not merely constituted by neutral matter, i.e. each particle attracting all the others and being attracted by them according to Newton's law; there are also electrical charges that polarize matter and make particles capable of a mutual repulsion stronger than Newtonian attraction, as can be seen currently in certain stable or unstable

plasmas; there is a considerable difference between a field like the gravitational field and a field like an electrical field or magnetic field: the latter actually involve a polarity, whereas the field of gravity does not. Finally—over and above electrical charges (be they associated with matter or not) and appearing as electron or ion, potential or potential well—there is electromagnetic radiation, which can be grasped in all the degrees of the vast domain of transductivity it constitutes. If the physical universe were only constituted by neutral particles without polarity and without radiation, its properties would be totally different from what they are. The problem of physical individuality certainly would not be posed with such acuteness: there would then be no explanation for why a corpuscle like an electron, which repels other electrons with a force inversely proportionate to the distance between the corpuscles, is not dislocated by forces that should, by virtue of the preceding law, tend to dissociate its parts from one another. If the individual unity of the electron remains despite this law, this is because a reality distinct from attraction at a distance and from repulsion at a distance enters into play on the level of the particle.<sup>15</sup> The physical individual cannot be treated according to laws derived from the study of interindividual relations, since, if the individual exists, this is because the laws (whose action is not observable on the interindividual level) become predominant on the individual level. If there were only one type of relation, the individual would not be isolated from the whole into which it is integrated. In the same way, in psychology the normality of the individual cannot be defined by a law that expresses the coherence of the world, because if this law alone were valid, there would be no individual reality, and thus no problem of normality could intervene.

Furthermore, in the description of the neuroses he recounted, Dr. Kubie indeed shows that the adaptation in question, which defines normality, is an adaptation of the individual not only to the human world but also to himself, because in formal terms, success, achievement, an enviable and envied situation, an honorable position, and wealth do not constitute satisfaction, without which there is no adaptation. However, a law comparable to that of gravitation in the physical world cannot determine in the human world whether a specific role suits a specific personality. The neurotic is one for whom no role is suitable and who therefore suffers from a constant disadaptation, not between his role and society, but between himself and his role in society. One can be disadapted without being neurotic and neurotic without being disadapted, because the compatibility or incompatibility in the relation of the individual to himself is not determined by the law of interindividual relation. An implicit sociology is not a guarantee of objectivity in psychology; it only keeps

us from posing the problem of the relation of the individual to himself. Nevertheless, this question is posed on the level of physical thought itself; it is posed all the more in psychology due to the higher level of organization and the greater complexity of the individual within this domain.

#### 5. *The Problematic of Reflexivity in Individuation*

The difficulty experienced by psychosociology of situating individual reality and defining adaptation seems to stem from the same origin as the difficulty that plagues scientific thought when it seeks to define physical individuality: wanting to grasp the being's structure without operation and operation without structure, it either leads to an absolute substantialism or to an absolute dynamism that does not leave room for relation within the individual being; relation becomes inessential. Even Bergson, who has made a remarkable effort to think the individual without allowing himself to be snared by a mental habit imported into psychology by a spirit accustomed to treating other problems, has remained too close to pragmatism; like pragmatism, he has privileged intraindividual dynamism at the expense of structural realities that are just as intraindividual and important. It would be difficult to account for a properly *mental* illness in Bergson's philosophy.

According to the doctrine that we are expounding, the psychological individual, like the physical individual, is a being constituted by the coherence of a domain of transductivity. In particular and as a direct consequence of this nature, it is impossible to constitute in the study of the individual two types of forces or behaviors, i.e. normal behaviors and pathological behaviors; certainly not because behaviors would be identical to one another, but precisely because they are so different from one another to be able to constitute two types alone; according to the point of view in which we are situated, either an infinity of types can be constituted or one alone, but never two alone. The constitution of two types does nothing but express the bipolarity of normativity essential to a psychological classification that conceals an implicit sociology and sociotechnics. In fact, as in every domain of transductivity, there is in the psychological individual the unfolding of a reality that is simultaneously continuous and multiple. Bergson has seized upon this characteristic in one of its dimensions, i.e. the temporal dimension; but, instead of studying the characteristics of relation according to the order of simultaneity more deeply, he has remained prejudiced against spatiality (no doubt due to the abuses of psychological atomism) and has remained content with opposing the characters of the "superficial self" to those of the "deeper self." However, transductivity on the psychological level is expressed by the relation

between the transductive order of the simultaneous and the transductive order of the successive. Without this relation, psychological reality would not be distinct from physical reality. In the psychological domain, the relation that has the value of being is that of the simultaneous and the successive; the different modalities of this relation are what constitute the domain of properly psychological transductivity; but they cannot be divided into kinds; they can only be hierarchized according to a given type of function.

Ultimately, the very center of individuality therefore appears as *reflexive* self-consciousness, this expression being taken in its fullest sense; a non-reflexive consciousness, one that is incapable of introducing a normativity derived from behavior into behavior itself, would not effectuate this domain of transductivity that constitutes the psychological individual; indeed, the characteristic polarity of teleological behavior already exists on the biological level; but then it lacks this reciprocity (between the order of the simultaneous and the order of the successive) that constitutes psychological reality. Moreover, we do not mean by this to assert that there is a radical distinction between the biological order and the psychological order; by hypothesis alone, we are saying that pure biological reality would be constituted by the non-reciprocity of the relation between the domain of the simultaneous and that of the successive, whereas psychological reality is precisely the establishment of this reciprocity that can be called reflection. The pure living being indeed integrates its past experience into its present behavior, but it cannot carry out the inverse integration, because it cannot introduce reflection due to which the present behavior, already imagined in its results and analyzed in its structure, is placed on the same ontological level as the past behavior. For the pure living being, there is a heterogeneity between experience and behavior; for the psychological individual, there is a relative and progressive homogeneity of these two realities; instead of sinking into the past by becoming pure experience, the past behavior conserves the characteristics of interiority that make it a behavior; it conserves a certain coefficient of presence; inversely, the present behavior, consciously represented as that which will have consequences as effective as those that now constitute the real experience of the past, is already an experience in advance. The possibility of foresight and the possibility of remembering converge, because they share the same nature and have a single function: to establish the reciprocity of the order of the simultaneous and the order of the successive.

The domain of psychological individuality thus appears to be affected by a certain precariousness, for it is defined not only by the composition of a certain number of element that constitutes a partially unstable idiosyncrasy,

but also by a self-constitutive dynamism that exists only to the extent that it supports itself and maintains itself in the being; an activity that constructs itself and conditions itself develops on a biological underpinning that provides a more or less abundant, concordant, or discordant idiosyncrasy. This self-constitutive character develops as a problematic without a solution on the level of personal idiosyncrasies; the character is not yet the individual, because it is what poses problems but not what resolves them; if the solution of problems were given in experience, the individual would not exist; the individual exists the moment that a reflexive becoming-conscious of the posed problems has allowed the particular being to introduce its idiosyncrasy and its activity (including that of its thought) into the solution; the proper characteristic of the solution on the level of the individual resides in the fact that the individual plays a double role, on the one hand as an element of the data and on the other hand as an element of the solution; the individual intervenes twice in its problematic, and it is through this double role that it calls itself into question; if, as Vladimir Jankélévitch says, every problem is essentially thanatological, this is because the axiomatic of every human problem can only appear to the extent that the individual exists, i.e. establishes a finitude within itself that confers a recurrent circularity onto the problem of which it becomes conscious; if the individual were posited as eternal, none of the problems that appear to it could receive a solution, because the problem could never be dissociated from the subjectivity that the individual confers on it by figuring among the data and elements of the solution; the problem must be able to be freed from its inherence to individuality, and this requires that the individual only intervene provisionally in the question that it poses; a problem is a problem to the extent that it includes the individual, since it includes the individual doubly in its structure, although the individual seems to appropriate the problem; the individual and the problem surpass one another and sort of intersect according to a schema of mutual inherence; the individual exists to the extent that it poses and resolves a problem, but the problem only exists to the extent that it forces the individual to recognize its temporally and spatially limited nature. The individual is the being that joins within it and outside it an aspect of the simultaneous and an aspect of the successive; but in this act through which it brings a solution to an aspect of a problem, it becomes determined in order to make a compatibility between these two orders occur, and it is localized and temporalized by becoming universalized. Every individual act is essentially ambiguous, since it is at the point where there is a chiasmus of interiority and exteriority; it is at the limit between interiority and exteriority; interiority is biological, exteriority is physical; the

domain of psychological individuality is at the limit of physical reality and biological reality, between the natural and nature, as an ambivalent relation with the value of being.

The domain of psychological individuality therefore does not have its own space; it exists as a superimpression relative to the physical and biological domains; it is not inserted between them, properly speaking, but joins them and includes them partially, all while being situated in them. The nature of psychological individuality thus is essentially dialectical, since it only exists to the extent that it establishes a compatibility that passes through itself between nature and the natural, between interiority and exteriority; biological reality is anterior to psychological reality, but psychological reality takes the biological dynamism back up after being decentered with respect to it. The psychological detour is not an abandonment of life but an act through which psychological reality becomes decentered relative to biological reality to be able to grasp in its problematic the rapport of the world and of the ego, the rapport of the physical and of the vital; psychological reality unfolds as a transductive relation of the world and of the ego. The direct communication of the world and of the ego is not yet psychological; for psychological reality to appear, the implicit link between the world and the ego must be broken and then reconstructed solely through this complex act of two mediations that suppose one another and are mutually called into question in reflexive self-consciousness.

Whence results for the psyche the necessity to unfold through mediations endowed with reciprocity; since its domain is that of relation but not of possession, it can only be constituted by what it constitutes. This reciprocity of the subject and the object appears in the individual problematic, because what the object of the problem is for the consciousness that posits it, the subject of this consciousness is for the world that contains this object. This double situation is inherent to the opposition of realism and nominalism. However, the dialectical relation of the individual to the world is transductive, because it unfolds a homogeneous and heterogeneous, consistent and continuous, but diversified world, a world which neither belongs to physical nature nor to life but to this universe in the process of constitution that can be called mind [*esprit*]. Yet this universe constructs the transductivity of life and of the physical world through knowledge and through action; the reciprocity of knowledge and of action allows this world to be constituted not just as a mixture but as a veritable transductive relation; everything that is constructed by the individual, everything that is apprehensible by the individual is homogeneous, whatever the degree of spatial and temporal diversity that affects the

elements of this constructed universe may be; all individual realities can be ordered in continuous series without radical heterogeneity. Every reality can be understood either as physical being, as vital gesture, or as individual activity; this third order of reality establishes a transductivity that partially and incompletely joins the preceding orders that are commensurate with the existence of psychological individuals. The inclusion of the elements of the first two orders in the third is the work of the individual and expresses the individual. Nevertheless, this inclusion is never complete, because it requires the existence of physical and biological underpinnings; just as there cannot be an entirely biological world, there cannot be an entirely psychological world.

The psychological individual could also appear to belong to a psychological world. But here an illusion arising from an overly facile analogy must be prevented: properly speaking, a psychological world within which individuals would be distinguished and defined after the fact does not exist. The psychological world is constituted by the relation of psychological individuals; in this case, the individuals are anterior to the world and are constituted based on non-psychological worlds. The relation of the physical and biological worlds to the psychological world passes through the individual; the psychological world must be called the transindividual universe rather than the psychological world, since the latter does not have an independent existence; for example, culture is not a reality that subsists of itself; it only exists to the extent that cultural monuments and expressions are reactualized by individuals and included by them as bearers of significations. What can be transmitted is nothing but the universality of a problematic, which is in fact the universality of an individual situation recreated through space and time.

Yet the psychological world exists to the extent that each individual finds before it a series of mental schemata and of behaviors already incorporated in culture that compel the individual to pose its particular problems according to a normativity previously elaborated by other individuals. The psychological individual must choose among the values and behaviors from which it receives examples: but not everything is given in culture, and we must distinguish between culture and transindividual reality; culture is neutral in a certain sense; it has to be polarized by the subject that calls itself into question; on the contrary, there is in the transindividual relation a requirement of the subject to be called into question by himself, because this calling into question is already begun by others; the decentering of the subject relative to himself is carried out in part by others in the interindividual relation. However, it should be noted that the interindividual relation can obscure the transindividual relation, to the extent that a purely functional mediation is

made available as an easy option that avoids the veritable position of the problem of the individual by the individual himself. The interindividual relation can remain a simple rapport and avoid reflexivity. Pascal has felt and noted quite vividly the antagonism between diversion and the reflexive consciousness of the problem of the individual; to the extent that the interindividual relation offers a prior validation of the ego grasped as a persona through the functional representation that others have formed of it, this relation avoids the acuteness of the calling into question of oneself by oneself. On the contrary, the veritable transindividual relation only begins beyond solitude; it is constituted by the individual who called himself into question and not by the convergent sum of interindividual rapports. Pascal discovers transindividuality in the reciprocal relation with Christ: "I have shed my blood for thee," Christ said; and the man who has managed to remain alone understands that Christ is in agony until the end of time; "there must be no sleeping during that time," Pascal said. The veritable individual is one who has traversed solitude; what the individual discovers beyond solitude is the presence of a transindividual relation. The individual finds the universality of relation at the end of the trial that is imposed on him, and this trial is one of isolation. We believe that this reality is independent of any religious context, or rather, it is anterior to any religious context and is in fact the common basis for all religious forces when it is translated into religion. The source of all religions is not society, as certain sociological thoughts have wanted to show, but the transindividual. This force is socialized, institutionalized only afterwards; but it is not social in its essence. Nietzsche shows Zarathustra taking refuge in his cave at the top of the mountain to find solitude, which allows him to foresee the enigma of the universe and to speak to the Sun; he isolates himself from other men to the point of being able to say: "You great star, what would your happiness be had you not known those for whom you shine?". The transindividual relation is that of Zarathustra to his disciples or that of Zarathustra to the tightrope walker who lies broken on the ground in front of him and who has been abandoned by the crowd; the crowd only considered the funambulist in terms of his function; it abandons him when he ceases to perform his function after his death; on the contrary, Zarathustra feels himself to be this man's brother, and he carries off his corpse to give him a proper burial; it is with solitude, in this presence of Zarathustra to a dead friend abandoned by the crowd, that the trial of transindividuality begins. What Nietzsche describes as the event of wanting "to climb onto his own shoulders" is the act of every man who undergoes the trial of solitude to discover transindividuality. However, Zarathustra does not discover a creator

God in his solitude but the pantheistic presence of a world submitted to eternal return: “Zarathustra dying holds the earth in his arms.” The trial is thus anterior to the discovery of the transindividual, or at the very least anterior to the discovery of all the transindividual; the example of Nietzsche’s Zarathustra is invaluable, for it shows that the trial itself is often guided and initiated by the flash of an exceptional event that makes man conscious of his destiny and leads him to feel the necessity of the trial; if Zarathustra hadn’t felt this absolute and profound fraternity with the tightrope walker, he would not have left the village to seek refuge in the cave at the top of the mountain. A first encounter between the individual and transindividual reality is necessary, and this encounter can only be an exceptional situation that externally presents the aspects of a revelation. But, in fact, the transindividual is self-constitutive, and Pascal’s phrase “you would not seek me, if you have not found me,” if it accounts for the role of the individual’s activity in the discovery of the transindividual, seems to presuppose the transcendent existence of a being in which the origin of all transindividuality resides. Neither the idea of immanence nor the idea of transcendence can account completely for the characteristics of the transindividual with respect to the psychological individual; transcendence or immanence are indeed defined and determined before the moment that the individual becomes one of the terms of the relation into which it is integrated, and whose other term was already given. However, if it is admitted that the transindividual is self-constitutive, it will be seen that the schema of transcendence or the schema of immanence only account for this self-constitution through their simultaneous and reciprocal position; each moment of self-constitution involves the definition of the rapport between the individual and the transindividual as that which *surpasses the individual by extending it*: the transindividual is not exterior to the individual and yet becomes detached from the individual to a certain extent; furthermore, this transcendence that takes root in interiority (or rather, at the limit of interiority and exteriority) does not bring about a dimension of exteriority but a dimension of excess relative to the individual. The fact that the trial of transindividuality was able to be interpreted sometimes as a recourse to a superior and exterior force and sometimes as a deepening of interiority—according to Augustine’s formulas, *In te redi; in interiore homine habitat veritas* (“return to yourself, truth resides in everyone”), or even, *Deus interior intimo meo, Deus superior superrimo meo* (“God is higher than my highest and more interior than my innermost self”)—shows that at the very start this fundamental ambiguity exists: the transindividual is neither exterior nor superior; it characterizes the true relation between every exteriority

and every interiority relative to the individual; perhaps the dialectical formula according to which man must go from the exterior to the interior and from the interior to the superior could also articulate the passage from interiority to exteriority prior to the access to superior things. For it is in the relation between exteriority and interiority that the starting point of trans-individuality is constituted.

Thus, psychological individuality appears to be what is elaborated by elaborating transindividuality; this elaboration rests on two interconnected dialectics, one of which interiorizes the exterior, the other of which exteriorizes the interior. Psychological individuality is therefore a domain of transductivity in this sense; it is not a substance, and the notion of the soul must be revised, since it seems to imply in some of its aspects the idea of a substantiality of the psychological individual. However, beyond the notion of the soul's substantiality and also beyond the notion of the inexistence of any spiritual reality, there is the possibility of defining a transindividual reality. The afterlife of the soul is then no longer presented with the characteristics that the quarrel between materialism and spiritualism have given it; the most delicate question is undoubtedly that of the "personal" nature of the afterlife of psychological individuality. None of the alleged reasons for proving this personal character are definitive; all these reasons and this whole search simply show the existence of the desire for eternity, which is indeed a reality qua desire; and a desire is obviously not a simple notion; it is also the emergence of a dynamism of the being, of a dynamism that makes transindividuality exist by suffusing it with value. It nevertheless seems possible to affirm that the path of research here is indeed the examination of this transindividual reality that psychological reality is; in a certain sense, every human act achieved on the level of transindividuality is endowed with the power of indefinite propagation that confers on it a virtual immortality; but is the individual itself immortal? The interiority of the individual cannot be immortal, since it has too many biological roots to be able to be immortal; the pure exteriority attached to the individual, with its deeds or its works insofar as they materialize its action, also cannot be immortal; they survive it but are not eternal; what can be eternal is this exceptional relation between interiority and exteriority, which is designated as supernatural and which must be maintained above any interiorist or communal deviation. Just as the excellence of the sacred is something enviable for cementing the greatness of establishment or for legitimizing the promotion of a certain interiority to the status of spirituality, there is a strong tendency to the interiorist or communal deviation of transindividual spirituality. No solution in this domain

can be absolutely clear: the notion of the soul and that of matter merely provide the false simplicity of what habit presents and manipulates without clarifying the implicit meanings; the notion of the afterlife through trans-individuality is more unfashionable and less common than that of the completely personal afterlife of the soul or that of cosmic afterlife in a pantheistic union, but it is not more confused; like them, it can only be grasped by intuitions formed in an active and creative contemplation.

Wisdom, heroism, and sainthood are the three paths for studying this transindividuality according to the predominance of representation, action, or affectivity; none of them can lead to a complete definition of transindividuality, but each designates in some way one of the aspects of transindividuality and contributes a dimension of eternity to individual life. The hero is immortalized through his sacrifice, just as the martyr in his bearing witness and the sage in his radiant thought. The excellence of action, the excellence of thought, and the excellence of affectivity, moreover, are not exclusive with respect to one another; Socrates is a sage, but his death is a heroic testimony of affective purity. Martyrs are saints become heroes. Every path of transindividuality initiates the other paths. Furthermore, each of them has something in common that marks the category of the transindividual specifically and manifests it without, however, sufficing to define it: what they each share is a certain sense of inhibition, which is like a negative revelation that puts the individual into communication with an order of reality superior to that of everyday life. According to the cultural basis of each path, these inhibitions that orient action are presented as emanating from a certain transcendent being or from a "spirit" [*génie*], such as Socrates's *daimon*; but what is most important is the existence of this inhibition; in sainthood, it manifests through the refusal of everything that is judged impure; in heroism, abject and ignoble actions are refused; and in wisdom, the refusal of the useful and the affirmation of the necessity of disinterest has this same value of inhibition; the lack of this inhibition was seen in the Sophists by Plato, and this is what allowed him to oppose Socrates against them. There is a negative and inhibitive aspect of asceticism that prepares the way to wisdom. The being surpasses itself specifically to the extent that this inhibition is exerted, either according to a search for transcendence or by being "immortalized in the sensible." It should be noted that this inhibition can take on different forms, but it only transforms the better to subsist. Thus, in Nietzsche, the ancient and classical aspects of this inhibition are refused and fiercely critiqued: violence replaces sainthood, and the inspired frenzy of Dionysus compensates the cold lucidity of Apollo with the creation of the gay science; but what remains is

contempt, which becomes the attitude of Nietzsche's hero and which, under the auspices of a feeling of the overman's superiority, in fact contains an extremely strong inhibition; the overman is denied happiness and any sort of easiness.

Psychological individuality introduces certain norms that do not exist on the biological level; whereas biological finality is homeostatic and seeks to obtain a satisfaction for the being in a state of greater equilibrium, psychological individuality exists to the extent that this biological equilibrium and this satisfaction are judged insufficient. Apprehensiveness and concern in vital security mark the arrival of psychological individuality, or its possibility of existence at the very least. Psychological individuality cannot be created by a devitalization of the vital rhythm or by a direct inhibition of tendencies, since this would then lead to nothing but an interiority and not a spirituality. Psychological individuality is superimposed on biological individuality without destroying it, since spiritual reality cannot be created by a simple negation of the vital. We should note that the distinction between the vital order and the psychological order is particularly revealed by the fact that their respective normativities constitute a chiasmus: worry appears during a time in which biological calm dominates, and during times of pain spirituality transforms into defensive reflexes; fear transforms spirituality into superstition.

Ultimately, the appeal to transcendence that sees in spiritual reality a being distinct from the living individual is still too close to immanence; there is still too much biological reality in a pantheistic or creationist conception of spirituality.

Indeed, pantheistic or creationist conceptions place the individual in an attitude whose initial participation is undertaken with great difficulty; participation requires a sort of self-abnegation and a sort of self-departure, both through the negation of individual reality (as in the thought of Spinoza) as well as through the detachment of the individual from the biological milieu (as in certain aspects of creationist mysticism). This is because too much individuality remains in the conception of the transindividual; the relation between the biological individual and the transindividual then can only intervene through a disindividuation of the individual; here, the error properly speaking is not one of anthropomorphism but of the individualization of the transindividual; perhaps only negative theology has made an effort not to think the transindividual in the manner of a superior individuality that is vaster but just as individual as that of the human being; the most difficult anthropomorphism to avoid is that of individuality; nevertheless, pantheism does not avoid this anthropomorphism, for it can do nothing but expand the

singular individual to the dimensions of the cosmos; but the analogy between microcosm and macrocosm, which remains present throughout this infinite expansion of unique substance, sustains the individuality of the macrocosm. It is no doubt because of this ineradicable individuality that every pantheism leads to this difficult conception of freedom within necessity, whose infinitely subtle Spinozist form, however, is reminiscent of the Stoic image of the dog attached to the cart: the dog is a slave when its will is not in unison with the rhythm of the carriage, while it is free when it has been able to synchronize the movements of its will with the cart's successive stops and starts. What is oppressive in every type of pantheism is the valorization of cosmic law as the rule of thought and of the individual will; however, this valorization of universal determinism intervenes because there is an implicit presupposition: the universe is an individual. Theodicy can be opposed to pantheism as well as creationism and the doctrine of a personal God, because in both cases facts become norms, insofar as the mutual foundation of the fact and the norm is a law, that of the internal organization of the supreme individual. The transcendence or immanence of this individual relative to the world does not change the fundamental schema of its constitution, which thereby confers value on each determination.

Furthermore, we should ask to what extent the phenomenon that psychologists call "split personality" comes up in the study of transindividuality. Indeed, the splitting of the personality is quite clearly a pathological aspect of self-consciousness and of behavior. However, there is nevertheless an aspect of the study of spirituality that cannot fail to bring splitting to mind: this aspect is the separation in itself between good and evil, between beast and angel, which is a separation accompanied by the awareness of man's twofold nature and is projected outside in mythology as a Manichaeism that defines a principle of good and a principle of evil in the world; the very idea of demons, with the description of the means they use to tempt someone's soul, is merely the transposition of this duality accompanied by an implicit technique of exorcizing the evil one has within oneself; for the Devil is not just the principle of evil; the Devil is also the scapegoat that pays for all the sins and weaknesses that one does not wish to attribute to oneself and to whom one attributes responsibility; in this way, bad conscience is transformed into hate against the Devil. Temptation is the imminence of the personality's split, the moment when the being feels that it will allow its effort and its tension to be released to fall into a lower level of thought and action; this fall of oneself away from oneself gives the impression of an alienation; it is put back into a perspective of exteriority. No doubt the splitting would not exist if

man always lived and thought on the same level; but how can one explain that the fall from a higher level to a lower level gives the impression of an alienation? This is because the presence of the transindividual then is found lacking and because the subject understands that its existence is realigned or defined by new values that are not properly speaking more mediocre than the old ones or absolutely antagonistic, but foreign to them; these new values do not contradict the old values, for to contradict is still to recognize, yet they do not speak the same language. The fall to a lower level could not cause the splitting on its own if there weren't at the same time a decentering of the system of references. If the lower values were in an analogical rapport relative to the higher values, if there were but a vertical leap from one level to the other, the profound *disorientation* that arises in temptation would not manifest. It is by resorting to a simplicity of expression that one can render *disorientation* an invasion of evil and render evil the correlate of the good with respect to a neutrality of values. If evil were the correlate of the good, the ego would never be foreign to itself; here, there is an essentially *asymmetrical* relation, and the substantialistic idea of two natures is still much too close to a schema of symmetry to be able to account for this relation.

#### 6. *The Necessity of Psychical Ontogenesis*

According to this perspective, ontogenesis would become the starting point for philosophical thought; it would really be first philosophy, anterior to the theory of knowledge and to an ontology that would follow this theory. Ontogenesis would be the theory of the phases of the being, anterior to objective knowledge, which is a relation of the individuated being to the milieu after individuation. The existence of the individuated being as subject is anterior to knowledge; a first study of the individuated being must precede the theory of knowledge. The science [*savoir*] of ontogenesis is prior to any critique of knowledge [*connaissance*]. Ontogenesis precedes ontology and critique.

Unfortunately, it is impossible for the human subject to witness its own genesis, for the subject must exist in order for it to think. The geneses of the conditions of the validity of thought in the subject cannot be mistaken for a genesis of the individuated subject; the Cogito, with the methodological doubt that precedes it and with the development that follows it ("but what am I, I who am?"), does not constitute a true genesis of the individuated subject: the subject of doubt must be anterior to doubt. One can only say of the Cogito that it approaches the conditions of individuation by assigning the return of the subject to itself as a condition of halting doubt: the subject grasps itself simultaneously as a doubting being and as an object of his doubt. Doubting

and doubt are a single reality grasped via two aspects: it is an operation that returns to itself and grasps itself from two facets. It is a privileged operation that objectivates the subject facing himself, because in the operation of doubting, it objectivates the doubting subject; doubt is both the doubt subject, i.e. the doubt *operation* in the first person, and also the doubt that detaches from the operation of actual doubting as doubted doubt, an already accomplished objectivated operation, i.e. already matter for another operation of doubting that immediately follows it. Between doubting doubt and doubted doubt, a certain relation of distancing is constituted through which, nevertheless, the continuity of the operation is sustained. The subject recognizes himself as a subject of the doubt he just put forth, and nevertheless this doubt as an accomplished reality is already objectivated and detaches by becoming the object of a new doubt. In order for reaction to exist, there must be memory, i.e. at the same time and through a shared reality or operation, a distance-taking and a joining-together; the operation of doubt, which in this instance adheres to the subject, must distance itself relative to the center of activity and of consciousness, and it must form as an independent and autonomous unity of the being, all while remaining through this distance a thing of the subject, a thing expressing the subject. Memory is a distance-taking, an acquisition of objectivity without alienation. It is an extension of the limits of the subjective system that takes on an internal duality without separation or rupture: it is alterity and identity progressing together, forming and becoming distinguished in the same movement. The content of memory becomes the symbol of the present ego; it is the other part; the progress of memory is an asymmetrical splitting of the subject being, an individualization of the subject being. The mental matter that has become memory (or rather, the content of memory) is the milieu associated with the present ego. Memory is the unity of the being as totality, i.e. as a system that incorporates this splitting and resists it, such that this splitting can be repeated and taken up again by the being. To remember is to find oneself again. But what finds is not homogeneous with what is found; what finds is like the individual, and what is found is like the milieu. The unity of the being that remembers is the unity of the joining of symbols. The being that remembers is more than the ego; it is more than the individual; it is the individual plus something else. The same applies for the imagination; the difference between memory and the imagination resides in the fact that the principle of encounter between the ego and the symbol of the ego aligns with a dynamic tendency of the ego in the imagination, whereas in memory the principle of encounter is in the symbol of the ego; there is symbolization in both cases, but in the operation

of memory, symbolization takes the complementary symbol of the ego for the individual and the ego for the milieu; in the imagination, the ego is the individual, and the symbol of the ego is the milieu. Finally, in the dialogue with oneself, the two roles alternate, such that a quasi-reciprocity is established between the ego and the symbol of the ego. But this reciprocity is illusory: it cannot be equivalent to a veritable reciprocity except in the cases of splitting, i.e. when a certain coalescence is effectuated between the two symbols of the ego, the symbol relative to which the ego is an individual and the symbol relative to which it is a milieu; a counter-personality is therefore constituted at the expense of the first, which increasingly loses its power of actuality and consequently its freedom; freedom is in fact essentially constituted by this double adequation of the ego to its symbols, that of memory and that of the imagination. What psychoanalysis considers to be an unconscious should in fact be considered a counter-ego, a double that is not a true ego, since it is never endowed with actuality; it can only be expressed in dreams or automatic acts, not in the state of integrated activity. Janet's idea of the personality splitting is perhaps closer to reality than that of the unconscious, which has been accepted since Freud. However, it would be more appropriate to speak of a *doubling* [*doublement*] of personality, of a phantom-personality, than of a *splitting* [*dédoublement*] of personality. What splits is not the actual personality, but another personality, a personality equivalent that is constituted outside the field of the ego, like a virtual image is constituted beyond a mirror for the observer without ever really being there. If there were a veritable splitting of the personality, one could not speak of a first state and a second state; even if the second state occupies a time frame longer than the first state, it does not have the same structure and can be recognized as the second state.

Yet Descartes chooses the development of memory as the privileged case in which the existence of the subject is deciphered: the reciprocity of the doubt that *just occurred* relative to the doubt that *is* currently being constituted as doubt establishes the substantial unity of the subject in a conditional and causal circularity. Nevertheless, this circularity is a borderline case; there is already distance, and there must be distance for there to be circularity; but the circularity conceals and obscures the distance; this is why Descartes can substantialize what is not a substance properly speaking, i.e. an operation; the soul is defined as *res* and as *cogitans*, the support of the operation and the operation in the process of being accomplished. However, the unity and homogeneity of this being formed by a support and by an operation can only be affirmed if the being-operation ensemble continues to be perpetuated in

the same mode. If the activity stops or seems to stop, the permanence and identity of substance thus defined is put at risk: whence the problem of sleep and loss of consciousness for Descartes relative to the conception of the nature of the soul.

Descartes has legitimately considered the self-return of doubt as indicating the consistency and unity of the individuated being; circularity indeed should be considered as indicating the consistency of the individuated being; but perhaps there is an error in considering that the return of actualized doubt as an object of actual doubt is a veritable circularity; assimilating this return to a circularity in his proof of the Cogito, Descartes does not account for the growing distance between actualized doubt—which has become the object of memory—and actualizing doubt, relative to which this anterior doubt is an object to the extent that it is no longer already actual: individuation is not achieved, it is in the process of taking place, but there is already more than the actual subject ego to the extent that there is enough distance between *doubt* and *ego* for doubt to be able to be the object of the ego: doubt becoming object is doubt passing and not doubt actualizing. Through this first assimilation, through this first encroachment unrecognized as encroachment, the adjacent symbol of the ego is attached to and assimilated with the ego: by gradually proceeding in this way Descartes attaches the whole symbolic content to the actual ego; the attachment of actualized doubt to the subject of actual doubt authorizes the attachment of willing, feeling, loving, hating, and imagining to thinking substance; the fact of suffering is homogeneous relative to the act of thinking. The most distant aspects of reflecting thought are then attached to this reflecting thought that has helped define the essence of the *res cogitans*. This radical affirmation of homogeneity can only be effectuated by pushing back the limit between the *res cogitans* and the *res extensa*: the break is thus so abrupt between the aspects of thought most attached to the body and the body itself that the gulf between substances is insurmountable. Descartes has not just separated the soul from the body; he has also, within the very interior of the soul, created a homogeneity and a unity that prevent the conception of a continuous gradient of distancing relative to the actual ego, thereby joining it, in its most decentered zones at the limit of memory and the imagination, with somatic reality.

Psychically, the individual continues its individuation by means of memory and imagination, the function of the past and the function of the future according to mundane definitions. Indeed, it is only after the fact that one can speak of past and future for memory and imagination: memory is what creates the past for the being, in the same way that the imagination creates

the future; the product of this psychical individuation is in fact only psychical at the center; the pure psychical is the actual; the distant future and the past that has become distant past are realities that tend toward the somatic; the past is incorporated as well as the future into the form of anticipation. By distancing from the present, the past becomes a state against the ego and is available for the ego but is not directly related to the ego and is not adherent to the ego. The future projected is all the more distanced from actualization as it is broadly pushed back into the future; but progressive becoming evokes it and renders it imminent, little by little gives it a status that is closer to the status of the present, i.e. more directly symbolic relative to the actual present.

According to this manner of envisioning the reality of the individuated being, it could be said that the body plays a double role with respect to consciousness; with respect to imagining consciousness, the body is milieu and not individuated reality; it is the real virtual, i.e. a source of reality that can become symbolic with respect to the present: this reality splits into present and future as though into individual and milieu. Conversely, the body results from the splitting that creates memory as an individuated being relative to a consciousness milieu of individuation: the consciousness of memory is thus always as though it were below what it remembers, whereas imagining consciousness is above what it imagines; the past—and therefore the body—is what directs and chooses the present in the consciousness of memory, while the present chooses the future in imagining consciousness. The body provides access to memory while consciousness provides access to imagination.

Consciousness is attached to the body through memory and through imagination at least as much through functions generally considered psychosomatic; the complementary opposition of memory and imagination indicates psychophysiological relation. But this relation cannot be assimilated to bi-substantial relation; the aspect of the soul and the aspect of the body are merely extreme cases; the pure soul is the present; the pure body is the soul infinitely past or infinitely distanced into the future. This is why the soul is univalent, while the body is bivalent; the body is pure past and future; the soul makes the near past and near future coincide; it is present; the soul is the being's present; the body is its future and its past; the soul is in the body, just as the present is between the future and the past that radiate out from it. The body is past and future, but not the soul; in this sense, the soul is timeless as pure soul; but this timelessness is nevertheless lodged between two temporal realities; this timelessness temporalizes toward the past by becoming body, and it arises from a corporeal reality that approaches the state of the present. The reality of the being comes from the future toward

the present by becoming soul, and it is reincorporated by passing. The soul emerges and is built between two corporeities; it is the extremity of animation and the origin of incorporation.

Consciousness is therefore a mediation between two corporeal becomings, an ascending movement toward the present and a descending movement from the present. One could say that this movement of becoming—proceeding step by step—is transductive. The true schema of real transduction is time, the passage from state to state that is formed by the very nature of the states, by their content, and not by the exterior schema of their succession: time thus conceived is the being's movement, real modification, reality that modifies and is modified, being simultaneously what it leaves behind and what it takes, real insofar as it is relational to the middle [*milieu*] of two states; being of passage, a passing reality, reality insofar as it passes—such is transductive reality. The individuated being is that for which there exists this ascent and this descent of becoming relative to the central present. There is no living and psychical individuated being except to the extent that it assumes time. To live as an individuated being is to exert memory and anticipation. The present is psychosomatic at the limit, but it is essentially psychical. Relative to this present that is psychical, the future is like an immense possible field, a milieu of virtualities associated with the present through a symbolic relation; on the contrary, the past relative to this very present is an ensemble of individualized, localized, defined points. The present is a transduction between the field of the future and the interconnected points of the past. The field of the future is reticulated through and by the present; it loses its tensions, its potentials, its implicit energy that expands in its full extension and is coextensive with it; it crystallizes into individuated points in a neutral void; whereas the tendency of the future is expanded through the whole milieu (like the energy of a field not localizable into points) and constitutes a sort of general energy, the past takes refuge in a network of points that absorb its whole substance; it loses the milieu, its own extension, the omnipresent immanence of tension to charged reality; there is nothing in the universe of memory but actions and reactions between points of reality structured in a network; between these points, there is the void, and this is why the past is condensable, since there is nothing in the intervals between these points of reality; the past is isolated relative to itself, and it can become a system only partially through the present that reactualizes it, takes it back up, gives it tendency and living corporeity; the past owes its availability to this structure of molecular isolation; it can be artificialized because it does not hold onto itself; it allows itself to be utilized because it is in pieces. The future does not

allow itself to be condensed, detailed, or even thought; it can only be anticipated by a real act, for its reality is not condensed in a certain number of points; all of its energy exists between possible points; there is a proper ambience of the future, a relational capacity and an implicit activity before any realization; *the being preexists itself through its present*. The present of the being is thus simultaneously individual and milieu; it is individual relative to the future and milieu relative to the past; the soul, the active essence of the present, is both individual and milieu. But it cannot be individual and milieu without this existence of the total being, the psychosomatic being, which is both somatic and social, linked to exteriority. The relation of the present to the past and to the future is analogical vis-à-vis the somatopsychic relation and to this other, vaster relation of the complete individuated being to the world and to other individuated beings. This is why one must refrain from substantializing the soul, for the soul does not possess all its reality within itself; the present requires the future and the past in order to be present, and through these two distancings of the future and the past, the soul approaches the body. The body is the non-present; it is not the matter of a soul-form. The present arises from the body and returns to the body; the soul crystallizes the body. The present is individuation's operation. The present is not a permanent form; it is found as form in the operation, it finds form in individuation. This double rapport of the symbolization of the present relative to the future and to the past allows one to say that the present, or rather presence, is signification relative to the past and to the future, a mutual signification of the past and of the future through the transductive operation. The present consists for the being in existing as individual and as milieu in a unitary way; however, this is only possible through the operation of ongoing individuation, which is analogous in itself to the initial individuation by which the somatopsychic being constitutes itself within a tensed and polarized systematic whole. The individual concentrates within it the dynamics that has given birth to it, and it perpetuates the first operation as a continued individuation; *to live is to perpetuate an ongoing relative birth*. It does not suffice to define the living being as an organism. The living being is an organism depending on the initial individuation; but it can live only by being an organism that organizes and organizes itself through time; the organization of the organism is the result of an individual individuation that can be called absolute; but this organization is a condition of life, rather than life itself; it is a condition of the perpetuated birth that life is. To live is to have a presence, to be present relative to oneself and relative to what is outside oneself. It is indeed true in this sense that the soul is distinct from the body, that it is not

the organism; it is the presence of the organism; to make of consciousness an aspect of the organism, as Goldstein does, is to envelop it in an organismic unity. However, the Parmenidean monism that inspires Goldstein, failing to give temporality a constitutive role in the being, cannot introduce diversification into the being except through the notion of a “folding of being,” according to the expression put forth by the author; the soul could then only be a being imperfectly detached from within a totality that would in this way lose its reciprocal unity of circular plenitude. If, by contrast, the soul is conceived as what perpetuates the first operation of individuation that the being expresses and integrates (insofar as it is the result of the latter yet contains and extends it), such that the genesis that has made it be is veritably its own genesis, the soul intervenes as the extension of this unity; it has a reference to what has not been incorporated into the individual by individuation; it is presence to this symbol of the individual; it is at the very center of the individual, but it is also that through which the latter remains attached to that which is not individual.

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# Collective Individuation and the Foundations of the Transindividual

## I. THE INDIVIDUAL AND THE SOCIAL, GROUP INDIVIDUATION

### 1. *Social Time and Individual Time*

Such a view of individual reality seeking to clarify the problems that psychology is tasked with resolving would nevertheless make it impossible to arrive at a clear representation of the rapport of the individual to society. Society encounters the individual being and is encountered by it in the present. But this present is not the same as what could be called (at the limit) the individual present or the somatopsychic present. The social rapport is indeed to the present from the point of view of each individual. But society encountered in this rapport itself possesses its equivalent of substantiality, its presence, as a correlation between past and future; society becomes; an affirmation of permanence is still a mode of becoming, for permanence is the stability of a becoming that has a temporal dimension. The individual encounters in society a specific demand of the future and a conservation of the past; the future of the individual in society is a reticulated future conditioned according to points of contact with a structure quite analogous to that of the individual past. Engagement in society for the individual directs it toward the fact of being this or that; becoming is no longer effectuated—as in the non-social individual envisioned by hypothesis—from the future toward the present: it is effectuated in the inverse direction *starting from the present*; the individual finds himself proposing goals and roles to choose; he must tend toward these roles, toward types, toward images to be guided by structures that he endeavors to realize by coordinating with them and by accomplishing them; society facing the individual being presents a network of states and of roles through which individual behavior must pass.

What is most important for society is the individual past, because the agreement of the individual and the social is formed by the coincidence of two reticulations. The individual is forced to project his future through this social network that is already there; to socialize, the individual must pass; to be integrated is to coincide according to a reticulation and not according to this force that is immanent to the future of the somatopsychic being. The individual draws on tendencies from the social past and an impetus toward a specific action rather than a veritable remembrance; he draws from the social past that which would be associated with the dynamism of his future and not with the reticulation of his individual past; the rapport to the social requires that between the individual soul and the social contact a sort of reversal, a sort of substitution, is established. Sociality requires presence, but a presence-in-reverse. The social soul and the individual soul operate in inverse directions and individuate opposite from one another. This is why the individual can appear to himself as fleeing into the social and confirming himself in opposition to the social. The social thus appears as a reality that is quite different from the milieu with respect to the individual; we can speak of the social milieu only imprecisely and by expanding its meaning. The social could be a milieu if the individuated being were a simple result accomplished once and for all, i.e. if he did not continue to live by transforming. The social milieu exists as such only to the extent that it is not grasped as a reciprocal social; such a situation only corresponds to that of children or the sick; it is not that of the integrated adult. The integrated adult, relative to the social, is an equally social being to the extent that he possesses an actual active consciousness, i.e. to the extent that he extends and perpetuates the movement of individuation that has given birth to him, instead of merely resulting from this individuation. Society does not really emerge from the mutual presence of several individuals, but it is also not a substantial reality that should be superposed on individual beings and conceived as independent of them: it is the operation and the condition of operation through which is created a mode of presence more complex than the presence of the individuated being alone.

## *2. Interiority Groups and Exteriority Groups*

The relation of an individuated being to other individuated beings can form either analogically—the past and the future of each coinciding with the past and the future of the others—or non-analogically—the future of each individuated being finding in the ensemble of the other beings not subjects but a reticular structure through which it must pass. The first case is what American

researchers call the *in-group*; the second case is what they call the *out-group*; however, there is no *in-group* that does not suppose an *out-group*. The social is formed by the mediation between the individual being and the *out-group* through the intermediary of the *in-group*. It is useless to proceed like Bergson by opposing an open group and a closed group;<sup>1</sup> up close, the social is open; from afar, it is closed; the social operation is situated at the limit between the *in-group* and the *out-group* rather than at the limit between the individual and the group; the individual's body proper extends up to the limits of the *in-group*; just as there is a corporeal schema, there is a social schema that extends the limits of the ego up to the boundary between the *in-group* and the *out-group*. In a certain sense, the open group (*in-group*) can be considered as the social body of the subject; the social personality extends up to the limits of this group; belief, as a mode of belonging to a group, defines the expansion of the personality up to the limits of the *in-group*; such a group indeed can be characterized by the community of implicit and explicit beliefs in all the members of the group.

In certain cases, it can come about that the open group is significantly reduced around an atypical subject to the point that the social expansion of the personality is null, and that consequently every group is an *out-group*; this is what occurs in cases of delinquency, mental alienation, or in "deviants" within a specific group; it can also come about, through an immense effort of expansion of the personality, that every group, even those that normally seem to be *out-groups*, is accepted by the subject as an *in-group*. Charity is the force of expansion of the personality that does not wish to recognize any limit to the *in-group* and considers it as coextensive with the whole of humanity or even with all of creation; for St. Francis of Assisi, not only men but the animals themselves belong to the *in-group*, the interiority group. Similarly, Christ did not recognize enemies, and he had an attitude of interiority even toward those who struck him.

Between these two extremes that absolutely reduce or infinitely expand the boundaries of the interiority group, there is the status of contemporary life, i.e. everyday social life, which situates the limit between the interiority group and the exteriority group at a certain distance from the individual. This limit is defined by a second zone of presence that is attached to the presence of the individual. The integration of the individual to the social is formed by the creation of a functional analogy between the operation that defines individual presence and the operation that defines social presence; the individual must find a social individuation that overlaps his personal individuation; his

rapport to the *in-group* and his rapport to the *out-group* are like the future and the past respectively; the *in-group* is the source of virtualities, of tensions, just like the individual future; it is a reservoir of presence because it precedes the individual in the encounter of the exteriority group; it represses the exteriority group. Through belief, belonging to the interiority group is defined as an unstructured tendency that is comparable to the future for the individual: it is conflated with the individual future, but it also assumes the individual's past, for the individual is given an origin in this interiority group, whether it be real or mythical: it is of this group and for this group; future and past are simplified, led to a state of elementary purity.

### 3. *Social Reality as a System of Relations*

Thus, it is difficult to consider the social and the individual as clashing directly in a relation of the individual to society. This confrontation corresponds only to an extreme theoretical case to which certain lived pathological situations approach; the social substantializes into society for the delinquent or the alienated, and perhaps for the child; but the veritable social is not substantial, for the social is not a term of relation: it is a system of relations, a system that includes a relation and sustains it. The individual only relates with the social through the social; the interiority group mediates the relation between the individual and the social. The group interiority is a certain dimension of the individual personality, not a relation to a distinct term of the individual; it is a zone of participation around the individual. Social life is a relation between the milieu of participation and the milieu of non-participation.

Psychologism is insufficient for representing social life, insofar as it supposes that the intergroup relations can be considered as an extension of the individual's relations to the interiority group; by partially exteriorizing the relations of the individual to the interiority group, then by partially interiorizing the relations of exteriority groups to the interiority group, one can manage in an illusory manner to identify two types of relation; but this identification misrecognizes the proper nature of the social relation, since it misrecognizes the boundary of relational activity between the interiority group and the exteriority group. Sociologism also misrecognizes the characteristic relation of social life in the same way by substantializing the social based on exteriority, instead of recognizing the relational character of social activity. However, there is not the psychological and the sociological, but there is the human, which, at the extreme limit and in rare situations, can split into the psychological and the sociological. Both psychology and sociology are two viewpoints

that fabricate their own object based on interiority or exteriority; the psychological approach to the social is formed by the intermediary of small groups; nevertheless, this manner of approaching the social based on the psychological forces one to load the psychological with something of the social: such is the *affective stability* of the American psychosociologists, i.e. the character of the individual being that is already social or pre-social. In the same way, adaptability and the capacity for acculturation are pre-social aspects of the being. The individual being is seen according to instances that overflow his individual existence.

Similarly, the sociological attitude includes contents of the pre-individual in the social that will allow for individual reality to be recovered by reconstituting it. To this extent, we understand why problems like those concerning the study of labor are invalidated by the opposition between psychologism and sociologism; the human relations that characterize labor or at the very least are introduced by labor can be reduced neither to the play of sociological substantialism nor to an interpsychological schema; they are situated at the boundary of the interiority group and the exteriority group. However, envisioned as interpsychological relations, the human relations of labor are assimilated to the satisfaction of a certain number of needs, the list of which could be drawn up based on an inspection of the individual being by considering it before any social integration, as if there were a pure and complete individual before any possible integration. Labor is consequently considered as the satisfaction of an individual need, as relative to an essence of man, a collective essence but one that defines man as individual, as a being made of soul and body (something also found in the notion of manual labor and of intellectual labor, with a hierarchical distinction between these two levels of labor). Based on sociologism, on the contrary, labor is envisioned as an aspect of *the exploitation of nature by men in society*, and it is understood through the politico-economic relation. Labor then is substantialized as an exchange value in a social system within which the individual disappears. The notion of class is founded on the fact that the group is always considered as an exteriority group; the interiority of one's own class is no longer that of a social body coextensive with the limits of the personality, for class is no longer eccentric relative to the individual; one's class is conceived as one's own class based on conflict with the adverse class; it is through the return of becoming-conscious that one's class is conceived as one's own; becoming-conscious is secondary relative to this first opposition; there is no longer a structure of successive circles but a structure of conflict with a front line.

*4. Insufficiency of the Notion of the  
Essence of Man and of Anthropology*

However, it can be wondered whether an anthropology would be capable of giving a unitary vision of man that can serve as a principle for this study of social relation. But an anthropology does not include this relational duality contained in a unity that characterizes this rapport; it is not based on an essence that one can indicate what man is, for every anthropology will be forced to substantialize either the individual or the social to give an essence of man. By itself, the notion of anthropology already includes the implicit affirmation of the specificity of Man separated from the vital. Nevertheless, it is indeed certain that one cannot make man emerge from the vital if one deducts Man from the vital; but the vital is the vital that includes Man, not the vital without Man; it is the vital up to Man and including Man; there is the whole vital, which includes Man.

The anthropological point of view would thus suppose a preliminary abstraction, similar to the abstraction that one encounters in the subdivisions into individual and social and the principle of these further abstractions. Anthropology cannot be the principle of the study of Man; on the contrary, human relational activities, like the one that constitutes labor, can be taken as the principle of an anthropology to be developed. The being as relation is what is first and what must be taken as a principle; the human is social, psychosocial, psychical, and somatic, without any of these aspects being able to be considered as fundamental while the others would be judged as ancillary. In particular, labor cannot be defined solely as a certain rapport of man to nature. There is a labor that is not referred to Nature, for example the labor accomplished on Man itself; a surgeon labors; the exploitation of Nature by associated Men is a particular case of the relational activity that constitutes labor; labor can be grasped in its essence as a particular case only if this essence extracts its particularity from the whole spectrum of possible labor activities; a particular case cannot be taken as a foundation, even if it is encountered very frequently. Labor is a certain rapport between the interiority group and the exteriority group, just like war, propaganda, and commerce. Each group with respect to others can be considered as an individual to a certain extent; but the error of traditional psychosociological conceptions consists in taking the group as a gathering of individuals in the manner in which there are gatherings of individuals in the sciences, i.e. the domain of the biological sciences; in fact, the interiority group (and every group relative to itself exists to the extent that it is an interiority group) is formed by the

superposition of individual personalities and not by their agglomeration; the agglomeration, whether organized or inorganic, would presuppose a viewpoint at the level of somatic realities, not at the level of somatopsychic ensembles.

An interiority group does not have a structure that is more complex than a single person; each individual personality is coextensive with what can be called the group personality, i.e. with the shared locus of individual personalities that constitute the group. However, this manner of envisioning the group is not a psychologism, for two reasons: the first is that the word personality is not taken in a purely psychological sense, but in a really and unitarily psychosomatic sense, which includes tendencies, drives, beliefs, somatic attitudes, significations, and expression. The second reason, which is more important and constitutes the foundation of the first, is that this overlapping of individual personalities in the interiority group plays a self-constitutive structural and functional role. This overlapping is an individuation, the resolution of a conflict, the assumption of conflictual tensions in an organic, structural, and functional stability. These are not structures of personalities that are previously defined, i.e. structures that are constituted and fully formed, before the moment when the interiority group is constituted, and that come to be encountered and overlapped; the psychosocial personality is contemporaneous with the genesis of the group, which is an individuation.

The group is not what contributes to the individual being a fully formed personality, like a cloak tailored in advance. The individual, with an already constituted personality, is not what is approached by other individuals with the same personality to constitute a group with them. It is necessary to start from the operation of group individuation within which the individual beings are both the milieu and the agents of a syncrystallization; the group is a syncrystallization of several individual beings, and it is the result of this syncrystallization that constitutes the group personality; the group personality is not introduced into individuals by the group, since the individual must be present for this operation to occur; furthermore, it is not just required that the group merely be present; the group must also be tensed and partially undetermined, like pre-individual being before individuation; an absolutely complete and perfect being could not enter into a group; the individual must still be a bearer of tensions, tendencies, potentials, and reality, and this reality that it bears must be structurable but not yet structured for the interiority group to be possible; the interiority group emerges when the forces of the future harbored by several living individuals lead to a collective structuration; participation and overlapping arise at this instant of group individuation

and of the individuation of grouped individuals. The individuation that gives birth to the group is also an individuation of grouped individuals; without emotion, without potential, and without preliminary tension, there can be no group individuation; a society of monads cannot exist; the contract does not found a group, no more than the statutory reality of an already existing group; even in this borderline case where the already constituted group receives a new individual and incorporates it, the incorporation of the new is a new birth (individuation) for this individual and also a rebirth for the group; a group that cannot be recreated by incorporating new members dissolves as an interiority group.

The member of a group sustains the collective personality in the group by recruiting new beings and by introducing them into the group. The distinction between psychogroups and sociogroups is only valid as a manner of defining a certain polarity within groups: every real group is simultaneously a psychogroup and a sociogroup. The pure sociogroup would have no interiority and would be nothing but a social substance; a group is a psychogroup as soon as it forms; but this momentum of the psychogroup can only be perpetuated by incorporating, by giving birth to sociogroupal structures. Psychogroups and sociogroups can only be distinguished abstractly.

##### *5. Notion of Group Individual*

It is therefore not appropriate to speak of the influence of the group on the individual; in fact, the group is not formed by individuals joined together in a group due to certain bonds, but by grouped individuals, *group individuals*. Individuals are group individuals, just as the group is a group of individuals. It cannot be said that the group exerts an influence on individuals, for this action is contemporaneous with the life of individuals and is not independent from the life of individuals; the group is also not interindividual reality but the complement of individuation on a vaster scale joining together a plurality of individuals.

This type of reality cannot be thought if it is not acknowledged that there is a mutual convertibility of structures into operations and of operations into structures, and if the relational operation is not considered as having a value of being. Substantialism forces us to think the group as anterior to the individual or the individual as anterior to the group, which is how psychologism and sociologism arise as two substantialisms on different levels, that of the molecular or the molar. The choice of an intermediate, microsociological, or macropsychical dimension cannot resolve the problem, since it is not founded on the choice of a dimension that is adequate to a particular phenomenon

that would be intermediate between the social and the psychical. There is no psychosociological domain that would be the domain of restricted groups; this privileged aspect of certain restricted groups only stems from the fact that the successive crises of individuation, the outbursts of functional structurations through which they pass, are more visible and can be more easily studied. But these phenomena are the same as in larger groups, and they introduce the same dynamic and structural rapports; only the types of mediation between individuals are more complex, since they use modes of transmission and of action that imply a delay and are exempt from real presence; but this development of networks of communication and of authority does not have an essence (apart from macrosocial phenomena insofar as they are social) in their rapport to what can be called the individual being. The rapport of the individual to the group is always the same in its foundation: it depends on the simultaneous individuation of individual beings and of the group; it is presence.

#### *6. Role of Belief in the Group Individual*

In the individual, belief is the latent set of references relative to which significations can be discovered. Belief is not the immanence of the group to the individual, who would ignore such an immanence and would falsely believe to be an autonomous individual when he would merely express the group; belief is this collective individuation in the process of existing; it is presence to the other group individuals, the overlappings of personalities; personalities can overlap through belief; more exactly, what is called collective belief is equivalent in the personality to what a belief would be in the individual; but this belief does not exist as belief; there is belief only when some force or obstacle obligates the individual to define and structure his belonging to the group as expressible in intelligible terms for individuals who are not members of the group. Belief supposes a foundation of belief, which is the personality formed in the group individuation; belief develops in the individual as veritable belief when belonging to the group is called into question; belief is veritably interindividual; it supposes a foundation that is not merely interindividual but veritably groupal.

This is why the study of beliefs is a rather bad means of knowing man as a group member. The man who believes defends himself, or he wants to change groups and is in disharmony with other individuals or with himself. Belief is granted a causal privilege in group belonging, since belief is what is the easiest to manifest, project, and consequently grasp in the usual methods of the knowledge of psychosocial reality. But belief is a phenomenon of the

dissociation or alteration of groups, not a basis of their existence; it has a provisional value of compensation, consolidation, or reparation rather than a fundamental signification relative to the genesis of the group and to the mode of existence of individuals in the group. Perhaps one could distinguish in this sense between myth (collective belief) and opinion, which would be individual belief. But myths and opinions correspond in symbolic pairs; when the group elaborates myths, group individuals express corresponding opinions; myths are the geometrical sites of opinions. Between myth and opinion, there is merely a difference relative to the mode of inherence: opinion is what can be expressed relative to a precise exterior case; it is the norm of a defined and localized judgment concerning a precise matter; myth is an indefinite reserve of possible judgments; it has the value of a paradigm and is turned toward group interiority, rather than toward beings exterior to judging relative to group norms; myth represents the group and the personality in its internal consistency, whereas opinions are already diversified in definite objectivated situations that are separate from one another.

Myths and opinions are the dynamic and structural extension of the operations of group individuation into situations within which this individuation is no longer actual, possible, or able to be reactivated; opinion is borne by the individual, and it manifests in situations where the individual is no longer in the group, although he is of the group and tends to act as belonging to it; opinion allows the individual to confront other individuals that belong to the exteriority group, all while maintaining its relation to the interiority group and allowing this confrontation to occur as a confrontation with the exteriority group. Myth, on the contrary, would be the shared locus of opinions that obey a systematics of group interiority, and this is why myth cannot circulate perfectly in its pure form except in the interiority group; it supposes a logic of participation and a certain number of basic evidences that are part of the group individuation.

### *7. Group Individuation and Vital Individuation*

It is possible to investigate the signification of social reality with respect to the living individual. Can we speak of individuals living in society, i.e. can we suppose that individuals would be individuals even if they didn't live in society? The example of animal species shows us that there are cases in which the life of the solitary individual is possible; in other cases, periods of solitary life alternate with periods of collective life. Finally, in a number of cases, life is almost always social, except in some extremely rare moments (courtship, mating).

Should it then be said that sociality resides in the species and is a part of specific characteristics? If this proposition is admitted, we will have to consider an individual that is not integrated into a social group (in a generally social species) as an unaccomplished, incomplete individual that does not participate in this system of individuation that the group is; if, on the contrary, the group is formed by beings that could be complete individuals by themselves, the isolated individual is not necessarily incomplete.

However, the response to this question seems contained in the morphology and physiology of the species. When a morphological and functional specialization intervenes and models individuals to the point of making it improper for them to live in isolation, sociality should be defined as one of the characteristics of the species; the bee or the ant is necessarily social, because it only exists as a very specialized individual in its inability to live alone. On the contrary, in the species where there is no extremely clear differentiation between individuals that makes them incomplete by themselves, the necessity of social life belongs less directly to specific characteristics; according to ecology or other conditions, temporary isolated life arises or halts; the group can be intermittent; the group is then a mode of behavior of the species relative to the milieu or to other species, rather than the expression of the imperfect and incomplete character of the individual being. This is generally the type of existence for societies of mammals.

For man, the problem is more complex; there is the somatic and functional independence of the individual, as in other mammals; there is both the possibility of a somewhat grouped life and a somewhat solitary life, which is the consequence of this somatic and functional completion of the individual. In these conditions, there can be groupings that correspond to a mode of behavior relative to the milieu; Marx interprets the characteristic association of labor in this sense. But it seems that in addition to this somatopsychic individuation that permits independence or association on the level of specific behaviors, the human being still remains unachieved, incomplete, evolving individual by individual; there is no specific behavior that is sufficient for responding to this becoming that is so strong that, while having a somatopsychic achievement at least as perfect as that of other animals, man resembles a very incomplete being. It is as if, above a first specific individuation, man sought another individuation and required two individuations consecutively. Recognized as living in the world, man can associate together to exploit the world; but something is still lacking for man, there is still a void to fill, something that has yet to be accomplished. Exploiting Nature alone is not enough for man; the species facing the world is not an interiority group;

another relation is required to make each man exist as a social person, and for that to come about, there must be this second genesis, i.e. the group individuation.

After having been constituted as a complete being, man once again enters into a calling of incompleteness in which he seeks a second individuation; Nature or man face to face with Nature are not enough. There still remain forces and tensions that go further than the group face to face with nature; this is why man thinks of himself as a spiritual being, and to a certain degree the notion of spirit is perhaps mythical, insofar as it leads to the substantialization of the spirit and to a somatopsychic dualism. In addition to functional groups, which are like animal groups, or in addition to the functional tenor of groups, there is something hyperfunctional in groups, specifically their interiority; this interiority creates the human individual a second time, recreates him through his existence as an already biologically individuated being; this second individuation is the group individuation; but it is not at all reducible to the specific group, i.e. the exploitation of Nature by associated men; this group, which can be called an action group, is distinct from the interiority group.

Nothing, moreover, proves that human groups are the only ones to possess the characteristics we define here: it could be that animals include a certain coefficient that corresponds to what we are seeking as the basis of spirituality in human groups, albeit in a more transitory, less stable, and less continual way. In this opposition of human groups to animal groups, here we are not taking animals as being veritably what they are, but as responding, perhaps fictitiously, to what is the notion of animality for man, i.e. the notion of a being that has relations regulated by the characteristics of the species with Nature. It is then possible to call the human social group a group whose basis and function would be a specific adaptive response to Nature; this would be the case for a labor group that would be nothing but a labor group, if such a thing could be realized in a pure and stable manner. Social reality thus defined would remain on the vital level; it would not create the relation of group interiority, unless one accepts the Marxist schema of the conditioning of superstructures by the socioeconomic infrastructure.

But it is precisely a question of knowing if one can treat the other types of groups and the other contents of group life as superstructures with respect to this unique infrastructure. There are perhaps other infrastructures than the exploitation of nature by men in society, other modes of relation to the milieu than those that pass through the relation of elaboration, i.e. through labor. The very notion of infrastructure can be critiqued: is labor a structure,

or indeed a tension, a potential, a certain manner of being connected to the world through an activity that calls for a structuration without itself being a structure? If it is admitted that socio-natural conditionings are multiple on the specific level, it is difficult to extract one of these conditionings and to assert that it has the value of a structure; perhaps Marx has generalized a real historical fact, i.e. the dominance of this mode of relation to Nature that labor is in the human relations of the nineteenth century; but it is difficult to find the criterion that allows for this relation to be integrated into an anthropology. The man who works is already biologically individuated. On the biological level, labor is like the exploitation of Nature; it is a reaction of humanity as a species, a specific reaction. This is why labor is so permeable to other interindividual relations: it does not have its own resistance, it does not produce a second, properly human individuation; it is defenseless; in himself, the individual remains a biological individual, a simple individual, a determined and already given individual. But above these biological, bioligico-social, and interindividual relations, there is another level that could be called the level of the transindividual: this is what corresponds to interiority groups, to a veritable group individuation.

The interindividual relation goes from individual to individual; it does not penetrate individuals; transindividual action is what makes it such that individuals exist together as the elements of a system that contains potentials and metastability, expectation and tension, then the discovery of a structure and of a functional organization that integrate and resolve this problematic of incorporated immanence. The transindividual passes into the individual as though from individual to individual; individual personalities are constituted together by overlapping and not by agglomeration or by a specializing organization, as in the biological grouping of solidarity and division of labor: the division of labor imprisons the biological unities, i.e. the individuals, into their practical functions. The transindividual does not localize individuals: it makes them coincide; it makes individuals communicate through significations: relations of information are what is primordial, not relations of solidarity and functional differentiation. This coincidence of personalities is not reductive, for it is not founded on the amputation of individual differences or on their utilization toward ends of functional differentiation (which would imprison the individual in its particularities), but on a second structuration based on what the biological structuration that forms living individuals still leaves unresolved.

It could be said that biological individuation does not exhaust tensions, which have aided in its constitution: these tensions pass into the individual;

they pass into the individual from the pre-individual, which is both milieu and individual: it is precisely based on this position of the unresolved in man, within this not-yet-individuated charge of reality, that man seeks out his fellow man to form a group in which he will find presence through a second individuation. In man and perhaps also in animals, biological individuation does not fully resolve tensions: it leaves the problematic latent, subsistent; to say that life is that which carries spirit is not to express oneself correctly; for life is a first individuation; but this first individuation has not been able to exhaust and absorb all forces; it has not resolved everything; we have movement to go ever further, as Malebranche said; in fact, we have tension and potentials for becoming-other, for recommencing an individuation that is not destructive of the first.

This force is not vital; it is pre-vital; life is a specification, a first solution, complete in itself by leaving a residue outside its system. It is not as a living being that man bears carries him what individuates spiritually, but as a being that contains something pre-individual and pre-vital in it. This reality can be called transindividual. Its origin neither social origin nor individual; this reality is deposited in the individual, carried by the latter, but it does not belong to the individual and is not a part of the individual's system of being. We should not speak of the individual's tendencies that carry it toward the group; for these tendencies are not properly speaking tendencies of the individual qua individual; they are the non-resolution of potentials that have preceded the genesis of the individual. The being that precedes the individual has not been individuated without remainder; it has not been totally resolved into individual and milieu; the individual has conserved the pre-individual with it, and all individuals together thus have a sort of unstructured ground based upon which a new individuation can occur.

The psychosocial is transindividual: it is this reality that the individuated being carries, this charge of being for future individuations. This pre-vital charge should not be called *élan vital*, since it is not exactly in continuity with vital individuation, although it extends life, which is a first individuation. As a bearer of pre-individual reality, man encounters in others another charge of this reality; the emergence of structures and functions that can occur at this moment is not interindividual, since it contributes a new individuation that is superposed on the older one and goes beyond it, linking several individuals into a group that is born. In this sense, it could be said that spirituality is marginal relative to the individual rather than central, and that it does not establish a communication of consciousnesses but a synergy and shared structuration of beings. The individual is not just the individual,

for it is also the *being's reserve*, which is not yet polarized but which is available and lies in wait. The transindividual is with the individual, but it is not the individuated individual. It is with the individual according to a more primordial relation than belonging, inherence, or the relation of exteriority; this is why it is a possible contact beyond the limits of the individual; to speak of the soul is to overly individualize and overly particularize the transindividual. The impression of surpassing individual limits and the opposite impression of exteriority that characterize the spiritual have a meaning and find the foundation of their unity of divergence in this pre-individual reality. The divergence of spirituality's transcendence and immanence is not a divergence within the transindividual itself but a divergence with respect to the individuated individual alone.

#### 8. *Pre-individual Reality and Spiritual Reality: The Phases of Being*

The very notion of psychosomatic unity is not completely satisfying, and we recognize this insufficiency of organismic theory without being able to say what it consists in. However, it in fact seems that the insufficiency consists in this overflowing of pre-individual reality with respect to the reality of the individual. The individual is only itself, but it *exists* as superior to itself, since it carries with it a more complete reality that individuation has not exhausted and that is still new and potential, i.e. animated by potentials. The individual is aware of this fact of being linked to a reality that is over and above itself as an individuated being; with a mythological reduction, one can make of this reality a δαίμων [daímon], a spirit [*génie*], a soul; one then sees in it a second individual that doubles the first, watches over it and can constrain it, lives on after it as an individual. By accentuating the aspect of transcendence, one can also find in this same reality the testimony for the existence of a spiritual individual exterior to the individual.

All these various expressions used for naming this spiritual reality are expressions the individual translates for consciousness and conduct so as not to feel alone inside himself, to not feel limited as an individual to a reality that would be nothing but himself; the individual begins to participate by association within himself before any manifested presence of some other individuated reality. Starting from this first feeling of possible presence, the search begins for this second fulfillment of the being that reveals the transindividual to it by structuring this reality carried with the individual at the same time as other similar realities and by means of them. One can speak neither of the immanence nor transcendence of spirituality with respect to the individual, for the veritable relation is that of the individual to the transindividual:

the transindividual is what is on the outside of the individual as well as inside him; in fact, the transindividual, insofar as it is not structured, traverses the individual; it is not in topological relation with the individual; *immanence or transcendence* can only be said with respect to individuated reality; there is an anteriority of the transindividual relative to the individual that prevents defining a rapport of transcendence or immanence; the transindividual and the individuated do not concern the same phase of the being; there is a co-existence of two phases of being, like the amorphous ice in a crystal. This is why the group can seem like a milieu: the group personality is constituted on a ground of pre-individual reality that includes, after structuration, an individual aspect and a complementary aspect of this individual. The group possesses an analogue of the soul and an analogue of the body of the individual being; but this soul and this body of the group are formed by the reality provided before any splitting by the individuated beings.

Collective consciousness is not formed by the joining of individual consciousnesses, no more than the social body arises from the joining of individual bodies. Individuals carry something that can become collective but is not already individuated in the individual. The union of individuals charged with non-individuated reality, bearers of this reality, is necessary for the individuation of the group; this non-individuated reality cannot be called purely spiritual; it splits into collective consciousness and collective corporeity as structures and limits that determine the individuals. The individuals are both animated and determined by the group. Purely spiritual groups cannot be created without bodies, without limits, or without attachments; like that which is individual, the collective is psychosomatic. If successive individuations become rare and less frequent, the collective body and the collective soul increasingly separate, despite the production of myths and opinions that keep them relatively paired together: whence the aging and decline of groups, which consists in a detachment of the group soul from the group body: the social present is no longer an integrated present, but an erratic one; it becomes insular, detached, just as the awareness of the present in a person of old age is no longer directly linked to the body, is no longer inserted in the body, but sustains itself in an indefinite iteration. One can assert that there is a relation of the collective and the spiritual, but this relation is neither on the level of the interindividual nor on the level of the natural social, if by natural social one means a collective reaction of the human species to the natural conditions of life, for example through labor.

What makes use of already individuated reality, whether somatic or psychical, cannot define a spirituality. Spiritual significations are discovered on

the level of the transindividual, not on the level of the interindividual or the social. The individuated being bears with it a possible future of relational significations to be discovered: the pre-individual is that which founds the spiritual in the collective. One could call *nature* this pre-individual reality that the individual bears with it by seeking to rediscover in the word nature the significations that the pre-Socratic philosophers gave it: the Ionian physiologists found in nature the origin of all types of being prior to individuation; nature is the *reality of the possible*, in the form of this ἄπειρον [ápeiron] from which Anaximander makes every individuated form emerge: Nature is not the contrary of Man, but the first phase of the being, while the second phase is the opposition of the individual and the milieu, the complement of the individual relative to the whole. According to the hypothesis presented here, ἄπειρον would remain in the individual, like a crystal that retains its mother liquor, and this charge of ἄπειρον would allow it to go toward a second individuation. However, unlike all the systems that grasp the collective as a joining of individuals and that think the group as a form for which individuals are the matter, this hypothesis would not make individuals into the matter of the group; individuals bearing ἄπειρον discover in the collective a signification, which is expressed, for example, as the notion of destiny: the charge of ἄπειρον is the principle of disparation relative to the other charges of the same nature contained in other beings.

The collective is an individuation that joins the natures that are borne by several individuals but not contained in the already constituted individualities of these individuals; this is why the discovery of the collective's signification is both transcendent and immanent relative to the anterior individual; it is contemporaneous with the new group personality in which the individual participates through the significations that he discovers, i.e. through its nature; but this nature is not veritably the nature of its individuality; it is the nature associated with its individuated being; it is the persistence of the initial and original phase of the being in the second phase, and this persistence implies a tendency toward a third phase, which is that of the collective; the collective is an individuation of the natures linked to individuated beings. Through this ἄπειρον that it carries, the being is not just an individuated being; it is the pair of the individuated being and of nature; through this persistent nature, the being communicates with the world and with other individuated beings, discovering significations concerning which it does not know whether they are *a priori* or *a posteriori*. The discovery of these significations is *a posteriori*, for there must be an operation of individuation in order for these significations to appear, and the individuated being cannot

accomplish this whole operation of individuation alone; a presence must be created with some other being than the individuated being alone in order for individuation, the principle and milieu of signification, to be able to appear. But this appearance of signification also supposes a real *a priori*, the link to the subject of this charge of Nature, the persistence of the being in its original, pre-individual phase. The individuated being is the bearer of absolute origin. Signification is the correspondence of the *a prioris* in the individuation that come after the first, i.e. the *a posteriori* individuation.

## II. THE COLLECTIVE AS CONDITION OF SIGNIFICATION

### 1. *Subjectivity and Signification; the Transindividual Character of Signification*

The existence of the collective is necessary for information to be significative. When the original charge of nature borne by individual beings cannot be structured and organized, there can be no form in the being for accommodating the form contributed by signals. To receive an information is in fact for the subject to carry out within itself an individuation that creates the collective rapport with the being from which the signal arises. To discover the signification of the message that stems from one being or several beings is to form a collective with them and individuate through the group individuation with them. There is no difference between discovering a signification and existing collectively with the being relative to which the signification is discovered, since signification is not of the being but between beings, or rather across beings: it is transindividual. The subject is the ensemble formed by the individuated individual and the ἄπειρον [ápeiron] that it carries along with it; the subject is more than individual; it is individual and nature, it is both phases of being at the same time; the subject tries to discover the signification of these two phases of being by resolving them in the transindividual signification of the collective; the transindividual is not the synthesis of the first two phases of being, since this synthesis could only occur in the subject in order to be rigorously synthetic. But the transindividual is nevertheless the signification of these two phases, since the disparation that exists between the two phases of being contained in the subject is enveloped within signification via the constitution of the transindividual.

This is why it is absolutely insufficient to say that language is what allows man to access significations; if there were no significations to sustain language, there would be no language; language is not what creates signification; it is merely what conveys between subjects an information, which, in order to

become significative, must encounter this ἄπειρον [ápeiron] associated with the definite individuality in the subject; language is the instrument of expression, the conveyance of information, but it does not create significations. Signification is a rapport of beings, not a pure expression; signification is relational, collective, transindividual, and it cannot be provided by the encounter of expression and the subject. We can say what information is based on signification, but we cannot say what signification is based on information.

There are innate psychosomatic structures and dynamisms that constitute a mediation between the natural (the pre-individual phase) and the individuated. Sexuality is one such mediation; in a sense, it could be said that the fact of being sexuated for the individual is a part of individuation; and sexuality in fact could not exist if the psychosomatic distinction of individuals did not exist; however, sexuality does not belong to the individual, is not its property, and requires the couple to have a signification. Sexuality is the pre-individual still linked to the individual and is specified and dichotomized in order to be conveyed implicitly and psychosomatically by the individual. The dichotomy of the pre-individual allows for a larger integration of this pre-individual charge into the individual; sexuality is more immanent to the individual than the pre-individual, which veritably remains an ἄπειρον; sexuality models the body and the soul of the individuated being, and it creates an asymmetry between individuated beings qua individuals. Sexuality is at an equal distance between the ἄπειρον of pre-individual nature and the limited, determined individuality; it establishes the inherence to limited, individuated individuality, i.e. a relation to the unlimited; this is why it can be passed through in two directions, toward individuality and toward nature; it makes individuality and nature communicate. It is not true that sexuality is merely a function of the individual, since it is also a function that makes the individual step outside itself. It is not a specific function placed by the species in the individual as a foreign principle: the individual is sexuated, it is not merely affected by a sexual index; individuation is therefore bimodal qua individuation; and it is precisely not an individuation completely achieved as individuation, because it remains concretely bimodal: there is a halt in the path of individuation that allows for this bimodality to conserve the inherence of a charge of ἄπειρον [ápeiron]; this translation of the unlimited into the limited protects the being from aseity and correlatively deprives it of complete individuation. In this way, it can be understood why this individual bimodality was able to be considered as a principle of dialectical ascension; nevertheless, the myth of the hermaphrodite indeed remains a myth, for the hermaphrodite is bisexual rather than a complete individual: we can wonder

if the rigorously unimodal individual can exist apart; in species where sexuality does not exist or is merely episodic for the individual, there are often gregarious forms of existence that mark a halt in individuation. With superior species, the adherence of sexuality to the individual being creates the inherence of a limit of individuation to the interior of the individual. Sexuality can be considered a psychosomatic immanence of pre-individual nature to the individuated being. Sexuality is a mixture of nature and of individuation; it is an individuation in suspense, arrested in the asymmetrical determination of the elementary collective, of the unified duality of the couple.

This is why sexuality can be an introduction to the collective or a withdrawal starting from the collective, an inspiration and incitation toward the collective, but it is not the collective, and it is also not spirituality, but the incitation to spirituality; putting the being into movement, it informs the subject that it is not a closed individual, that it does not have aseity; the subject is, but it remains a *metaxy* and cannot be detached from the individuated being, since it is deposited in its modality of individuation. Unlike Freud, we cannot identify sexuality with the very principle of the tendencies in the individuated being; the being also cannot be divided into two principles, that of pleasure and that of the death drives, as Freud attempted when he reworked his doctrine and modified it after the First World War. Freud felt that there is both a unity and a duality of the individuated being. But the being can neither be interpreted according to pure unity nor according to pure duality. The difficulty of Freud's whole doctrine stems from the fact that the subject is identified with the individual and from the fact that sexuality is placed in the individual as something that the individual contains and includes; however, sexuality is a modality of the initial individuation, rather than a content of the actual individual; it is organized or is not organized in its ontogenetic development with what we have called Nature in the subject, such that it becomes individualized or on the contrary is linked to the world and to the group. Pathogenesis should be linked to a conflict between the modality of individuation in the form of sexuality and the charge of pre-individual reality that is in the subject without being included in the individual. But it is indeed certain that the fulfillment of desires, the satisfaction of tendencies, and the relaxation of all the tensions of the sexuated being do not harmonize the individual with itself and do not halt the pathogenic conflict within the subject between the modality of individuation and nature. Neither the study of the individual alone nor the study of social integration alone can account for pathogenesis. It is the subject that is ill, not the individual alone, for there is within it a conflict between nature and the individual.

The only path of resolution is the subject's discovery of significations due to which the collective and that which is individual can be harmonized and develop in a synergistic way. Goldstein appropriately remarks that the normal state of the drives is not resolution, flat calm, but a certain median tension that applies them to the world and attaches them to their object; the subject can find its fulfillment and its equilibrium neither in the pure individual facing itself and its given reality, nor in its insertion into the empirical social. Freud and Karen Horney have generalized two borderline cases. Mental pathology is on the level of the transindividual; it appears when the discovery of the transindividual is lacking, i.e. when the charge of nature that is in the subject with the individual cannot encounter other charges of nature in other subjects with which it could form a transindividual mode of significations; the pathological relation to others is one that lacks significations and dissolves into the neutrality of things, thus leaving life without polarity; the individual then feels itself becoming an insular reality; improperly crushed or falsely triumphant and dominant, the subject seeks to link the individual being to a world that loses its signification; the transindividual relation of signification is replaced by the powerless relation of the subject to neutral objects, some of whom are his peers. With "Fate analysis," Szondi has indeed found this aspect of nature that there is in the subject; but this aspect must also be found in cases where no definite pathogenic forces appear; there is still some pre-individual reality that has guided the subject in its positive choices: indeed, choice is not merely the activity of that which is entirely individuated in the subject; choice supposes the individuation of a part of non-individuated nature, for choice is the discovery of a relation of the being through which the subject is constituted in a collective unity; choice is not the control of a neutral object by a dominant subject, but the individuation that intervenes in a charged pre-individual ensemble formed by two or several subjects; choice is the discovery and institution of the collective; it has a self-constitutive value; it takes several masses of pre-individual nature for choice to be fulfilled; choice is not an act of the subject alone; it is the structuration in the subject with other subjects; the subject is the milieu of choice as well as an agent of this choice. Ontologically, every true choice is reciprocal and supposes an operation of individuation deeper than a communication of consciousnesses or an intersubjective relation. Choice is a collective operation, a group foundation, a transindividual activity.

Thus, the subject more so than the individual is implicated in choice; choice occurs on the level of subjects and involves the constituted individuals within the collective. Choice is therefore the advent of the being. It is not

simple relation. It then would be more appropriate to study if there are modes of the pre-individual, i.e. the different aspects of nature that subjects include. The ἄπειρον [ápeiron] is perhaps undetermined only with respect to the individuated being; there are perhaps various modalities of the undetermined, which would explain why specific cases and specific tensions are required for the birth of the collective and in order to have a certain number of chances of stability in all cases. One could perhaps define in this way classes of *a priori*s in possible significations, categories of potentials, stable pre-relational bases. The concepts to carry out such a study are lacking.

## 2. *Subject and Individual*

One of the things that seems to emerge from this partial and hypothetical study is that the name individual is improperly given to a more complex reality, that of the complete subject, which, in addition to individuated reality, includes within it an unindividuated, pre-individual, or even natural aspect. This unindividuated charge of reality conceals a power of individuation, which, within the subject alone, cannot conclude, whether due to the being's poverty, isolation, or the lack of a systematic whole. Gathered with other subjects, the subject can correlatively be the theater and agent of a second individuation that gives birth to the transindividual collective and links the subject to other subjects. The collective is not nature, but it supposes the preliminary existence of a nature attached to subjects between which collectivity is established by their overlapping. Beings are linked to one another in the collective not actually as individuals, but as subjects, i.e. as beings that contain the pre-individual.

This doctrine would aim to consider individuation as a phase of being. This phase, moreover, cannot exhaust the possibilities of pre-individual being, such that a first individuation gives birth to beings that still carry virtualities and potentials with them; although they are too weak in each being, these potentials joined together can carry out a second individuation (the collective), thus linking individuated beings via the pre-individual that they conserve and include. The particular being is thus more than an individual; it is first an individual on its own, as the result of a first individuation; a second time it is a member of the collective, which is what makes it participate in a second individuation. The collective is not a milieu for the individual but a set of participations in which it enters through this second individuation that choice is when it is expressed as a transindividual reality. The subject being can be conceived as a more or less perfectly coherent system of three successive phases of being: the pre-individual phase, the individuated phase, and

the transindividual phase, all of which partially but not completely correspond to what is designated by the concepts of nature, individual, and spirituality. The subject is not a phase of being opposed to that of the object, but the condensed and systematized unity of the three phases of being.

*3. The Empirical and the Transcendental. Ontogenesis and Pre-critical Ontology. The Collective as Signification That Overcomes a Disparation*

This manner of envisioning the subject allows us to avoid the difficult distinction of the transcendental and the empirical. It also saves anthropology from the dead end of an absolute point of departure for the knowledge of man based on an essence. The individual is not everything in man, for the individual is the result of a preliminary individuation; a pre-individual knowledge of the being is necessary. The being as individuated must not be considered as absolutely given. Ontogenesis must be integrated into the domain of philosophical examination, instead of considering the individuated being as absolutely first. This integration would allow for the surpassing of certain ontological postulates of critique, postulates which are essentially relative to individuation; it would also allow us to refuse a classification of beings into genera that do not correspond to their genesis but instead correspond to a knowledge of beings considered after genesis, concerning which we have asserted that it was the foundation of every scholasticism. It is therefore a question of witnessing the genesis of individuated beings based on pre-individual reality that contains potentials that are resolved and determined within systems of individuation.

To try to lead to this institution of a pre-critical ontology that is an ontogenesis, we have wanted to create the notion of phases of being. This notion to us has seemed to be established on the basis of the notion of information, which is destined to replace the notion of form such as it is implicated in the insufficient hylomorphic schema; information is not a system of form and matter, but a system of form and form, which supposes an equality and homogeneity of both terms, along with a certain discrepancy that founds signification and collective reality (such as visual disparation). The collective is the signification obtained by the superposition of beings that are disparate by themselves in a single system: it is an encounter of dynamic forms established into a system, i.e. a realized, consummated signification that requires passage to a superior level, i.e. the advent of the collective as a unified system of reciprocal beings; the collective personality of the individual is what can become significant relative to other collective personalities evoked at the same moment by a play of reciprocal causality. Reciprocity, internal resonance, is

the condition for the advent of the collective. The collective is what results from a secondary individuation relative to vital individuation, since it takes back up what the first individuation had left unused of bare nature in the living being. This second individuation does not fully overlap the first; despite the collective, the individual dies as an individual, and participation in the collective cannot save it from this death, which is a consequence of the first individuation. The second individuation, that of the collective and the spiritual, gives birth to transindividual significations that do not die with the individuals by which they are constituted; what there is of pre-individual nature in the subject being can survive the individual that has been a living being as signification; *non omnis moriar* (“not everything dies”) is true in a certain sense, but it would be necessary to be able to alter this judgment with an index that deprives it of personality in the first person; for this is no longer the individual, and it is barely the subject that lives beyond itself; the charge of nature associated with the subject, which has become a signification integrated into the collective, is what survives the *here and now* of the individual contained in the subject being. The only chance for the individual (or rather, for the subject) to live beyond itself in some fashion is to become signification, to make it such that something of itself becomes signification. This is still a fairly unsatisfying perspective for the subject, since the task of the discovery of significations and of the collective is submitted to chance. Nevertheless, the subject being can hardly live beyond itself in the generalized collective except as information; participating in collective individuation, the subject infuses something of itself (which is not individuality) into a reality that is more stable than it. There is contact with the being via associated nature. This contact is information.

#### *4. The Central Operational Zone of the Transindividual: Theory of Emotion*

The gist of this study is the following: the hylomorphic schema must be abandoned to think individuation; veritable individuation does not amount to a form-taking. The operation of individuation is a much more general and much vaster phenomenon than simple form-taking. Form-taking can be thought based on individuation, but individuation cannot be thought based on the paradigm of form-taking. The hylomorphic schema includes and accepts a dark zone, which is precisely the central operational zone. It is the example and the model of all logical processes through which a fundamental role is attributed to borderline cases, to the extreme terms of a reality organized into series, as if the series could be generated based on its boundaries.

According to the method proposed to replace the hylomorphic schema, the being must be grasped in its entirety, and the milieu of an ordered real is as substantial as its extreme terms. The dark zone conveyed by the hylomorphic schema projects its shadow over every reality known by way of this schema. The hylomorphic schema improperly replaces the knowledge of the genesis of a real; it prevents the knowledge of *ontogenesis*.

In psychology, the median zone of the being is thrust back into the irrational and the unknowable that cannot be experienced or known: the psychosomatic relation poses unsolvable problems. However, perhaps it should be asked whether the notion of psycho-physiological relation is illusory and merely expresses the fact that one has wanted to consider the being as the result of a form-taking and to grasp it by way of the hylomorphic schema after it has been constituted. The impossibility of reaching a clear relation of the soul and the body merely expresses the being's resistance to the imposition of the hylomorphic schema; the substantialized terms of soul and body can be nothing but artifacts that stem from this effort to know the being by way of this schema, which first requires a preliminary reduction of the entire spectrum of reality that constitutes the being in its extreme terms considered as matter and form. The study of groups also reveals the same existence of a dark zone; the body of groups is known by way of social morphology; group representations are the object of inter-psychology and microsociology. But between these two extremes extends the dark relational zone, that of the real collective, the ontogenesis of which seems to be thrust back into the unknowable. According to the attitude of sociological objectivity, to grasp the reality of groups as a fact is to come after the individuation that founds the collective. To start with inter-psychological postulates is to place oneself before the group individuation and to want to extract this group of psychical dynamisms that are internal to individuals or to the individual's tendencies or social needs. However, the veritable collective that is contemporaneous with the operation of individuation cannot be known as a relation between the extreme terms of the pure social and the pure psychical. The collective is the very being that spans the spectrum from social exteriority to psychical interiority. The social and the psychical are nothing but borderline cases; they are not the foundations of reality, the true terms of relation. There is nothing but extreme terms for the gaze of knowledge, insofar as knowledge must be applied to a hylomorphic schema, a pair of clear notions that cling to an obscure relation.

The representation of individuation that grasps the being in its center of activity stands against the hylomorphic schema. But, in order for the notion

of individuation to be fully dissociated from the hylomorphic schema, a procedure of thought must be elaborated that does not invoke a classification and that foregoes definitions of essence via the inclusion or exclusion of characteristics. This is because classification, which permits a knowledge of beings via common genus and specific differences, supposes the usage of the hylomorphic schema; form gives to the genus its signification relative to the species, which are its matter. The thought that can be called *transductive* does not consider that the unity of a being is conferred by the form informing a matter, but by a definite regime of the operation of individuation that founds the being absolutely. The being's cohesion forms the being's unity, not the rapport of a form to a matter; the being's unity is a regime of activity that traverses the being, going from part to part, converting structure into function and function into structure. The being is relation, for relation is the internal resonance of the being relative to itself, the manner in which it is conditioned reciprocally within itself, splitting and reconverting into unity. The being's unity can only be understood based on individuation, absolute ontogenesis. The being is one, because it is a symbol of itself, harmonizing with and reverberating within itself. Relation can never be conceived as a relation between preexisting terms, since it is a reciprocal regime of information exchange and of causality in a system that individuates. Relation exists physically, biologically, psychologically, collectively as the internal resonance of the individuated being; relation expresses individuation and is at the being's center.

For being-to-being relation to be possible, there must be an individuation that envelops the beings between which there is relation: this supposes that there is within individuated beings a certain charge of the undetermined, i.e. of pre-individual reality that has passed through the operation of individuation without being effectively individuated. This charge of the undetermined can be called nature; it must not be conceived as pure virtuality (which would be an abstract notion arising to a certain extent from the hylomorphic schema), but as a veritable reality charged with potentials actually existing as potentials, i.e. as an energy of a metastable system. The notion of virtuality must be replaced with that of a system's *metastability*. The collective can emerge starting from the charge of pre-individual reality contained within individuated beings and not based on an encounter of previously existing form and matter. The individuation of the collective is the relation between individuated beings; the relation starting from individuated beings and depending on their very individuality taken as a term is not what founds the relation and constitutes the collective; without individuation there can be no being, and without the being there can be no relation. The bonds that can exist between

already individuated beings and that would be established between their individualities, grasped on the basis of an individuation of the collective, would merely be an interindividual relation, like the inter-psychological relation. The collective has its own ontogenesis, its own operation of individuation that utilizes the potentials carried by the pre-individual reality contained in already individuated beings. The collective manifests through the internal resonance within the collective; it is real as a stable relational operation; it exists *physikos* and not *logikos*. The birth of an intersubjective relation is conditioned by the existence of this charge of nature within subjects, the persistence of a pre-individuality within individuated beings.

Manifestations like emotion in the individual being seem impossible to explain in accordance with only the content and structure of the individuated being. It is certainly possible to invoke a certain phylogenetic conditioning that influences ontogenesis and to reveal in emotion the characteristics of adaptation to critical situations. In fact, these aspects of adaptation raised by Darwin indeed exist, but they do not exhaust the whole reality of emotion. Through emotion, the being disadapts as much as it adapts, if adaptation is reduced to behaviors that guarantee the security of the individual qua individual. If, in fact, emotion poses problems to psychology that are so difficult to resolve, this is because it cannot be explained in accordance with the being considered as totally individuated. Emotion reveals the persistence of the pre-individual within the individuated being; it is this real potential that, within the natural undetermined, evokes within the subject the relation inside the collective that establishes itself; there is the collective to the extent that an emotion structures itself; in the situation of solitude, emotion is like an incomplete being that will only be able to systematize itself according to a collective that will individuate; emotion is something pre-individual revealed within the subject and can be interpreted as interiority or exteriority; emotion refers to exteriority and to interiority, because emotion is not something individuated; it is the exchange within the subject between the charge of nature and the individuated being's stable structures; exchange between the pre-individual and the individuated, emotion prefigures the discovery of the collective. Emotion is a calling into question of the being in its individual aspect insofar it is the capacity to evoke an individuation of the collective that will overlap and link the individuated being.

Emotion is incomprehensible according to the individual because it cannot find its root in the structures or functions of the individual qua individual: its adaptation to certain acts or to certain behaviors is merely lateral; it seems that emotion creates a disadaptation so as to be able to remedy this

disadaptation by way of a certain number of ancillary manifestations. Indeed, the adaptation-disadaptation criterion does not suffice to account for emotions, since it grasps emotion after the fact in its consequences or marginally in the reactions of the individual's adaptation to emotion; the individual communicates with emotion and adapts relative to it, not so as to struggle against emotion, as is generally said, but in order to exist with emotion; there is a correlation of the individual and the charge of pre-individual nature in emotion; but we can only grasp behaviors that do not have their own explanation within themselves if we take on a study of emotion that wants to restrict it to the structures of the individuated being; it will therefore have to rely on a complex set of reductive suppositions (like that of bad faith for Sartre) in order to reduce emotion to a phenomenon of the individual. Emotion also cannot be interpreted correctly by attempting to consider it as social, if the social is conceived as substantial and anterior to the birth of emotion and capable of provoking emotion within the individual by way of an invasive action that comes from outside. Emotion is not the action of the social on what is individual; it is also not the momentum of the constituted individual that would constitute the relation starting from a single term; emotion is the potential that is discovered as signification by structuring itself within the individuation of the collective; it is incomplete and unachieved as long as it is not fulfilled within the individuation of the collective; it does not exist veritably as emotion outside the collective, but is like a conflict between the pre-individual reality and the individuated reality within the subject, which is the latency of emotion and is sometimes confused with emotion itself; this emotion is not a disorganization of the subject, so to speak, but the initiation of a new structuration that will be able to stabilize only within the discovery of the collective. The essential instant of emotion is the individuation of the collective; after this instant or before this instant, the complete and veritable emotion cannot be discovered. Emotive latency, the inadequacy of the subject to itself, the incompatibility of its charge of nature and of its individuated reality, indicates to the subject that it is more than the individuated being and that it contains the energy for a further individuation; but this further individuation cannot take place within the being of the subject; it can only take place through this being of the subject and through other beings as the transindividual collective. Emotion is therefore not implicit sociality or disturbed individuality; it is that which within the individuated being contains the possible participation in further individuations that incorporate the pre-individual reality remaining in the subject.

It is not surprising that emotion is situated within the dark zone of the psychosomatic relation; it cannot be thought whatsoever via the hylomorphic schema. Arising from the pre-individual, emotion seems to be able to be grasped (before individuation) as an invasive disturbance in the individual and (after individuation) as a functionally defined signification on the level of the collective; but neither that which is purely individual nor that which is purely social can explain emotion, which is the individuation of pre-individual realities on the level of the collective established by this individuation. Emotion cannot be grasped by the extreme terms of its development, which it joins together through its own cohesion, i.e. the purely individual and the purely social, insofar as these terms are the extreme terms of emotive individuation only because emotion localizes them and defines them as the extreme terms of a relational activity that it establishes. The purely social and the purely individual exist with respect to transindividual reality as the extreme terms of the entire scope of the transindividual; the individual and the social do not exist as antithetical terms with respect to one another. The transindividual has only been forgotten in philosophical reflection because it corresponds to the dark zone of the hylomorphic schema.



# Conclusion

To conceive individuation as *operation* and as an operation of communication—thus as first operation—is to accept a certain number of ontological postulates; it is also to discover the foundation of a normativity, insofar as the individual is not the only reality, being's unique model, but merely a phase. However, it is more than a part of a whole, because it is the seed of a totality.

The entrance into the collective must be conceived as a supplementary individuation that calls for a charge of the pre-individual nature borne by living beings. Indeed, nothing makes it possible to assert that the whole reality of living beings is incorporated into their constituted individuality; the being can be considered as an ensemble formed by individuated reality and pre-individual reality:<sup>1</sup> pre-individual reality can be considered as the reality that founds transindividuality. Such a reality is not at all a form within which the individual would be like a matter, but a reality that extends the individual on both sides, like a world into which the individual is initially inserted by being on the same level as all the other beings that make up this world. The entrance into the collective is an amplification of the individual in the form of the collective of the being that would include a pre-individual reality as well as an individual reality. This supposes that the individuation of beings does not completely exhaust the potentials of organization and that there is only a single possible state of the completion of beings. Such a conception therefore depends on a postulate of discontinuity; individuation does not effectuate itself according to the continuous, which would result in making it such that an individuation could only be total or null, since this mode of the appearance of the being qua unity cannot operate via fractions of unity (whereas a plurality joins together with another plurality). The discontinuous is normally conceived as a spatial or energetic discontinuous that only

appears in exchanges or in movements for the elementary particles of physics and chemistry. Here, the idea of the discontinuous becomes that of a discontinuity of phases linked to the hypothesis of the compatibility of the being's successive phases: a being, considered as individuated, can in fact exist according to several phases present altogether, and in itself it can change phases of being; there is a plurality in the being that is not the plurality of parts (the plurality of parts would be below the level of the being's unity), but this plurality is a plurality that is even above this unity, since it is that of the being as phase, in the relation of one phase of being to another phase of being. The being qua being is fully given in each of its phases, yet with a certain reserve of becoming; it could be said that the being has several forms and consequently several entelechies, not just one, as the doctrine extracted from a biological abstraction supposes.<sup>2</sup> The relation of the being to its own parts or the consideration of the being's becoming insofar as this becoming alters it cannot provide the key to the rapport between the being's unity and plurality, no more than it can provide the key to the rapport between the individuated being and other beings. Being (whether individuated or not) has a spatio-temporal dimensionality, for, in one instant and in one place, it harbors several phases of being; the being is not merely what it is insofar as it manifests, since this manifestation is just the entelechy of a single phase; while this phase actualizes, other latent and real phases exist (and these can even be actual as energetically present potential), and the being consists in them as well as in its phase through which it attains entelechy. The error of the hylomorphic schema mainly consists in that it merely authorizes a single entelechy for the individuated being, whereas the being must be conceived as having several phases; the being can have several successive phases that are not entelechies of the same phases and are consequently not iterations. The relation of the individuated being to other beings is inconceivable in a doctrine that substantializes the individuated being, because it considers individuation as an absolute appearance of the being, a creation, or as a continued formation based on elements that do not contain something that foresees the individuated being and that prepares it energetically. Ontological monism must be replaced with a pluralism of phases, since the being incorporates, instead of a single form given in advance, successive informations that are a certain number of reciprocal structures and functions. *The notion of form must be dissociated from the hylomorphic schema in order to be able to be applied to the polyphasic being.* Consequently, this being cannot be considered from within the general schema of common genera and specific differences, which supposes the validity of the hylomorphic schema. Dissociated from the hylomorphic

schema, the notion of form can become adequate to the polyphasic nature of being by structuring itself in a relational way, following the direction of the Gestalt theorists: this relational signification of form is attained more fully from within the notion of information, provided that information be understood as the relational signification of a disparation, i.e. as well as a problem that cannot be resolved through amplification. Such a doctrine supposes that there is communication only within an individuated reality and that information is one of the aspects of the reciprocity of the individuated being relative to itself. The relation of the being with respect to itself is infinitely richer than identity; identity, an impoverished relation, is the only relation of the being to itself that can be conceived according to a doctrine that considers the being as having a single phase; in the theory of polyphasic being, identity is replaced with internal resonance, which, in certain cases, becomes signification and permits an amplifying activity. Such a doctrine supposes that the order of realities is grasped as *transductive* and not as *classificatory*. The grand divisions of the real (marked by genera in hylomorphic theory) become phases, which are never totally simultaneous in actualization but nevertheless exist either as functional and *structural actuality* or as *potentials*; the potential becomes a phase of the actually existing real, instead of being pure virtuality. By contrast, what was considered as the pure indetermination of matter in the hylomorphic theory of the individuated being becomes an ordered transductive series or the incompatibility of several transductive series. Transductive order is an order according to which a *qualitative or intensive staggered spectrum* spreads out on both sides based on a center in which the qualitative or intensive being culminates: such is the series of colors, which one should not attempt to discern from its extreme, imprecise, and outstretched limits of infrared and ultraviolet, but which one should grasp *in its center*, in the yellow-green *in which organic sensibility culminates*; for the human species, yellow-green is the center starting from which chromatic quality splits toward red and toward violet; there are two tendencies in the series of colors, tendencies starting from the *center* toward the *extremes*, tendencies *already contained in the center qua center of the series*. The series of colors must first be grasped in its *real middle [milieu]*, which is variable for each species;<sup>3</sup> this also applies for tonal qualities and thermal qualities; for the individuated being, there is neither matter, which is pure indetermination, nor an infinite diversity of the sensible, but the fundamental bipolarity of transductive series ordered according to an axis. Instead of a relation between two terms, the transductive series constitutes as a single central term that splits into two opposite directions starting from itself, distancing

from itself into complementary qualities. Such a representation of the being requires a conceptual reform that can only be obtained based on a revision of the basic schemata; the usage of a certain number of paradigms is necessary for replacing the hylomorphic schema, which is directly imposed by culture. However, the choice of the domain that can provide the first notional paradigms cannot be arbitrary: in order for a schema to be able to be utilized effectively as a paradigm, there must be an operative and functional analogy between the original domain and the domain of application for the paradigm to be possible. The hylomorphic schema is a paradigm extracted from the technical operation of form-taking and then utilized to think the living individual grasped through its ontogenesis. On the contrary, we have attempted to extract a paradigm from the physical sciences by thinking that it can be transposed into the domain of the living individual: the study of this physical domain is meant not only to form notions, but also to serve basically as the study of a first domain within which an operation of individuation can exist; since we suppose that there are various degrees of individuation, we have utilized the physical paradigm without reducing the vital to the physical, since the transposition of the schema is accompanied by a composition of the physical itself. We do not mean to say that physical individuation is what produces vital individuation: we simply mean to say that reality has not clarified and developed all the possible steps of the operation in the physical system of individuation, and that a vital individuation still remains available within the physically individuated real;<sup>4</sup> the individuated physical being can be invested in a further vital individuation without its physical individuation dissolving; perhaps physical individuation is the condition of vital individuation without ever being its cause, since the vital intervenes as an amplifying deceleration of physical individuation; physical individuation is the *resolution of a first problem* underway, and vital individuation is inserted into it after the emergence of a new problematic; there is a pre-physical problematic and a pre-vital problematic; *physical* individuation and *vital* individuation are modes of resolution; they are not absolute points of departure. According to this doctrine, individuation is *the arrival of a moment of the being* that is not first. Not only is it not first, but it brings with it a certain *persistence of the pre-individual phase*; only the pre-individual phase can really be called monophasic; on the level of the individuated being, the being is necessarily already *polyphasic*, for the pre-individual past survives parallel to the existence of the individuated being and remains a seed for new amplifying operations; individuation intervenes in the being as the *correlative birth of the distinct phases* based on that which did not include them, insofar as what did

not include them is pure omnipresent potential. The individual, which is the *result* but also the *milieu* of *individuation*, must not be considered as singular: it is singular only with respect to other individuals, according to a very superficial *here and now*. In fact, the individual is multiple insofar as it is polyphasic, multiple not as if it harbored within it a plurality of more localized and more momentary secondary individuals, but because it is a provisional solution, a phase of becoming that will lead to new operations. The unity of the individual is the *central and middle phase of being*, starting from which other phases arise and diverge into a unidimensional *bipolarity*. The being after individuation is not merely an individuated being; it is the being that entails individuation, the result of individuation, and the movement toward other operations based on a persistence of the initial pre-individual state. After individuation, the being *has a past*, and the pre-individual becomes a phase; the pre-individual is before every phase; it becomes the first phase only based on the individuation that splits the being and phase-shifts it with respect to itself. Individuation is what creates phases, for phases are nothing but this development of the being on both sides of itself, this double decentering based on an initial consistency swarming with *tensions* and *potentials* that made it incompatible with itself. The pre-individual is *being without phases*, while *the being after individuation is phasic being*. Such a conception identifies or at the very least links *individuation and the being's becoming*; the individual is not considered identical to the being; the being is richer, more durable, and larger than the individual: the individual is *individual of the being, individual taken from the being, not the primordial and elementary constituent of the being*; it is a manner of the being, or rather a moment of the being.

To propose a conception of individuation as the genesis of an individuated being that *is not the first element of the being* is to be forced to indicate the meaning of the consequences that such a conception must have for the entirety of philosophical thought. Indeed, it seems that a certain conception of individuation is already contained within the notion of term at least implicitly. When reflection, intervening before any ontology, wants to define the conditions of valid judgment, it resorts to a certain conception of judgment and, correlatively, a certain conception of the content of knowledge, of the object and the subject as terms. However, prior to any exercise of critical thought concerning the conditions of judgment and the conditions of knowledge, it would be necessary to respond to this question: what is relation? What is implied in such a theory of knowledge is a certain conception of relation, and in particular a certain conception of the individuality of terms as anterior to relation. Nevertheless, nothing proves that knowledge is a relation,

particularly a relation within which the terms preexist as individuated realities. If knowledge were conditioned by the community of an individuation that envelops the subject and the object within a structural and functional unity, what is said of the conditions of judgment would not be seen to concern the reality of knowledge but a *translation after the fact* of knowledge as a relational schema between separately individuated terms. A theory of individuation must develop into a theory of sensation, perception, affection, and emotion. It must make *psychology* and *logic* coincide, the mutual separation of which indicates a double inadequacy to the studied object rather than a separation of points of view. *The theory of individuation must be first with respect to the other critical and ontological, deductive studies.* It's precisely this theory of individuation that indicates the legitimacy for carving up being in order to make it enter into the propositional relation. Prior to any particular category, there is the category of *being*, which is a response to the problem of individuation: to know *how being can be thought*, one must know how it individuates, for this individuation is the support of the validity of any logical operation that must conform to it. Thought is a certain *mode of secondary individuation* that intervenes after *the fundamental individuation that constitutes the subject*; thought is *not necessarily capable of thinking being in its totality*; it is second relative to the subject's condition of existence; but this condition of the existence of the subject is not isolated and unique, for the subject is not an isolated term with the capacity to constitute itself; the substantialization of the subject as a term is a facility that thought grants itself to be able to witness the genesis and justification of itself; thought seeks to be identified with the subject, i.e. to be identified with its condition of existence so as not to lag behind itself. However, if the individual is itself relative as a phase of being, and if it is richer than unity as the depository of a pre-individual situation that it transmits in an amplifying activity, it cannot be grasped as the pure term of relation. The subject is *substantialized by thought* so that thought *can coincide with the subject*. Yet the subject's substantialization, which supposes that the subject can be taken as a term of relation, gives it the status of an absolute term; substance is like the *relational term become absolute*, having absorbed into it everything that was the being of relation. A similar *logical reduction* is tangible in all the cases within which the individual has been thought; for the individual is always to a certain extent *thought as being a subject*; man is put in the place of what he thinks as an individual; the individual is what could have an interiority, a behavior, volitions, a responsibility, or at least a certain coherent identity that is on the same order as responsibility. There is an implicit subjectivity to every conception of the

individual in contemporary doctrines, whether physical or biological; nevertheless, in addition and prior to this projection of the status of subjective individuality into the world, a reduction takes place within the subject that reduces it to being a substance, i.e. a term that has absorbed relation into it; substance is an extreme case of relation, that of the inconsistency of relation. Under these conditions, it seems difficult to consider the notion of the individual as first with respect to every judgment and every critique; the individual being, which is the principle of the notion of substance, must be considered via individuation, the operation that founds it and brings it about; the study of ontogenesis must be anterior to logic and ontology. The theory of individuation must therefore be considered as a theory of the *phases of being*, a theory of the being's becoming insofar as the latter *is essential*. According to the notion of substance, becoming indeed poorly fits together with being's essence; the notion of accident is not very satisfying and makes necessary delicate systematic edifices, like those of Leibniz, who could hardly account for becoming qua becoming, because, insofar as all the accidents are included in essence conceived as the complete individual notion, there is no longer a veritable becoming for monadic substance, including the power of the future; the Spinozist edifice is not much more satisfying relative to becoming, which is excluded more so than integrated, since the individual is denied as a separate being. In a theory of the phases of being, becoming is something other than an alteration or a succession of states comparable to a serial development. Indeed, becoming is a perpetuated and renewed resolution, an amplifying, incorporating resolution that proceeds via crises, such that *its sense is in each of its phases*, not at its *origin* or its *end* alone. To explain becoming as a series instead of positing it as transduction is to want to make it emerge from its extreme terms, which are the most impoverished and least stable; an individual life is neither the determined unfolding of what it has been at its origin, nor the preparation of a voyage toward a final end; it is also not a tension between a birth and a death, between an *Alpha* and an *Omega* that would be the true terms; the being must also be grasped temporally in its center, in its present at the moment in which it is, and not reconstituted based on the abstraction of its two parts; the substantialization of the extremities of the temporal series disrupts the being's central consistency; becoming is being as *present* insofar as it actually phase-shifts into past and future, thus finding its sense in this bipolar phase-shifting. It is not the passage from one moment to the other as one would pass from yellow to green; becoming is transduction based on the present: there is only one source of time, the central source that the present is, just as there is a single source of *chromatic*

*qualities in their bipolarity*, a single source for all intensive and qualitative series. The being's present is *its problematic in the process of resolution*, since as such it is *bipolar according to time, i.e. phasic insofar as it is problematic*. The individuated being is not substance but *the being called into question*, the being across a problematic, divided, reunited, carried within this problematic that posits itself through the being and makes the being become at the same time as it makes becoming. *Becoming is not the becoming of the individuated being but the becoming of the being's individuation*: what happens comes about as a calling into question of the being, i.e. as an *element of an open problematic*, which is what the being's individuation resolves: the individual is *contemporaneous with its becoming*, since this becoming is that of its *individuation*; time itself is essence, not as an unfolding of an origin or a tendency toward an end, but as *the being's resolute constitution*. Such a conception is possible only if we accept the notion of phases of being. This notion is different from the notions contained and utilized by dialectics: dialectics indeed implies the existence of a significative becoming that has a capacity to constitute *essence*; but dialectical becoming changes the being, opposes it, renews it: on the contrary, phases are phases of the being; the being is not what passes through phases by modifying; it is *the being that becomes the being of the phases*, that proceeds from itself by phase-shifting with respect to its center of reality. The dimensionality of phases is the being's becoming; the being is according to the phases that are its phases, phases relative to the center that it is; the being is not displaced from the center by phase-shifting in two directions with respect to itself; the time of becoming is the direction of the bipolarity according to which the being phase-shifts; the being *individuates* as it *becomes*; to individuate and to become is a single mode of existing. The phases of being are given together, they are part of one manner of being; becoming is a manner of being, it is the being's becoming, not a becoming to which the being is submitted by some violence done to its essence and with which the being could dispense all while remaining what it is. In the conception of dialectics, being requires becoming, but becoming is nevertheless conceived partially as it was when becoming was considered independent of being, foreign to being, *hostile to its essence*; the becoming of dialectics is *not sufficiently integrated into the being that becomes*; the time of the dialectic has remained the time of being, which is timeless *in essence* but thrown into becoming due to *its existence*.<sup>5</sup> The successiveness of dialectical stages can be contracted into the parallelism of the phases of being if becoming is veritably the being's becoming, in such a way that one cannot say that being is in becoming, but that being becomes; becoming is ontogenesis,

*physis*. Dialectics overly separates becoming from the existence through which being becomes. It is not becoming that modifies being, it is being that becomes; the modifications of being are not the consequences of becoming but aspects of the phases of being. The existence of phases of being should not be conceived as a simple power of succession: there is succession only on a background of the parallelism of phases, as a dimension of phases; permanence and succession are concepts that cannot account for becoming because they suppose being to be reduced to a single phase, i.e. exempt from phases.

There is a danger in the use of the physical paradigm to characterize life: that of reduction. But this danger can be avoided; indeed, this paradigm can be used by taking the physical domain as a support of structures and functions that depend on non-living characteristics that expand them in their initial phase and amplify them but are not reduced to them. There is a domain of knowledge of the physical and a domain of knowledge of the living; but there is not in the same sense a real domain of the physical and a real domain of the living separated by a certain equally real boundary; the physical and the vital are distinct according to structures and functions without being separate according to the substantial real. There is a certain mode of existence of the physical that should not be confused with the physical after the emergence of the vital; after the emergence of the vital, the physical is an impoverished, uncharged real, a residue of the complete process from which life has emerged by separating. But there is also a physical that can be called the natural and that is both pre-vital and pre-physical; life and non-living matter in a certain sense can be treated as two speeds of the evolution of the real. Perhaps, even here, we shouldn't attempt to recompose totality based on the extreme terms by considering these extreme terms as the substantial bases capable of explaining in their combination the entire relational reality that they omit between them. This intermediate reality, which can be considered after the fact as a mixture engendered by relation, is perhaps that which carries the extreme terms, engenders them, and pushes them outside itself as the extreme boundaries of its existence. The relational appearance perhaps supposes a pre-relational being. The opposition of the inert and the living would be the product of the application of the dualizing schema of hylomorphic origin, with its characteristic zone of central obscurity, which leads one to believe in the existence of a relation where there is in fact the being's consistent center.<sup>6</sup> Seen through the hylomorphic schema, life and inert matter are perhaps the result of two speeds of the individuation of the same pre-vital and pre-physical reality. The study of the individuation through which this differentiation occurs therefore cannot be merely a paradigmaticism;

logically, it is a source of paradigms; but it can be a source of paradigms only if it is fundamentally (at least in a hypothetical sense) a grasping of real becoming, based upon which the domains of application of the schemata that it unleashes constitute themselves; here, the paradigm is not an analogical paradigm, like Plato's, but a conceptual and intuitive line that accompanies an absolute genesis of domains with their structure and the operations that characterize them; it is a discovery of the intellectual axiomatic contemporaneous with the study of being, not an initiation to the domain of the knowable difficultly based on a better known domain that is easier to explore (which would suppose an analogical relation between the two domains).

In this sense, it must not be said that the living being appears *after* physical reality and above it by integrating it; on the contrary, the appearance of the living being would have the effect of deferring and delaying physical reality by expanding the initial phase of its constitution; it would necessitate more precise and more complex conditions of initial tension and metastability capable of "neotenzing" physical individuation. Even before the genesis of the individual being in itself, a study of becoming and of the exchanges it involves would allow for the grasping of this possible genesis of the individual being (whether physical or living, vegetal or animal) on a ground of the being's transformations. Since it is a question of the being before any individuation or of the being split after individuation, the method would always consist in attempting to apprehend the being in its center to understand on the basis of this center the extreme aspects and the dimension according to which these opposed aspects constitute themselves: the being would thus be grasped as a tensed unity or as a structured and functional system, but never as an ensemble of terms in relation; becoming and the appearances of relations it involves would consequently be known as dimensions of being and not as a framework within which something happens to being according to a certain order. Becoming is being phase-shifting with respect to itself, passing from the phaseless state of being to the state of being according to the phases that are *its* phases.

Such a conception of the being supposes that the principle of the excluded middle is not used, or that at the very least it is relativized; indeed, the being would first present itself as that which exists in the state of tensed unity, bearing an incompatibility that pushes it toward a structuration and a functionalization that constitutes becoming, with becoming having the capacity to be conceived as the dimension according to which this resolution of the being's first state is possible through a phase-shift. The prime mover thus would not be the simple and singular being, but the being insofar as it is anterior to any

appearance of phases, harboring them *energetically*, yet not as *forms* or *structures* that can come forth, in the same way as the position of the problem in a certain sense bears the possible solution as a tension toward a signification that incorporates the data of the problem, albeit without the prior formation of the effective lines of the solution, which would only appear through the real becoming of resolute invention and which *are this becoming*; thus, the capacity of resolute becoming is contained in the being before any becoming through the incompatibility that it will be able to make compatible, but not the line of this becoming's existence, which is not already given and cannot be preformed, since the problematic is without phases.<sup>7</sup> The resolute discovery in its becoming makes structures and functions appear on the one hand, and matter deprived of its tensions on the other, i.e. individual and milieu, information and matter. The resolution makes two complementary aspects appear: the extreme terms on the one hand and the reality that establishes mediation on the other; individual and milieu are two phases of being, the extreme terms of a splitting that intervenes as a resolute invention, which presupposes a preliminary tension and incompatibility that they transform into an asymmetrical structuration; it can be said that the being phase-shifts into individual and milieu, allowing for a great many modalities depending on whether this phase-shift is total or partial, whether it is capable or incapable of degrees, and whether it admits a continuous progress or proceeds by leaps.

Such a theory doesn't merely seek to explain the genesis of individuated beings and to propose a vision of individuation; it attempts to make of individuation the foundation of an amplifying becoming and therefore places individuation *between* an initial state of the unresolved being and the entrance into the resolute path of becoming; individuation is not the result of becoming or something produced in becoming, but becoming in itself insofar as becoming is the being's becoming. Individuation cannot be suitably known if it is related to its result, i.e. the constituted individual, and if one attempts to give individuation a definition merely seeking to account for the characteristics of the individual in itself; the individual does not make it possible to ascend back to individuation, since the individual is merely one of the aspects of individuation; there is a correlate of the individual that is constituted at the same time as it by individuation: the milieu, which is the being deprived of what the individual has become.<sup>8</sup> Only the milieu-individual couple could allow for the ascent back toward individuation; individuation is what produces the phase-shift of the being into individual and milieu based on a previous being that is capable of becoming individual and milieu. Individual and milieu should be taken only as the extreme, conceptualizable,

but not substantializable, terms of the being within which individuation takes place. The center of individuation is not the constituted individual; the individual is lateral relative to individuation. The being taken in its center on the level of individuation must be grasped as splitting into individual and milieu, i.e. undergoing resolution. Eventually, the individuated being can once again be the theater of an individuation, since individuation does not exhaust from the start the potential resources of the being in an initial operation of individuation: the first pre-individual state of the being can continue to exist in association with the result of an initial individuation; in fact, it can be supposed that individuation takes place in a quantum manner through abrupt leaps, each plateau of individuation being capable of once again relating itself to the following as a pre-individual state of being; a rapport of the successive states of individuation occurs in this way. In particular, this is how the relation between individuated beings can be explained: this relation is only seemingly between beings; it is the collective individuation of a charge of pre-individual reality contained in beings that have received an initial status of individuation. What is defined as an interindividual rapport is in reality the coherence of a systematics of individuation that incorporates the already constituted individuals into a vaster unity. Relation is founded by individuation due to a rapport between successive states of individuation that remain linked by the being's energetic and systematic unity.

A substantialistic monism, like that of Spinoza, comes against a great difficulty when it is a question of accounting for the individual being. This difficulty does not arise so much from the unity of substance as from its eternity; this difficulty, moreover, is shared by all substantialistic doctrines, even when they fragment substance to the point of identifying substance and individual, thereby composing everything with individuals, as Leibniz does in his acceptance of an infinity of substances. This difficulty is simply more apparent in Spinoza, since Spinoza to the end accepts the consequences of substantialism and refuses to place a genesis of substance as the constitution of complete individual notions (substantial essences) in the beginning of becoming. The substantial being can become with difficulty, because the substantial being is resolved in advance; it is always absolutely monophasic being, since it consists in itself; the fact of being in itself and by itself is also the fact of being coherent with itself, i.e. incapable of being opposed to itself. Substance is *one* because it is *stable*; it is actual, it is not charged with potentials. Despite Spinoza's terminology, what substance lacks is being nature, or it also lacks the capacity to not be simultaneously and indissolubly natured and naturing. According to the doctrine we are presenting, being is never one: when it is

monophasic, pre-individual, it is *more than one*: it is one because it is non-decomposed, but it has enough in it to be more than what it is in its actual structure; the principle of the excluded middle would only apply for a residual being incapable of becoming; the being is not several in the sense of realized plurality: it is *richer than its self-coherence*.<sup>9</sup> The one being is a being that is limited to itself, a coherent being. However, we would like to say that the original state of the being is a state that surpasses self-coherence, that exceeds its own limits: the original being is not stable, it is metastable; it is not one, it is capable of expansion starting from itself; the being does not subsist relative to itself; it is constrained, tensed, superposed on itself, and not one. The being is not reduced to what it is; it is accumulated in itself, potentialized. It exists as being and also as energy; the being is both structure and energy; structure itself is not merely structure, since several orders of dimension are superposed; each structure corresponds to a certain energetic state that can appear in future transformations and belongs to the being's metastability. It seems that all theories of substance, movement and rest, becoming and eternity, essence and accident, rely on a conception of exchanges and modifications that recognize only alteration and stable equilibrium, not metastability. The being (stable, possessing a structure) is conceived as simple. But stable equilibrium is perhaps nothing but a borderline case. The general case of states is perhaps that of metastable states: the equilibrium of a realized structure is only stable within certain limits and in a single order of magnitude, without any interaction with other orders of magnitude; it conceals potentials that when unleashed can produce an abrupt alteration that leads to a new, equally metastable structuration. Thus, being and becoming are no longer opposed notions if it is considered that states are metastable manners of being, plateaus of stability leaping from structure to structure: *becoming is no longer the continuity of an alteration but the linking of metastable states through the unleashing of potential energy whose play and existence are part of the regime of causality that constitute these states*; the energy contained in the metastable system is the same as that which is actualized as the *passage* from one state to another. This structure-energy ensemble is what can be called *being*. In this sense, it cannot be said that being is *one*: it is simultaneous, paired on its own in a system that surpasses unity, which is *more than one*. Unity, particularly that of the individual, can appear within being through a separative simplification that produces the individual and a correlative milieu, which is without unity but homogeneous.

Such a conception could be considered gratuitous and treated as one usually treats the creationist hypothesis: what is the point of pushing back into

an unknowable state of pre-individual being the forces that are destined to account for ontogenesis, if this state is only known through what follows it? If this were the case, it could indeed be said that the problem is merely pushed back, just as one does by supposing the prior existence of a creator being: this being is only presupposed as creative to the extent that the notion of creation serves to account for the created, such that the essence of the being invoked as creator is in fact fully known based on the result upon which one must fall back, i.e. being as created. Nevertheless, it seems that the hypothesis according to which a state of pre-individual being exists plays a different role than that of the usual creationist hypothesis. Indeed, this hypothesis concentrates all becoming in its origins, such that every creationism brings with it the problem of theodicy, the ethical aspect of a more general problem: becoming is no longer a veritable becoming: it is fully whole, as though it had already happened in the act of creation, which obliges to contribute after the fact a certain number of local correctives to the creationist theory in order to give a meaning to becoming. Nevertheless, these correctives most generally concern the points that upset the feeling that man has of becoming, for example the problem of moral responsibility. But creationism should be corrected on all points, for it is no more satisfying to annihilate the reality of physical becoming than to diminish that of the becoming of the human being as an ethical subject: this difference of treatment can only be justified by a dualism that is itself contestable. There would be a need to add a veritable physical theodicy to the ethical theodicy. On the contrary, the hypothesis of a pre-individual state of being is not totally gratuitous: it contains more than it seeks to explain, and it is not solely formed based on the examination of the existence of individuals; it is derived from a certain number of schemata of thought borrowed from the domains of physics, biology, and technology. Physics does not reveal the existence of a pre-individual reality, but it shows that there are geneses of individualized realities based on standard states; a photon is a physical individual in a certain sense; however, it is also a quantity of energy that can reveal itself in a transformation. An individual like an electron is in interaction with fields. A structural change of a molecular, atomic, or nuclear edifice produces energy and engenders physical individuals. Physics urges us to think the individual as exchangeable with the structural modification of a system, and thus with a certain definite system state. In the foundation of the ontogenesis of physical beings, there is a general theory of the exchanges and modifications of states that could be called *allagmatics*. This conceptual ensemble supposes that the individual is not an absolute beginning, and that its genesis can be studied based on a

certain number of energetic and structural conditions: ontogenesis pertains to the becoming of systems; the appearance of an individual corresponds to a certain system state and presents a meaning relative to this system. Furthermore, the physical individual is relative, it is not substantial; it is relative because it is in relation, quite particularly in energetic relation with fields, and this relation is part of its being. In wave mechanics, an electron has an associated wavelength: in the Davisson-Germer experiment, electrons can be made to interfere; however, electrons are considered as bits of electricity, indivisible charges. This existence of the phenomenon of interference, and generally of all phenomena which are accounted for by defining the associated wavelength, shows that there is a sort of physical collective within which the role of the individual is no longer merely an apportioned role, for which one would want to account by means of the notion of substance; the micro-physical individual is as much an energetic reality as a substantial being; it adheres to its genesis and remains present in its becoming, since it is in perpetual relation with fields. The individual is not the entirety of the being; it is only an aspect of the being; what matters is the study of the conditions in which the being manifests as individual, as if this involved not the being but a manner of being or a moment of being. In physics, there is a pre-individual being and a post-individual being; a photon disappears and becomes the structural change of an atomic edifice, or instead it changes wavelength, as if it had become other. Individuality becomes functional in some way; it is not the sole aspect of reality but a certain function of reality.

By generalizing this relativization of the individual and by transporting it into the reflexive domain, the study of individuation can be transformed into a theory of being. Individuation is then situated with respect to being. It appears as a modification of the being based upon which the latter's problematic becomes enriched: it is the appearance of information within the being's system. Instead of treating information as an absolute parameter that is measurable and quantifiable in a limited number of circumstances, it must be linked to individuation: there is information only as an exchange between the parts of a system that involve individuation, because, in order for information to exist, it must have a sense, and it must be received, i.e. it must be able to serve to carry out a certain operation; information is defined by the way in which an individuated system affects itself by conditioning itself: it is that through which there is a certain mode of conditioning of the being by itself, a mode that can be called *internal resonance*: information is individuating and requires a certain degree of individuation in order to be able to be received; it is that through which the operation of individuation progresses,

that through which this operation conditions itself. Form-taking, through which individuation is generally represented, presupposes information and serves as a basis for information; there is information exchanged only between already individuated beings and within a systematics of the being that constitutes a new individuation: it could be said that information is always internal; information must not be confused with the signals and signal supports that constitute its mediator. Information must be understood in the veritable conditions of its genesis, which are the very conditions of individuation in which it plays a role: information is a certain aspect of individuation; in order for it to be understood as having a sense (that without which it is not information but merely a weak energy), there must be a certain potential prior to itself; the fact that an information is veritably information is identical to the fact that something individuates; and information is exchange, the modality of internal resonance according to which this individuation effectuates itself. Every information is both informing and informed; it must be grasped in this active transition of the being that is individuating.<sup>10</sup> It is that through which being phase-shifts and becomes. In its separate, recorded, indirectly transmitted aspects, information also expresses a completed individuation and the resurgence of this completion that can extend into other stages of amplification: information is never after individuation alone, for if it expresses a completed individuation, it does so with respect to another individuation that is capable of being completed: as the expression of a completed individuation, information is the seed around which a new individuation will be able to complete itself: it establishes the transductivity of successive individuations, arranging them into series, insofar as it traverses them by carrying what can be taken back up from one individuation to the next. Information is that which overflows from one individuation to the next and from the pre-individual to the individuated, since the schema according to which an individuation completes itself is capable of initiating other individuations: information has an exterior power because it is an interior solution; it is that which passes from one problem to the next, that which can radiate from one domain of individuation to another domain of individuation; information is significant information because it is initially the schema according to which a system has successfully individuated; this is why information can become the schema for another system. This supposes that there is an analogy between the first and the second system. However, in a doctrine that avoids invoking a creationist postulate, in order for there to be an analogy between two systems, these two systems must belong to a vaster system; this means that when information appears in a subset as a schema of resolution

of this subset, it is already the resolution not only of this subset but also of that which within it expresses its belonging to the set: it is from the start capable of being transferred to other subsets, it is from the start interior to the original subset and already interior to the set as expressing that which in each subset is its mark of belonging to the set, i.e. the manner in which it is modified by the other subsets that constitute the set with it. It could be said that information is both interior and exterior; it expresses the limits of a subset; it is the mediation between the set and each subset. It is *the internal resonance of the set insofar as it includes subsets*: it realizes the individuation of the set as the progress of solutions between the subsets that constitute it: it is the internal resonance of the structures of subsets within the set: this exchange is interior relative to the set and exterior relative to each of the subsets. Information expresses the immanence of the set in each of the subsets and the existence of the set as a group of subsets, really incorporating the quiddity of each subset, which is the reciprocal of the immanence of the set to each of the subsets. If there is indeed a dependence of each subset relative to the set, there is also a dependence of the set relative to the subsets.<sup>11</sup> This reciprocity between two levels designates what can be called the internal resonance of the set, and it defines the set as a reality undergoing individuation.

Can a theory of individuation provide an ethics through the intermediary of the notion of information? It can at least serve to lay down the bases of an ethics, even if it cannot complete the latter due to the incapacity to present the its circumstances. In philosophical systems, ethics is generally divided into two paths that diverge and never rejoin: that of pure ethics and that of applied ethics. This duality stems from the fact that substance is separate from becoming, and because being, which is defined as one and completely given in individuated substance, is finished: thus, on the level of the essences and outside becoming, there arises a pure ethics that can only manage to preserve the theoretical substantiality of the individuated being and that in fact surrounds the latter with an illusion of substantiality. This first path of ethics, which could be called substantializing ethics (or the ethics of the sage or contemplative ethics), is only valid for a state of exception, which would not itself be stable without its opposition to the state of passion, servitude, vice, and existence in the *here and now*; its substantiality is merely a counter-existence, an anti-becoming, and life must become around it so that it can acquire the impression of substantiality by contrast; contemplative virtue requires merchants and madmen, just as the sober man requires the drunk man in order to be aware of being sober, and the adult needs the child to know

what it is to be adult. It is only through an effect of perceptive and affective relativity that this ethics can seem like an ethics of wisdom seeking the immutability of being. The same applies for the other branch of ethics, which is allegedly practical; it is only practical relative to the first type of ethics, and it utilizes the values defined by the first in order to have the ability to be constituted itself with stability; in fact, what has a signification is the pair of the two ethics, not each ethics by itself. Nevertheless, they define norms that provide incompatible directions, i.e. they create divergence; their very pairing is insufficient, in that it merely possesses a common logical axiomatic, not mutually coherent normative directions. The ethics of becoming and of action in the present requires the ethics of wisdom turned toward eternity in order to be aware of itself as an ethics of action; it is in harmony with itself more so in what it refuses than in what it constructs, just like the ethics of wisdom; the internal coherence of each of these ethics forms by way of the negative as a refusal of the path of the other ethics.

The notion of communication as identical to the internal resonance of a system undergoing individuation can, on the contrary, endeavor to grasp being in its becoming without granting a privilege to the immobile essence of being or to becoming qua becoming; there can be a single and complete ethics only to the extent in which the becoming of being is grasped as being itself, i.e. to the extent that becoming is known as the being's becoming. The two opposed ethics, pure theoretical ethics and practical ethics, separate interiority and exteriority relative to the individuated being because, for the ethics of contemplation, individuation is considered anterior to the moment in which becoming-conscious is achieved and, for practical ethics, as always posterior to this moment; theoretical ethics is a perpetual nostalgia for the individuated being in its purity, just as practical ethics is an ever renewed preparation for an ever deferred ontogenesis; neither of the two can grasp and accompany being in its individuation. However, if individuation is considered as conditioned by the internal resonance of a system and can effectuate itself fractionally by way of successive constitutions of metastable equilibria, we can neither accept *an ethics of the being's eternity*—which seeks to consecrate a structure that is discovered once and for all as definitive and eternal (one that is consequently an eminently respectable structure, the first and last term of reference, a structure that translates itself into norms that are absolute like it)—nor accept *a perpetual evolution of the ever-moving being* that becomes and changes continually throughout all the mobile circumstances that condition action and incessantly modify the norms according to which action must develop in order to accompany this ongoing evolution.

The notion of a successive series of metastable equilibria<sup>12</sup> must be substituted for this stability of the unconditional absolute and this perpetual evolution of a fluid relativity. Norms are the lines of internal coherence of each of these equilibria, and values are the lines according to which the structures of a system translate themselves into the structures of the system that replaces the former system; values are that through which the norms of a system can become the norms of another system through a change of structures; values establish and make possible the transductivity of norms, not as a permanent norm that is nobler than the others—for it would be quite difficult to discover a norm that was already truly given—but as a meaning of the axiomatic of becoming that is conserved from one metastable state to the next. Values are the capacity of amplificative transfer contained in the system of norms, i.e. they are norms led to the state of information: they are what is conserved from one state to another; everything is relative, except the very formula of this relativity, a formula according to which a system of norms can be converted into another system of norms.<sup>13</sup> Surpassing the system in its given form, normativity itself can be considered as value, i.e. as that which passes from one state to another. Taken one by one, the norms of a system are functional and seem to exhaust their meaning in this functionality; but their system is more than functional, and this is why it is value. It could be said that value is the relativity of the system of norms and is known and defined within the system of norms itself. In order for the normativity of a system of norms to be complete, it is necessary that within this very system its own destruction as a system and its possibility of translation into another system must be predicted according to a transductive order. That the system knows its own relativity within itself, that it be formed according to this relativity, that its own metastability be incorporated into its conditions of equilibrium: such is the path according to which the two ethics will have to coincide. The tendency toward eternity then becomes the awareness of the relative, which is no longer a will to halt becoming or to make an origin absolute and to grant a normative privilege to a structure, but the knowledge of the metastability of norms, the awareness of the meaning of transfer that the individual qua individual has. The will to find absolute and immutable norms corresponds to this veridical feeling according to which there is something that must not be lost and which, surpassing adaptation to becoming, must possess the power to guide becoming. But this guiding force that is not lost cannot be a norm; such a search for an absolute norm can lead only to a morality of wisdom as separation, withdrawal, and leisure, which is a way of mimicking eternity and timelessness within the becoming of a life: during

this time, vital and social becoming continues, and the sage becomes a sage-figure, he plays the role of a sage in his century as one who watches life pass and the passions dwindle; if he is not of that century, at least his role as a man who is not of the century is indeed in becoming. Wisdom is not universalizable, because it does not assume the whole of becoming, and because it transforms becoming into a mythical representation; like wisdom, sainthood or the other styles of individual life are extreme terms that illustrate the poles of moral life, but not the elements of moral life; on the basis of wisdom, sainthood, or any moral attitude of this type, the moral life cannot be recreated by combination, since there is no preoccupation of universality in these lifestyles that are taken as absolute and are nevertheless not universalizable; they require contemporary life in front of them in order to be what they are: they require a basis of contemporary life that they can negate. A veritable ethics would be one that accounted for contemporary life without becoming numb in the contemporaneity of this life, which should define through norms a meaning that surpasses them. Furthermore, moralities quite generally attempt to fill in this interval between that through which a morality has value and the tendency to fall back (starting from principles of value) onto the norms discovered in contemporary life; but the act of linking between foundations and norms is often arbitrary and poorly formed; it is ethics in its center that is faulty; there is also a central dark zone in this domain between form and matter, between principle and consequences. Values would have to be not above norms but across them as the internal resonance of the network that they form and as their amplificative power; norms could be conceived as expressing a definite individuation and consequently as having a structural and functional meaning on the level of individuated beings. On the contrary, values can be conceived as linked to the very birth of norms,<sup>14</sup> which expresses the fact that norms emerge with an individuation and last as long as this individuation exists as an actual state. The plurality of systems of norms can consequently be envisioned otherwise than *as a contradiction*. There is no contradiction arising from the *multiplicity of norms*, except if one makes of the individual an absolute and not *the expression of an individuation* that creates a merely provisional and metastable state as a discontinuous phase of transfer.

Considered as harboring a non-individuated reality within it, the being becomes a moral subject insofar as it is the association of an individuated reality and a non-individuated reality; to want to grant primacy to being insofar as it is individuated or to being insofar as it is not individuated is to oppose norms (which are relative to the individuated being within a system)

to values (which are relative to the non-individuated reality associated with the individuated being). Morality is neither in norms nor in values but in their communication grasped *in its real center*. Norms and values are the extreme terms of the being's dynamic, terms which do not consist in themselves and are not sustained in the being by themselves. There is no problem of the relation of values to norms, of the opposition of open morality and closed morality, but a problem of the phase-shift of ethics. A retroactive illusion makes it seem like historical progress progressively opens ethics and replaces closed moralities with open moralities: each new state of a civilization contributes opening and closing based on a single center; opening and closing are the dimension of an indefinite, unidimensional, and bipolar dyad. Every act, every functional structuration, tends to spread out into norms and values according to a correlative couple. Norms and values do not exist prior to the system of being in which they appear; they are becoming, instead of appearing in becoming without being part of becoming; there is a historicity of the emergence of values, just as there is a historicity of the constitution of norms. Ethics cannot be recreated based on norms or based on values, no more than the being can be recreated based on the forms and matters to which abstractive analysis reduces the conditions of ontogenesis. Ethics is the requirement according to which there is a significative correlation of norms and values. To grasp ethics in its unity requires that one accompany ontogenesis: ethics is the meaning of individuation, the meaning of the synergy of successive individuations. It is the meaning of the transductivity of becoming, the meaning according to which in each act there is both movement to go further and the schema that will integrate into other schemata; it is the meaning according to which the interiority of an act has a meaning in exteriority. To postulate that the interior meaning is also an exterior meaning, that there are no deserted islands in becoming, no eternally self-enclosed regions, no absolute autarchy of the instant, is to affirm that each activity has a meaning of information and is symbolic relative to life as a whole and to the totality of lives. There is ethics to the extent that there is information, i.e. signification overcoming a disparation of elements of beings, thus making it such that what is interior is also exterior. The value of an act is not its universalizable nature according to the norm that it implies, but the effective reality of its integration in a network of acts that becoming is.<sup>15</sup> This in fact concerns a network and not a chain of acts; the chain of acts is an abstract simplification of the network; ethical reality is indeed structured in a network because there is a resonance of acts with respect to one another, not by way of their implicit or explicit norms, but directly in the system that they

form, i.e. the being's becoming; the reduction to norms is identical to the reduction to forms: it only involves one of the extreme terms of the real. The act is neither matter nor form, it is becoming in the process of becoming, it is being to the extent that this being is, by becoming. The relation between acts does not pass through the abstract level of norms, but it goes from one act to other acts just as one goes from yellow-green to green and yellow by increasing the bandwidth of frequencies. The moral act is one that can spread out, phase-shift into lateral acts and link up with other acts by spreading out from its single active center. Far from being the encounter of a matter and a form, of an impulse and a norm, a desire and a rule, an empirical reality and a transcendental reality, the moral act is this reality that is more than unity and that spreads out from itself on both sides by joining with other realities of the same type; to reprise Malebranche's formula concerning freedom, according to which man is said to have movement to always go further, it could be asserted that the free act, or the moral act, is one that has enough reality to go beyond itself and encounter other acts.<sup>16</sup> There is only a *center* of the act, there are no *limits* of the act. Each act is centered but infinite; the value of an act is its breadth, its capacity of transductive expansiveness. The act is not a unity in the path toward an end, which would imply a concatenation. An act that is only itself is not a moral act. The act that is a unity, that consists in itself, that does not radiate outward and that has no lateral bands, is effectively one, but it is inserted into becoming without belonging to becoming, without completing this phase-shift of being that becoming is. The act that is more than unity, that cannot reside and consist only in itself but also resides and is completed in an infinity of other acts, is an act whose relation to other acts is signification and possesses the value of information. By taking generosity as the foundation of morality, Descartes revealed this power of the act to extend beyond itself. But, since he wanted to found a provisional morality, i.e. a morality that only looks ahead, he did not indicate the retroactive force of the act, which is just as important as its proactive force. Each act takes up the past again and encounters it anew; each moral act resists becoming and does not allow itself to be covered over as past; its proactive force is that through which it will always belong to the system of the present, able to be evoked again in its reality, extended, taken up again by an act, later on according to the date, but contemporaneous with the first act according to the dynamic reality of being's becoming. Acts construct a reciprocal simultaneity, a network that does not allow itself to be reduced by the uni-dimensionality of the successive. An act is moral to the extent that it has, by virtue of its central reality, the power to eventually become

simultaneous with respect to another act. The non-moral act is lost within itself, an act that is covered over and covers over a part of the subject's becoming: it is that which achieves a loss of being according to becoming. The non-moral act introduces a rift into the being that will prevent it from becoming simultaneous with respect to itself. If it exists, the immoral act is one that destroys the significations of acts that have existed or that will be able to be called on to exist, and, instead of being localized within itself like the non-moral act, the immoral act is an act that introduces a schema of confusion preventing other acts from structuring into a network. In this sense, the immoral act is not an act properly speaking, but like the inverse of an act, a becoming that absorbs and destroys the relational significations of other acts, that drags them into false paths of transductivity, that misleads the subject with respect to himself: the immoral act is a parasitic act, a false act that draws its semblance of signification from a random encounter. Such is aestheticism as counter-morality, the unification of acts according to a certain shared style and not according to their power of transductivity.<sup>17</sup> Aestheticism is a parasite of moral becoming; it is the creation of abstract forms within the existence of the subject and the illusion of unification according to these abstract forms. Aestheticism, which wants ever new acts, deceives itself in a certain sense and becomes an iteration of novelty according to the extrinsic norm of novelty; in the same way, conformism or perpetual opposition to social norms is a resignation facing the characteristic of the actuality of acts and a flight into a style of iteration according to a positive form of coincidence or a negative form of opposition with respect to a given. Iteration expresses the tendency of an act to dominate all becoming, instead of linking up with other acts; the non-moral or immoral act is one that, because it does not involve a relative inadequacy to itself and attempts to become perfect within its own limits, can only be recommenced and not continued; this act is egoistic in itself relative to other acts; it has a tendency to persevere in its being, which makes it such that it is excised from other acts, is not penetrated by them, and cannot penetrate them but only dominate them; any moral act harbors a certain internal organization that situates it and limits it as an act: it develops according to a certain partially inhibitive regulation that inserts its existence as an act into a network of acts. The act in which there is no longer this index of the totality and possibility of other acts, the act that provides itself with an aseity despite the genetic character of its emergence as a phase of becoming, the act that does not receive this measure that is both activating and inhibitive and arises from the network of other acts, is the wild or crazed act, which in a certain sense is identical with the perfect

act. Such an act is one in which there is no longer the presence of this pre-individual reality that is associated with the individuated being; the wild act is one that tends toward a total individuation and no longer admits anything as real except what is totally individuated. Acts are networked to the extent that they are considered on a ground of nature, the source of becoming via continued individuation. This wild or crazed act remains with only an internal normativity; it consists in itself and sustains itself in the vertigo of its iterative existence. It absorbs and concentrates within itself all emotion and all action, makes the different representations of the subject converge toward it, and becomes a unique point of view: every solicitation of the subject calls for the iteration of this act; the subject is reduced to the individual as the result of a single individuation, and the individual is reduced to the singularity of a perpetually recommencing *here and now* and is displaced everywhere like a being detached from the world and from other subjects by abandoning its role of transfer.

Ethics is that through which the subject remains subject, refusing to become an absolute individual, a closed domain of reality, or a detached singularity; it is that through which the subject remains in an ever-charged internal and external problematic, i.e. in a real present, living on the central zone of being, not wanting to become either form or matter. Ethics expresses the meaning of perpetuated individuation, the stability of becoming, which is that of the being as pre-individuated, individuating, and tending toward the continuous that reconstructs in an organized form of communication a reality as vast as the pre-individual system. Across the individual—understood as the amplificative transfer emerging from Nature—societies become a World.

# Notes

## FOREWORD

1. On this subject, see J. F. Marquet, “Gilbert Simondon et la pensée de l’individuation,” in *Actes du Colloque de la Cité des Sciences*, ed. Bibliothèque du Collège international de philosophie (Paris: Albin Michel, 1994).

2. Gilbert Simondon, *On the Mode of Existence of Technical Objects*, trans. Cecile Malaspina and John Rogove (Minneapolis: Univocal Press, 2017).

3. Maurice Merleau-Ponty, *The Visible and the Invisible*, trans. Alphonso Lingis (Evanston, Ill.: Northwestern University Press, 1968), 235. [Translation slightly modified—Trans.]

4. If the original publication date of *The Visible and the Invisible* (1964) seems to indicate that Gilbert Simondon has not read the above cited note such as it was written in this work, we should take care to note that Gilbert Simondon was clearly well aware of the spirit of radical reform of philosophical principles developed by Merleau-Ponty in his courses and conversations and that he could only confirm his own personal undertaking, which arose from a related meditation on the pre-individual order of the world. This would explain the homage of the dedication.

5. This long meditation on the pre-Socratic thinkers was recorded in a text titled “Histoire de la notion d’individu” that was until now unedited and is published here in the complements section (of the French edition). This work of extreme originality, whose critical dimension and style of questioning concern our modernity, cannot be measured by an ideal of philological and historical commentary, which wasn’t the author’s purpose. Instead, it is a matter of an open dialogue that ties this philosopher to the thinkers that have modeled, since the origin of occidental thought, our categories and our attitudes of thought and that always remain in present conversation with our contemporaneity.

6. See the first paragraph of the Introduction of the present work.

7. Duns Scotus, *The Ordinatio of Blessed John Duns Scotus*, book2, 177.

8. Aristotle, *Metaphysics*, Z, 13: 1038b, 10–11.

9. Werner Heisenberg, *The Physicist's Conception of Nature*, trans. Arnold J. Pomerans (London: Hutchinson & Co., 1958). Werner Heisenberg, *Physics and Beyond*, trans. Arnold J. Pomerans (New York: Harper Collins, 1971). On this subject, also see J. Garelli, *Rythmes et mondes* (Grenoble: Jérôme Millon, 1991).

10. *Infra.*, [PAGE NEEDED #].

11. *Infra.*, [PAGE NEEDED #].

12. "The Ancients only knew stability and instability, rest and movement, but they did not know metastability. . . . It is therefore possible to define this metastable state of being, which is quite different from stable equilibrium and rest, and which the Ancients couldn't establish in the search for the principle of individuation because they lacked a clear physical paradigm that could clarify its utilization." *Infra.*, [PAGE NEEDED #].

13. *Infra.*, [PAGE NEEDED #].

14. *Infra.*, [PAGE NEEDED #].

15. *Infra.*, [PAGE NEEDED #].

16. We have shown elsewhere in numerous poetic and pictorial examples how phenomena of internal resonance are deployed in systems created by images and the play of lines, masses, and colors. See J. Garelli, *Rythmes et mondes*, section IV and J. Garelli, "L'Entrée en Démesure," in *Epokhè*, no. 5 (1995).

17. See our phenomenological description of Pieter Breughel the Elder's painting "Mad Meg" in J. Garelli, "L'Entrée en Démesure."

18. Heisenberg, *The Physicist's Conception of Nature*.

19. Heisenberg, *Physics and Beyond*, 41.

20. *Infra.*, [PAGE NEEDED #].

21. *Infra.*, [PAGE NEEDED #].

22. *Infra.*, [PAGE NEEDED #].

23. *Infra.*, [PAGE NEEDED #].

24. *Infra.*, [PAGE NEEDED #].

25. *Infra.*, [PAGE NEEDED #].

26. *Infra.*, [PAGE NEEDED #].

27. See the titles of the sections, chapters, and paragraphs appearing in the new edition that allow us to immediately situate the methodological stakes of this discussion whose philosophical and epistemological consequences are major.

28. J. Garelli, *Rythmes et mondes*. J. Garelli, "Irréductibilité et Plétérologie," *Epokhè*, no. 3 (1993). J. Garelli, "L'Entrée en Démesure."

29. Martin Heidegger, "Seminar in Zähringen," in *Four Seminars*, trans. Andrew J. Mitchell and François Raffoul (Bloomington: Indiana University Press, 2003).

30. *Being and Time. The Basic Problems of Phenomenology. What Is a Thing? On Time and Being*. We have analyzed these texts at length in J. Garelli, *Rythmes et mondes*, section III.

31. This demonstration was developed at length in J. Garelli, *Rythmes et mondes*, J. Garelli, "L'Entrée en Démesure," and J. Garelli, "Irréductibilité et Hétérologie."

## INTRODUCTION

1. [Particularly in the framework of Aristotle's thought, the *súnolon* is the term used to designate the concrete individual insofar as it is a composite of form and matter. —Trans.]

2. Furthermore, the milieu may not be simple, homogeneous, or uniform, but it can be originally suffused by a tension between two extreme orders of magnitude that the individual mediates when it comes to be.

3. And the constitution of a mediating order of magnitude between two extreme terms; ontogenetic becoming itself can in a certain sense be considered as a mediation.

4. [Anterior redaction: "In order to define metastability, we must include the notion of the information of a system based on these notions and particularly on the notion of information that physics and pure modern technology leaves us with (notion of information conceived as negentropy), as well as the notion of potential energy, which takes on a more precise meaning when it is combined with the notion of negentropy."]

5. The ancients had intuitive and normative equivalents of the notion of metastability, but this concept is mostly indebted to the development of the sciences because metastability generally supposes both the presence of two orders of magnitude and the absence of interactive communication between them.

6. [This phrase was removed from the 1964 edition.]

7. Homeostasis and Ashby's homeostat.

8. It is through this introduction that the living being performs informational work, thereby itself becoming a node of interactive communication between an order of reality that is superior to its dimension and an order of reality that is inferior to it and which it organizes.

9. This interior mediation can intervene as a relay with respect to the external mediation that the living individual brings about, which is what allows the living being to make a cosmic order of magnitude (for example, luminous solar energy) and an infra-molecular order of magnitude communicate.

10. In particular, the relation to the milieu shouldn't be considered before and during individuation as the relation to a singular and homogeneous milieu: the milieu itself is a *system*, a synthetic grouping of two or several levels of reality without intercommunication before individuation.

11. By this, we mean to say that the *a priori* and the *a posteriori* are not found in knowledge; they are neither the form of knowledge nor its matter, for they are not knowledge but the extreme terms of a pre-individual and consequently pre-noetic dyad. The illusion of *a priori* forms proceeds from the preexistence of *conditions of totality* within the pre-individual system whose dimension is superior to that of the individual undergoing ontogenesis. Inversely, the illusion of the *a posteriori* stems from the existence of a reality whose order of magnitude, in terms of spatiotemporal modifications, is inferior to that of the individual. A concept is neither *a priori* nor *a posteriori* but *a praesenti*, insofar as it is an informative and interactive communication between that which is greater than the individual and that which is smaller than it.

12. This affirmation does not lead to contesting the validity of the quantitative theories of information and the measures of complexity, but it does suppose a fundamental state (that of pre-individual being) anterior to any duality of emitter and receiver and therefore to any transmitted message. What remains of this fundamental state in the classical case of information transmitted as a message is not the source of information but the primordial condition without which there is no effect of information and therefore no information: this condition is the metastability of the receiver, whether it be a technical being or the living individual. This information can be called "first information."

13. In particular, the plurality of orders of magnitude and the primordial absence of interactive communication among these orders involve such a comprehension of being.

14. On the contrary, the dynamism of the transductive operation expresses the primordial heterogeneity of two scales of reality, one which is greater than the individual (the system of metastable totality) and the other of which is smaller than it, like a matter. Between these two primordial orders of magnitude, the individual develops via an amplifying process of communication, the most primitive mode of which is transduction and which already exists in physical individuation.

15. Internal resonance is the most primitive mode of communication between realities of different orders; it contains a twofold process of amplification and condensation.

16. This operation parallels that of vital individuation: a plant institutes a mediation between a cosmic order and an infra-molecular order, storing and distributing the chemical natures contained in the soil and in the atmosphere by means of the luminous energy received in photosynthesis. It is an inter-elementary node, and it develops as the internal resonance of this pre-individual system composed of two layers of reality initially without communication. The inter-elementary node performs an intra-elementary labor.

17. Form therefore appears as active communication, the internal resonance that operates individuation: it appears with the individual.

### 1. FORM AND MATTER

1. In other words, between the reality of an order of magnitude (which is superior to the future individual and contains the energetic conditions of the molding) and the matter-reality (which is, grain by grain in its availability, of an order of magnitude inferior to that of the future individual, the real brick).

2. Thus, the mold is not just the mold but the end of the inter-elementary technical chain, which consists of vast ensembles that envelop the future individual (worker, workshop, press, clay) and contain potential energy. The mold totalizes and accumulates these inter-elementary relations, just as prepared clay totalizes and accumulates the molecular intra-elementary interactions of the aluminum hydrosilicates.

3. This energy expresses the macroscopic system state that contains the future individual; its origin is inter-elementary; however, it enters into interactive communication with each of the matter's molecules, and it is due to this communication that the form emerges contemporaneously with the individual.

4. Thus, the individual is constituted through this act of communication that occurs within a society of particles in reciprocal interaction, i.e. between all the molecules and the action of molding.

5. Although this energy is a state energy, an energy of the inter-elementary system; the communication between orders of magnitude consists in this interaction between two orders of magnitude on the level of the individual as an encounter of forces; this communication is due to a singularity, which is the principle of form and initiator of individuation. The mediating singularity is the mold here; in other cases, in nature the stone can be the initiator of the dune or gravel can be the germ of an island in a river depositing alluvia: the singularity exists on the intermediate level between the inter-elementary dimension and the intra-elementary dimension.

6. In this instant, matter is no longer pre-individual matter or molecular matter but already individual. The potential energy that is actualized expresses an inter-elementary system state vaster than matter.

7. This reciprocity causes a perpetual energetic availability: in a very limited space a considerable amount of work can be carried out if a singularity primes a transformation in that space.

8. These real singularities, which are the occasion of a shared operation, can be called *information*. Form is a device [*dispositif*] for producing them.

9. It only manifests the singularities of the *here and now* that constitute the conditions of the information of its particular molding, which include the wear and tear of the mold, pebbles, irregularities, etc.

10. The individuality of the brick, that through which this brick expresses a certain operation that has existed *here and now*, envelops the singularities of this *here and now*, prolongs them, and amplifies them; however, technical production seeks to reduce the margin of variability or unpredictability. The real information that modulates an individual seems like a parasite; it is that through which the technical object remains inevitably natural to a certain extent.

11. This implicit form, which is an expression of the old singularities of the growth of the tree (and through them, the expression of all types of singularities: the action of the wind, of animals, etc.), becomes information when it guides a new operation.

12. Implicit forms are information in the operation of form-taking; here, these forms are ones that modulate the activity and partially direct the tool, which is overall controlled by man.

13. The most perfect technical operation (producing the most stable individual) is the one that makes use of singularities as information in form-taking, like wood cut with the grain. This does not require the technical gesture to remain close to the microphysical level of a particular singularity, because when they are utilized as

information, singularities can act on a larger scale by modulating the energy contributed by the technical operation.

14. They are information, the capacity to modulate different operations in a determinate way.

15. The mold is a device [*dispositif*] for producing an information that is always the same for each molding.

16. [This passage was removed from the 1964 edition.]

17. While the system is in a state of metastable equilibrium, it is able to be modulated by singularities and is the theater of processes of amplification, summation, and communication.

18. Neither form nor matter are strictly intrinsic, but the singularity of the allagmatic relation in a state of metastable equilibrium, the individual's associated milieu, is immediately bound to birth of the individual.

19. [*Conata* translates to "exertion, struggle, desire," and the entire phrase roughly translates: "struggle is in vain" or "without results".—Trans.]

20. On the other hand, this reality consists of orders of magnitude that are different from that of the individual and of the singularity that initiates it, such that the individual plays a mediating role in relation to the different orders of reality.

21. [This passage was removed from the 1964 edition.]

## 2. FORM AND ENERGY

1. Also, potential energy is therefore linked more generally to the superior order of magnitude of a system considered in its large differentiated, separated, and hierarchized ensembles.

2. These conditions are sufficient by themselves to initiate a transformation: a pendulum that is drawn back from its equilibrium position and tied up cannot oscillate before it is released.

3. Except in the particular ideal case of completely reversible transformations in which entropy remains constant.

4. It could be said that energy has passed from a *formal system* of supports (an order of dimensions superior to that of the theater of transformations, i.e. the bullet) to a *material system*, which involves a dimensional order inferior to that of the theater of transformations, i.e. the different molecules of the bullet.

5. It should be noted that the formation of new crystals within the prismatic crystal occurs on a scale smaller than that of the prismatic crystal, which then plays the role of an initial milieu and of a surrounding system that contains the formal conditions of becoming in its structural state. Here, the form is the macrophysical structure of the system insofar as it energetically conditions future transformations.

6. This gradual propagation constitutes the most primitive and fundamental mode of amplification (amplifying transduction) that borrows its energy from the milieu within which the propagation takes place.

7. The imposed temperature belongs to the formal conditions of each subset of the system and defines in each subset the presence or absence and degree of a potential energy.

8. The substance's nature is what contains the material conditions, particularly by determining the number and type of the different systems of individuation that could develop there. In this sense, the energetic state of a substance is a pairing of formal and material conditions.

9. This is why the individual can play a role of singularity when it enters into a system in a state of metastable equilibrium and initiates an amplifying structuration.

10. [The bracketed text has been removed from the 1964 edition and replaced by the fifteen preceding lines.]

11. As in every operation of modulation, three energies are present: the strong potential energy of the amorphous substance in a metastable state, the slight energy borne by the crystalline germ (modulating energy, information), and finally an energy that pairs the amorphous substance and the crystalline germ, which is confused with the fact that the amorphous substance and the germ form a physical system.

12. This polarizing function, due to which each new layer is also a singularity that plays a role of information for the contiguous amorphous matter, explains amplification through transductive propagation.

13. The relation between the germ and the amorphous substance is an information process of the system.

14. The saturation of a solution perhaps creates a polarity on the microphysical level that renders the amorphous substance sensitive to the action of the crystalline germ. Supersaturation is in fact a physicochemical constraint that creates a metastability.

15. [This bracketed passage has been removed from the 1964 edition and replaced by the two preceding lines.]

16. [This phrase roughly translates to "a third something" in the Platonic dialogues.—Trans.]

17. [*Phthorá* means "corruption" or "passing away" and is terminologically in opposition to genesis.—Trans.]

18. [The *metrion* is that which is well-measured.—Trans.]

19. A relation made possible by the existence of an analogical rapport between the amorphous substance and the structural germ, which amounts to saying that the system constituted by the amorphous substance and the germ contains information.

20. Jean Wyart, *Cours de Cristallographie pour le certificat d'Études Supérieures de Minéralogie* (Paris: Centre de Documentation Universitaire), 10.

21. In nature, these imperfect individuals are often formed by a crystal around which an amorphous substance is deposited under certain conditions (snow, fog). The conditions of formation of these imperfect individuals are comparable to the conditions of supersaturation: the formation of rain or snow can be deposited by distributing crystals into a saturated air.

### 3. FORM AND SUBSTANCE

1. [This chapter, which appeared in the original dissertation (1958), was removed in 1964 for the first publication. Only the pages on "Topology, chronology and order of magnitude of physical individuation" were kept.]

2. [*Sphairos* is Parmenidean Being and mostly designates an undifferentiated amorphous matter that is devoid of all internal differences.—Trans.]
3. [“The tranquil shrines of philosophy,” a paraphrase of one of Lucretius’s lines of poetry.—Trans.]
4. [This phrase can be found in Plutarch and Pseudo-Plutarch, and roughly refers to the “constructive fire that breaches the whole.”—Trans.]
5. [*Autarkos kai apathos* roughly translates to “self-sufficient and dispassionate.”—Trans.]
6. [This phrase comes from the *Enchiridion* of Epictetus and designates “that which is not in our power.”—Trans.]
7. Text cited by Arthur Haas in *Wave Mechanics and the New Quantum Theory*, trans. L. W. Codd (London: Constable, 1928).
8. [This adjective describes “of sea-purple” and “of true colored dye” and therefore shows the tendency to see the color of the sea as purple, which is on the shortest wavelength end of the visible spectrum, rather than green or blue.—Trans.]
9. [Founded in 1946, this organization served to facilitate the probability of assured communication for the use of short wavelengths at a given time and for a given frequency.—Trans.]
10. Louis de Broglie, *Ondes, Corpuscles, Mécanique ondulatoire* (Paris: Albin Michel, 1945), 18–19.
11. [*Kainologia* refers to a usage of new or invented language or phraseology.—Trans.]
12. Yves Rocard, *Electricité* (Paris: Masson, 1966), 360.
13. Stéphane Lupasco, *Le Principe d’antagonisme et la logique de l’énergie. Prologomènes à une science de la contradiction* (Paris: Hermann & Co., 1954), 41–42.
14. Louis de Broglie, *Ondes, Corpuscles, Mécanique ondulatoire*, 33–34.
15. *Ondes, Corpuscles, Mécanique ondulatoire*, 35.
16. *Ondes, Corpuscles, Mécanique ondulatoire*, 39.
17. *Ondes, Corpuscles, Mécanique ondulatoire*, 73.
18. Louis de Broglie, “Communication faite à la séance de la Société Française de Philosophie” (paper presented at the annual meeting for the Société Française de Philosophie, Paris, France, April 25, 1953).
19. “Communication faite.”
20. Louis de Broglie, “La mécanique ondulatoire et la structure atomique de la matière et du rayonnement,” *Journal de Physique* 8, no. 4 (1927): 225.
21. Louis de Broglie, “La physique quantique restera-t-Elle indéterministe?” *Société Française de Philosophie, Bulletin* 4 (October–December 1953): 146.
22. “La physique quantique,” 147.
23. “La physique quantique,” 148.
24. “La physique quantique,” 156.
25. “La physique quantique,” 156.
26. [Cited in English in the original text.—Trans.]
27. “La physique quantique,” 150.

28. Haas, *Wave Mechanics and the New Quantum Theory*, 161.

29. In this case, the communication between orders of magnitude (here each nucleus and the total population of nuclei) is insufficient.

30. In an arrangement like this, it can be said that an individuation is produced the moment when the system can *diverge*, i.e. can receive information.

#### 1. INFORMATION AND ONTOGENESIS

1. "Measure" here is taken in the sense of "estimation of levels": it is a matter of evaluating levels, and therefore a question of a quantum measure, not of a continuous quantitative measure.

2. In this way, termites construct the most complex edifices of the animal kingdom, despite the relative simplicity of their nervous organization: they almost act as a single organism by working in a group.

3. This would be true if we considered the physical world as matter and as substance; but this is no longer true if we consider it as containing systems where potential energies and relations exist, which are supports of information. Materialism does not take information into account.

4. This resonance is the active analogy or pairing of non-symmetrical terms that exists in a system undergoing individuation, like between the crystalline germ and the solution.

5. In this sense, it can be said that there is a relation of information between the species and the milieu in the natural system.

6. For example, in polyps.

7. This does not mean that there are beings who merely live and beings who live and also think: it is probable that animals sometimes are in a psychical situation. It just means that these situations that lead to acts of thought are less frequent in animals. Since humans have access to more extensive psychical possibilities particularly due to the resources of symbolism, they call upon the psyche more often; what is exceptional for humans is the purely vital situation, wherein humans feel most helpless. But this does not involve a nature or an essence that provides a foundation for an anthropology; a threshold has simply been crossed: the animal is better equipped to live than to think, and man is better equipped to think than to live. But animals and humans both live and think, either in a typical or exceptional way.

8. This disparation is what is treated as information and what makes the psyche appear.

9. Which supposes three levels of composition: organism, organ, and cell.

10. This relation is amplificative, for a colony can emit several individuals capable of generating a complete colony.

11. [From this point on, we have opted to translate the author's use of *instinct* as "drive" in order to bring it in line with the way in which Freud's concept *Trieb* is generally translated today. The reader should also keep the notion of "drive" in mind when the author uses the adjective "instinctual."—Trans.]

12. Which, in the individual, is the expression of discontinuity, of the original singularity translated into behavior, and which is essentially the instrument of the amplificative capacity through the transductive propagation that characterizes individuation.

13. This expression is often used by Freud, especially after the First World War.

14. From this point of view, it would be interesting to consider superior animal forms as arising from the *neotenization* of the inferior species in which the stage of individual life corresponds to the function of amplificative reproduction, whereas the stage of life *in colonies* corresponds to the continuous, homeostatic aspect. In superior species, individuals are ones that live in society: the two stages and the two manners of being become simultaneous.

15. An approximation can be made between the plurality of stages of the individual's development (larva, nymph, and imago) and the individual-colony alternation.

16. Étienne Rabaud, *Zoologie biologique* (Paris: Gauthiers-Villars, 1934), 4: 475.

17. Perhaps the change of this rapport would have to be seen in the initial expression of the process of amplification that is prolonged in reproduction. (Perhaps the initial expression of the process of amplification that persists in reproduction would have to be seen in the change of this rapport.)

18. Rabaud, *Zoologie biologique*, 4: 486.

19. *Zoologie biologique*, 4: 487.

20. *Zoologie biologique*, 4: 489.

21. *Zoologie biologique*, 4: 491–92.

22. Here, the individual particularly seems like what corresponds to conditions of crisis, discontinuity, transfer, and amplification through remote propagation, which implies risk, mobility, concentration, and provisional independence with respect to nourishment, autonomy, and temporary freedom. This rapport between the individual and the colony is similar to that of the seed to the plant.

23. [The Greek word for heap is “sorites,” and this is why in philosophy the paradox of the heap is also known as the sorites paradox.—Trans.]

24. *Zoologie biologique*, 4: 492.

25. This fact, which is very important theoretically, could contribute to supporting the hypothesis presented above of a *neotenization* as the condition of an individuation.

26. *Zoologie biologique*, 4: 510.

27. *Zoologie biologique*, 4: 511.

28. For this reason, a seed must be considered as an individual, since it bears a specific, complete message and is endowed for a time (generally several years) with an absolute autonomy.

29. This expression “information signals” is used to maintain the difference between information properly speaking (which is a system's manner of being that supposes potentiality and heterogeneity) and information signals, which are called information in general, although they are merely an unnecessary instrument of information and particularly develop when the parts that form a system are distanced from one another, as is the case in a macroorganism or in a society.

30. A centripetal information signal is a type of signal that involves the sense organs. A centrifugal signal is one that incites a reaction, a posture, or a gesture.

31. A macroorganism can have localized individualities: reflexes, reaction of the skin's pigmentation to ultraviolet rays, local horripilation, and local defense reactions against a microbial invasion.

32. *Zoologie biologique*, 4: 517.

33. [The terms "homophyseal" and "heterophyseal" (*homophysaire* and *hétérophysaire*) are neologisms for translating these concepts from the French biologists Biard and Rabaud. Homophyseal is an adjective that describes living beings growing together within the same symbiotic complex, while heterophyseal describes living beings growing on their own within the same symbiotic complex.—Trans.]

34. This term is mostly used for plants, but it can be used to designate the morphological regression of the constituents of the heterophyseal complex.

35. Indeed, the more well adapted and vigorous the parasite is, the more it damages and diminishes its host, since it does not respect the host's functional autonomy. If the parasite develops too much, it winds up destroying its host and can then destroy itself, just as mistletoe kills the tree on which it settles.

36. Green algae carry out the chlorophyllic synthesis and provide nourishment for the fungus by decomposing carbon dioxide in the air. The fungus retains humidity and attaches the lichen on the support; it provides water for the green algae.

37. This is the case of the male crab parasited by the sacculina.

38. This association remains in reproduction (in what can be called the strictly individuated stage of the lichen): in fact, lichens reproduce through the spores of the fungus whose mycelium will surround the green seeds of the algae. This type of reproductive unity, the soredium, is the equivalent of a seed.

39. In the lichen, the fungus is like an exterior milieu for the green algae (which are algae that develop on rocks or humid earth), and the algae give to the fungus the food that it could only find in a vegetal milieu, since it lacks chlorophyll.

40. For example, supercooling.

41. The capacity of the individual to found a colony and thus to transport an effective information is similar to this.

42. See the international colloquium of the National Center for Scientific Research on the polarization of matter, April 1949.

43. This representation also applies fairly well for the continuous functions of a colony; but it does not express the discontinuous characteristic or the characteristic of information and the amplifying role of the individual.

44. This word is borrowed from the psycho-physiological theory of perception; there is disparation when two twin ensembles that are not completely superposable, such as the left retinal image and the right retinal image, are grasped together as a system, allowing for the formation of a single ensemble at a higher degree that integrates all their elements due to a new dimension (for example, in the case of vision, the layering of depths of field).

45. [English in the original.—Trans.]

46. The process of integration and constructive amplification is not necessarily continuous; when the individual founds a colony, when the larva becomes a nymph, when the soledium settles and yields a lichen, the individual transforms, but the amplification remains.

47. Ontogenesis itself can therefore present itself as an amplification; the action of the individual toward itself is the same as toward the exterior: it develops by constituting a colony of subsets within itself via reciprocal interlacing.

48. Through its differential usage, sensation supplies plurality, the non-compatibility of data, the problematic capacity that carries information. Perceptive integration can only be carried out through construction, which generally implies an effective motor response, the amplification of the sensorimotor universe.

49. It could therefore be said that the essential function of the individual is the activity of amplification, whether it exerts this activity within itself or transforms into a colony.

50. In other words, according to this doctrine, the generative pair of disparation is the individual-world rapport, not a duality the individual would bear within itself initially.

51. [This phrase literally means “the mind’s fluctuation, vacillation, or hesitation” and can be found specifically in Spinoza’s manner of characterizing the psychical tension in a simultaneity of affects. See Spinoza’s *Ethics* Part III, Proposition XVII and its corresponding scholium for the direct use of this term.—Trans.]

52. In this sense, growth is a form of amplificative action. It can be the only action possible for certain living beings, like plants.

53. Moreover, the totality of each of these worlds is not that different from the totality of the others due to qualitative and structural differences; the key points are not organized according to exactly superposable networks; similarly, in monocular images, the right image and the left image are grasped from different *points of view*, which in particular creates a difference of perspectives.

54. One of the greatest merits of Lamarck is to have considered evolution as an incorporation into the individual of effects randomly supplied by the milieu (like the nourishment conveyed by currents of water, then integrated due to vibrating cilia), which carries out an amplification of the zone of the living being.

55. Inversely, individuation is not the only vital reality. In the strict sense, individuation is in some manner a provisional, dramatic solution of urgency. And yet, because it is directly linked to a process of neotenzation, individuation is the root of evolution.

56. [*Apeiron* can be traced back to the Greek pre-Socratic philosopher Anaximander, and it literally means that which is “without limit” and is chiefly used in a cosmological sense to describe a principle that organizes primordial chaos. Aristotle takes up this conception attributed to Anaximander in his *Physics*.—Trans.]

57. [The word “charge” here should be taken in the multiple senses in which Simondon has used it throughout the work, specifically in the sense of the charge of the pre-individual milieu. The etymological sense of the word “charge” is related to

the words “cargo” and “carry” and relates not only to notions of loads or burdens but also to that of potentials.—Trans.]

58. An analogous phenomenon occurs in the case of the plant: an old tree can continue to grow, but if one of its large branches breaks, the tree does not manage to recover the equilibrium of its structure; however, its foliage continues to grow regularly; a young tree that experiences a break reorients its growth and recovers its verticality, and one of its lateral branches that was previously diageotropic then becomes ortho-geotropic.

59. *World as Will and as Representation*, vol. 1, book II.

60. This applies in the case of species that do not produce a colony. When the individual founds a colony, it is the colony that corresponds to its maturity and its achieved action.

61. [The usage of the word “actual” and its variations should be taken in its double meaning in French, which is that of “current, contemporaneous, present (in time)” and in the more traditional philosophical sense of “actual” as opposed to “potential” or “virtual.”—Trans.]

62. The individual is a solution for problems of discontinuity through discontinuity. Continuity is reestablished in the collective.

63. It is because there is no simple unity (substance) that the individual seeks to found a colony or to be amplified in the transindividual. The individual is a problem because it is not the whole of life.

64. [English in the original.—Trans.]

65. There is only information when that which emits signals and that which receives them form a system. Information is between two halves of a system in a relation of disparation. This information does not necessarily pass through signals (for example in crystallization); but it can pass through signals, which allows for realities distant from one another to form a system.

66. [Here the words “come forth” and the following phrase “to come” all relate to the French word *venir*, which means “future” as a noun and “to come (to)” as a verb.—Trans.]

## 2. PSYCHICAL INDIVIDUATION

1. Gestalt theory does not establish the essential distinction between an *ensemble*, the unity of which is structural and not energetic, and a *system*, a metastable unity consisting of a plurality of ensembles between which there is a relation of analogy and an energetic potential. The ensemble does not possess information. Its becoming can only be that of a degradation, an augmentation of entropy. On the contrary, the system perseveres in its metastable being due to the activity of information that characterizes its systemic state. Gestalt theory has taken for a quality of totalities, i.e. ensembles, what is in fact a property that only systems possess; yet systems cannot be *totalized*, since the fact of considering them as a sum of their elements ruins the awareness of what makes them systems: the relative separation of the ensembles they contain, analogical structure, disparation, and the relational

activity of information in general. What is at the basis of the nature of a system is the type of information it contains; however, information (relational activity) cannot be quantified abstractly but solely characterized in reference to the structures and schemata of the system within which it exists; information shouldn't be confused with information signals, which can be quantified but which wouldn't be able to exist without a situation of information, i.e. without a system.

2. The 1958 manuscript here included the following specifications: "The spider bothers us because it has no apparent polarity: we do not know where its head is; this also applies to the snake, an animal which coils around itself and reorients at any moment. A simple form like that of the cross bothers us because it proposes several polarities all at once; it is the very image of this plurality of polarities. The circle in certain conditions can produce the same effect, if it is large enough with respect to the subject to not be perceived as a small localized object but as an indefinite plurality of directions: for example, this is the case of a cylindrical tunnel. A square should be a better form than a rectangle; in fact, if a choice is given to subjects between squares and rectangles of different lengths for an invariable width, a preference for rectangles is revealed: this is because the rectangle is oriented: it has a length and a width."

3. In fact, the number of decisions diminishes when contrast is sharper: if there is nothing but an image in black and white, there will only be two possible states for each physical unit of surface; if there are various nuances of grey, there will be a large number of possible states, i.e. decisions.

4. The scrolling of a magnetic tape at high speed is the equivalent of the perception of a photograph from a great distance.

5. Only the degree of probability of the appearance of this form can be taken into account; good forms are finite in number, whereas unspecified assemblages can be indefinitely varied. But it is only through the intermediary of a possible coding that implies a low number of decisions that the good form is easy to transmit. In the case of lines, a very simple coding consists in reducing the number of possible states to two: black and white. It is in this sense that a pencil sketch is easier to transmit than an image in various tones of gray.

6. Already in the reflexes of perception accommodation, one finds both functionings that increase the quantity of signals (convex lens) and others that orient the living being and selectively privilege interesting signals: fixation, the ocular scanning of a moving object.

7. Simple heterogeneity without potentials cannot instigate a becoming. Granite consists of heterogeneous elements (quartz, feldspar, mica), and nevertheless it is not metastable.

8. This word is here taken in the sense that physics gives it, particularly in the theory of energy exchanges between an oscillator and a resonator.

9. Because it was part of a system, it was one of the real symbols existing with respect to another system: an information existed *in the system between the living individual and the milieu*, which is not the case for the physical individual.

10. The heir is indeed also a double of the contemporary, a symbol with which the contemporary is reciprocal. The heir, a symbol in the future, fills in the absence of being that the symbol of the past contains. In certain primitive groups, the last-born receives the name of the last person to have died.

11. [Simondon here is using the English word to correspond with the meaning of “average” in the above sentences. The italics are his.—Trans.]

12. Emotion modulates psychical life, whereas affection intervenes only as a content.

13. We take this word in the Platonic sense of *σύμβολα* [*súmbola*] (the two pieces of a broken stone) that reconstitute the original whole object when they are brought back together again to authenticate a relation of hospitality.

14. For example, recall the incomprehensible suicide of Georges Eastman, an American engineer who worked on photographic apparatuses, invented roll film in 1886, and founded the Eastman Kodak company in 1888. See P. Rousseau, *Histoire des techniques et des inventions*, p. 421.

15. In particular, we can recall the recent development in the theory of quarks.

### 3. COLLECTIVE INDIVIDUATION AND THE FOUNDATIONS OF THE TRANSINDIVIDUAL

1. Cf. *The Two Sources of Morality and Religion*.

#### CONCLUSION

1. To this extent—for the living being—pre-individual reality is *also* post-individual reality; the individualized phase is a transfer between two types of colony phases.

2. It could even be said that there is a complementarity of the individual phase and the colony phase. With the complex forms of vital organization and due to neo-tenization, these phases come closer together within the collective.

3. It is only starting from this middle—which is also an optimum—that one can establish measurements (for example that of the coefficients of spectral lucidity) with respect to the minimum of the mechanical equivalent of light, which is measured for the best specific luminous efficacy.

4. Physical individuation is considered here as an individuation that jumps the gun, i.e. that does not sufficiently remain in suspense at its origin; vital individuation would be like a dilation of the inchoate stage that makes possible an organization, a deepening of the extreme beginning.

5. This amounts to saying that there is no possible definition of becoming as amplification if we do not suppose an initial plurality of the orders of magnitude of reality.

6. This center consisting of the being is that of the communication between orders of magnitude—which are molar and molecular, inter-elementary and intra-elementary; starting from this center, a rapid and iterative individuation produces a physical reality; a decelerated, progressively organized individuation produces the living being.

7. Furthermore, it supposes an absence of communication between several orders of magnitude; individuation intervenes as an amplifying mediation through a becoming.

8. And an origin of the individual, a pre-individual situation.

9. It could also be said that the being transfers a problem, that it transports the possibility of an amplifying activity. It tends toward an entelechy that is not limited to its personal reality, for it is a condensed mode of the real and tends toward a phase of amplification.

10. To the same extent, the individual, which emerges from a communication between initially isolated orders of magnitude, carries the message of their duality and then reproduces the ensemble through amplification. Information conserves the pre-individual within the individual.

11. This is the condition of communication, which is found first at the moment of individuation and a second time when the individual amplifies itself into the collective.

12. The individual qua individual, which is distinct from the colony and the collective, emerges from a singularity and has a sense of discontinuity; but this discontinuity is amplifying and *tends* toward the continuous through a change in order of magnitude.

13. A system of norms is problematic, like two images in a state of disparation; it tends to resolve itself within the collective through constructive amplification.

14. Values are the pre-individual of norms; they express the attachment to different orders of magnitude; arising from the pre-individual, they turn toward the post-individual, either in the form of the colony phase or in that of the transindividual for superior species. They come from the continuous and again find the continuous by way of the individual, i.e. discontinuous transfer.

15. In other words, the amplification through which it finds the dimension of the continuous by inserting into the becoming of the colony or the reality of the collective; although according to norms it is an act of the individual, according to values it is an act toward the collective.

16. In other words, one that contains within itself a power of amplification.

17. Aestheticism causes the same loss of information as abstract knowledge. Thus, in order to form the comprehension of the species, it only retains what the individuals have in common between them.

# Individuation in Light of Notions of Form and Information

VOLUME II: SUPPLEMENTAL TEXTS

GILBERT SIMONDON

*Translated by Taylor Adkins*

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## Publisher's Note

This first English-language translation of Gilbert Simondon's magnum opus *Individuation in Light of Notions of Form and Information* follows the comprehensive, authorized edition published in France by Éditions Millon in 2013. Unlike the earlier 1964 Presses Universitaires de France and 1989 Aubier editions, which divided the thesis into two separate works, the text is presented here in its complete and intended order. The complete doctoral thesis appears in its entirety as volume 1 of this two-volume edition. Both those familiar with Simondon as well as newcomers to his work will find that the more recent Millon edition also includes valuable research notes, lectures, drafts, and related texts that provide a unique insight into the author's thinking process; these supplemental texts appear as volume 2 of this edition.

The publisher would like to thank Nathalie Simondon and Dominique Simondon for their guidance and generous cooperation in making this integral work of contemporary thought available to English-language readers.



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## Complementary Note on the Consequences of the Notion of Individuation

This “Complementary Note on the Consequences of the Notion of Individuation” was in a first stage of the thesis integrated after the conclusion under the title “Complementary note: The objective foundations of the transindividual.” The entire passage was removed right before the oral examination. Gilbert Simondon himself intended to reintegrate it into the 1989 Aubier edition. In an initial stage of editing, this text opened with the question, “What can be understood by value?” and was not divided into paragraphs.



# Values and the Search for Objectivity

## I. RELATIVE VALUES AND ABSOLUTE VALUES

Value represents the symbol of the most perfect integration possible, i.e. the unlimited complementarity between the individual being and other individual beings. Value supposes that there is a way to make all realities complementary, and the simplest way is obviously to suppose that everything that exists is integrated into a universal will; a divine finality, the universalization of the principle of sufficient reason, supposes and halts this search for value; this finality seeks to compensate the inadequation among every living being with a dissymmetry accepted once and for all between created beings and the creator being. God is invoked as the condition of complementarity. This complementarity can either result in a direct connection between a community and some sort of plan of a divine finality (this is precisely the meaning of the Old Testament with the notion of the chosen people), or in the constitution of a final virtual community of chosen ones, who will only be determined after the trials and tribulations of terrestrial existence (this is the meaning of communal Christianity), or as an indefinite possibility of progress or regress along the path of the discovery of God; Saint Paul and Simone Weil represent this will to direct transparency. An absolute and non-communal perfection is also conceivable, like Péguy's, which represents an effort toward integration that surpasses every preceding abstract thought.

But we should note that the pre-Socratics conceived complementarity differently as a pair of contraries: birth and death, ascent and descent, paths leading upward and downward. For the pre-Socratics, the death of one being is the condition for the birth of another; what Nietzsche rediscovered as an essential myth in the pre-Socratics and integrated into his pantheism is the complementarity of the sum of becoming expressed by the notion of eternal return.

In all these cases, value is the action due to which there can be complementarity. The consequence of this principle is that three types of values are possible: two relative values and an absolute value. We can deem values relative when they express the appearance of a complementary condition; this value is linked to the very thing that constitutes this condition, but it nevertheless does not reside in this thing; we can consider that the value is attached to this thing without however being inherent in it; this is the value of the remedy that cures or of the nourishment that allows us to live. Here, there can be value as an organic condition or value as a technical condition, depending on whether the already realized condition is technical or organic. The third type of value is the value that makes relation possible: the beginning or initiation of the reaction that makes this activity possible and sustains itself once it has started. Culture can be ranked among these values, since it is a set of beginnings of action that are endowed with a rich schematism, waiting to be actualized into an action; culture allows for problems to be resolved, but it does not allow for living or constructing organically; it supposes that the possibility of organic life and technical life is already given, but that the complementary possibilities do not correspond to one another and consequently remain sterile; it thus creates the system of symbols that allows these possibilities to enter into mutual reaction.

This supposes that culture is somehow capable of *manipulating* the symbols that represent a certain technical activity or a certain biological drive, insofar as the inertia and compactness of organic conditions or technical conditions prevents them from being put into relation in the brute state; we understand why culture is linked to the capacity of symbolizing organic and technical conditions instead of transporting them as a block in the brute state: just as, in order to initiate a reaction, we do not seek to act on the entire mass of bodies to be combined but instead on reduced masses that will propagate the reaction analogically throughout the whole, culture can only be effective if it possesses from the start this capacity of acting on symbols and not on brute realities; the condition for the validity of this action on symbols resides in the symbols' authenticity, i.e. the fact that they are veritably the extension of the realities that they represent and not a simple arbitrary sign artificially linked to the things that it must represent. Plato has shown that the soundness of denominations is necessary for adequate thought and that the philosopher must occupy himself with discovering the veritable symbol of each being, which has a meaning even for the Gods according to the terms of the *Cratylus*. This is why all the exercises of expression play a major role in culture, without however at any time requiring us to conflate culture with these exercises.

As a means of expression, the fine arts offer culture their force of adequate symbolization but do not constitute culture, which, if it remains aestheticism, does not have any effectiveness.

Furthermore, instead of being the pure consumerism of means of expression constituted in closed types, culture must effectively serve to resolve human problems, i.e. put organic conditions and technical conditions in relation. A pure organicism or a pure technicism avoids the problem of the effectiveness of culture. Marxism and Freudianism reduce culture to the role of means of expression; but in reality, a culture is either reflexive or does not exist: it would remain a mythology or a superstructure. Conversely, let's consider a reflexive type of culture that wants to resolve problems: we will find in it a utilization of the power to symbolize that is neither exhausted in a promotion of the organic or in an expression of the technical; reflexive culture is sensitive to the problematic aspect of existence; it looks for what is human, i.e. what, instead of being accomplished automatically and by itself, requires a calling into question of man by himself in the return of the causality of reflection and self-consciousness; the necessity of culture becomes apparent in the encounter of obstacles; Vladimir Jankélévitch writes that every problem is essentially thanatological; this is because, in the simple conditions of existence, man is an organism or technician, but never both at the same time; however, the problem appears when, instead of this alternation between organic life and technical life, the necessity for a mode of *compatibility* between the two lives emerges within a life that simultaneously integrates them, and this is precisely what human existence is. All cultures provide an answer to this problem of compatibility posed in particular terms. Plato finds the answer in the analogy of the structure, operations, and virtues that exist between the individual and the city in which his technical activity becomes explicit; this is the "frictionless city" of the *Republic* and the *Laws*. No longer seeking to immortalize man in becoming, Christianity introduces the notion of the merit of works and joins technical effort with organic life through the hope in an eternal life that integrates both aspects: non-organic effort is converted into spiritual life. Sacrifice is a mode of conversion that supposes the possibility of this integration. The relation between the two terms is possible by way of the shared relation to God.

## 2. THE DARK ZONE BETWEEN THE SUBSTANTIALISM OF THE INDIVIDUAL AND INTEGRATION INTO THE GROUP

We should note the particularly pronounced characteristic that the problem takes when technical activity is not reduced to war or to the management of

the city, like when the citizens of cities with slavery would be relieved from labor; Christianity corresponds to the necessity of integrating labor into the problem, which was not numbered among the techniques of the citizen. It would be completely false to consider that Christian culture is devaluated because it corresponds to the human problem of the slave, whereas Greco-Roman culture would be valuated because it corresponds to a position of the problem that does not contain the function of labor; if one of these cultures is incomplete, then so is the other; they are incomplete in a simultaneous and complementary way. They are unfinished cultures, in the sense that each of them supposes both the spiritual exclusion and the material existence of the other culture. Paganism and Christianity are reciprocal cultures that constitute an existential couple. By delving deeper into the study of Greco-Roman culture itself, we would find that before the historical appearance of Christianity, cultural traditions fulfilled the function that it later assumed with a magnitude that was on the scale of the new intellectual world: at the level of the city, initiatory cults—like Orphism and Pythagoreanism or even the mysteries of Cybele—constituted an element of thought that was not pagan properly speaking; the work of Plato reveals the importance of the values that they represented. In order to detail what Christianity is, Tacitus likens it to the cult of Dionysus, with which he will more or less completely conflate it. Considered as a culture, Christianity comes to replace the plurality of the initiatory cults of sacrifice and resurrection; but it is endowed with a power of universality that makes it the antagonist of the official religion of the Roman empire; the compatibility between pure paganism and the various initiatory cults, which already revealed its precariousness, will come to an end when Christianity begins to act as a sort of gravitational attractor for the various aspirations that until then had precisely constituted and been divided up into particular mysteries.

However, this antagonism of complementary cultural aspects has never ceased; today there is still a relative opposition between a civic culture and a religious culture. Nevertheless, there is no possible unity between these two sides of culture at the level of their particular content; only a reflexive thought can discover a unitary meaning of the values in this antagonism; every will to synthesize at the level of these two cultural contents would only end up with a breakdown into stereotyped determinations; this is what is revealed by the examination of these two very insufficient syntheses that constitute civic culture having become religion or religious culture having become the support of a closed society; Masonic thought is self-enclosed in the meditation of abstract civic virtues, and religious faith becomes the feeling of Pharisaic

membership to the little group of faithfuls, affirming through symbolism and ritual its distinction from the other social group. A civicism become religion is opposed to a religion become civicism. And yet, only a thought capable of instituting a veritable *allagmatic* relation between these two aspects of culture is valid; it is thereby not dogmatic but reflexive; the meaning of values disappears in this incompatibility between two cultures; only philosophical thought can discover a dynamic compatibility between these two blind forces that sacrifice man to the city or collective life to the individual search for salvation. Without reflexive thought, culture breaks down into incompatible and unconstructive efforts that consummate civic preoccupation and the search for an individual destiny in a sterile confrontation. The sense of values is the refusal of an incompatibility in the domain of culture, the refusal of a fundamental absurdity in man.

### 3. THE PROBLEMATIC OF AND SEARCH FOR COMPATIBILITY

This antagonism leaves open the place for a possible compatibility if *the individual*, instead of being conceived as a substance or a precarious being aspiring to substantiality, is grasped as *the singular point of an open infinity of relations*. If relation has the value of being, there is no longer any opposition between the desire for eternity and the necessity of collective life. Restrictive civicism, in whatever form it may take, is symmetrical with and sometimes the antidote for a conception of isolated individual destiny; it responds to a substantialism of the individual and is opposed to the former by accepting it. What is tragic about choice is no longer fundamental if choice is no longer what establishes communication between an independent city and an independent individual as substances. Value is not opposed to determinations; it makes them compatible. The sense of values is inherent in the relation through which man wants to resolve conflict by establishing a compatibility between the normative aspects of his existence. Without an elementary normativity, which is dealt with in some way by the individual and already contains an incompatibility, there would be no *problem*; but it is important to note that the existence of a problematic does not resolve the incompatibility that it expresses or designates; indeed, this problem cannot be fully defined in its terms, for there is no symmetry between the terms of the moral problem; the individual can live the problem, but he can only shed light on it by resolving it; the *supplement of being* discovered and created as action is what allows for consciousness after the fact to define the terms in which the problem is posed; when it is a matter of a moral problem, the systematic that

allows us to think the terms of the problem simultaneously is not really possible except starting from the moment when the solution is discovered.

Facing the problem, the subject is on too tenuous a level of being to be able to assume the simultaneous position of the terms between which a relation will be established in action; under these conditions, no pure intellectual approach, no vital attitude can resolve the problem. The sense of values resides in the feeling that prevents us from seeking a solution already given in the world or in the ego, like an intellectual schema or a vital attitude; value is the sense of the optative, and in any case one cannot reduce action to choice, for choice is a recourse to schemas of already preformed actions which, once we eliminate all but one of them, appear to us as if they were truly already existing in the future, as if we were we were necessarily destined not to assume them. A sense of value is what prevents us from having to confront the problems of choice; the problem of choice appears when all that remains is the empty form of action, when technical forces and organic forces are disqualified in us and seem indifferent to us. If there is no initial loss of biological and technical qualities, the problem of choice cannot be posed as a moral problem, since there are no predetermined actions, which are comparable to the bodies that Platonic souls must choose in order to be incarnated. There is neither a transcendent choice nor an immanent choice, one's sense of value is derived from the self-constitution of the subject by his own action. The moral problem that can be posed by the subject is therefore at the level of this ongoing constructive mediation due to which the subject progressively becomes conscious of the fact that he has resolved problems when these problems have been resolved into action.

#### 4. CONSCIENCE AND ETHICAL INDIVIDUATION

It could be noted that in such a conception, one's conscience<sup>1</sup> seems to have no role to play. In fact, it is impossible to dissociate one's veritable conscience from action; consciousness is the reactivity of the subject with respect to himself, which allows him to exist as an individual by being to himself the norm of his action; the subject acts by controlling himself, i.e. by putting himself in the most perfect communication possible with himself; consciousness is this return of the subject's causality back onto himself when an optative action is on the verge of resolving a problem. One's conscience differs from psychological consciousness insofar as psychological consciousness expresses the reverberation within the subject of his acts or of events in accordance with the subject's present state. Consciousness is judgment according to a current

and actual determination; conversely, one's conscience relates acts or the beginnings of acts to what the subject strives to be at the end of this act; one's conscience can only do so in an extremely precarious fashion by somehow "extrapolating" so as to account for the current and actual transformation of the subject; one's conscience is all the finer when it better manages to judge in accordance with what the subject will be; this is why there is a relative indetermination in the domain of conscience, since one's conscience from the start establishes an initial type of reactivity, like mere psychological consciousness, and then a second type of reactivity that stems from the fact that the modalities of this return of causality depend on the regime of action that they control: in this recurrence of information, the subject is a being that is endowed not only with a simple internal teleology but also with a teleology that is itself submitted to a self-regulation: psychological consciousness is already regulative; one's conscience is a regulative consciousness submitted to an internal self-regulation; this doubly regulative consciousness can be called normative consciousness. It is free because it elaborates its own regime of regulation itself. This freedom cannot be found in any being or any system that would only depend on a single set of conditions; it would lead to an indetermination or an activity that would be iterative, oscillatory, or based on relaxation; this freedom can only be found in the self-creation of a regime of compatibility between asymmetrical conditions, like the ones we find at the basis of action. A teleological mechanism can imitate the functioning of psychological consciousness, which can be instantaneous; but teleological mechanism cannot imitate conscience, for it never has a twofold and simultaneous conditioning; the organic and the technical must already be present, close to being put into relation, in order for conscience to be able to exist. Valorizing consciousness therefore defines a level of teleological activity that cannot be reduced to any automatism. The solution to the moral problem cannot be sought by a computer.

##### 5. ETHICS AND THE PROCESS OF INDIVIDUATION

Certainly, automatic and stereotyped behaviors emerge once the conscience abdicates; afterwards, thought via species and genera replaces the meaning of values; moral classification characterizes simple social or organic teleology and is basically automatic. This is what can be discovered by utilizing national stereotypes as a means of thinking morally: after a short amount of time, we wind up with a blockage of conscience or even psychological consciousness, and we remain at the level of positive or negative social instincts, like

xenophobia, the assimilation of foreigners to dirty beings. One can see the same thing play out in groups, which are supposed to share the same feelings as part of similar specific social classes. What creates an illusion here is the facile convergence contained within group feelings or instincts that seems to give them the power to resolve problems by way of an easily obtained collective consent. But in fact, purely regulative feelings are much less stable than the values elaborated by individuals; a change in social circumstances is enough to reverse stereotypes and give rise to a different convergence; social sentiments could be compared to this magnetization that is easy to produce in a magnetic metal below the Curie point; a slightly intense field is all it takes to change the residual magnetization; conversely, if the molecules have been magnetized above the Curie point and have been able to be oriented in the field and then are cooled back down while conserving this magnetization, a much more intense demagnetizing field is required to demagnetize the metal; this is because it is not simply a question of a group phenomenon but of a magnetization and orientation of each molecule taken individually.<sup>2</sup> People united by the sense of the same value cannot be divided by a simple organic or technical circumstance; friendship contains a sense of values that founds a society on something other than the vital necessities of a community. Friendship requires an exercise of conscience, and a sense of community requires the exercise of an action. Community is biological, whereas society is ethical.

Consequently, we can understand that societies cannot exist without communities but that the reciprocal of this affirmation is not true and that there can be communities without societies; the distinction that Bergson makes between closed societies and open societies is no doubt valid, but open societies correspond to an influence of individuals over their mutual relations, while community, the statutory form of relation, does not require conscience to exist; every society is open to the extent that the only valid criterion for them is constituted by action, without there being a σύμβολον [súmbolon] of a biological or technical nature to recruit or exclude members to or from this society. A society whose sense is lost because its action is impossible becomes a community and consequently becomes closed and therefore elaborates stereotypes; a society is a community in expansion, whereas a community is a society that has become static; communities utilize a thought that proceeds by inclusions and exclusions, genera and species; a society utilizes an analogical thought in the veritable sense of the term and does not acknowledge merely two values, but a continuous infinity of degrees of value, from nothingness to the perfect, without there being any opposition

of categories of good and evil and of good and bad beings; for a society, only positive moral values exist; evil is a pure nothingness, an absence, and not the mark of a voluntary activity. The reasoning of Socrates, οὐδείς ἐχὼν ἀμαρτάνει [οὐδεὶς hechòn amartáneì],<sup>3</sup> according to which no one does evil or wrong willingly, is remarkably revealing as to the veritable conscience of the individual and of a society of individuals; in fact, since one's conscience is self-normative and self-constitutive, it is essentially placed in the alternative either of not existing or of not doing evil or wrong willingly; it supposes that the relation to other people is a relation of individual to individual in a society.

Conversely, in a community, exterior communities (due to the fact that they are exterior) are thought to be bad; the categories of inclusion and exclusion are contained in their implicit type, which is interiority or exteriority with respect to the community; out of these primitive categories of inclusion and exclusion, which correspond to actions of assimilation and disassimilation, there develop annexed categories of purity and impurity, kindness and harmfulness, which are the social roots of the notions of good and evil. Here, there are symmetrical notions, like those that the living individual manifests in the bipolar opposition of the dangerous and the assimilable. The bipolarity of values reveals a community; the unipolarity of values reveals a society. We should note here that technical activity does not introduce a bipolarity of values in the same way as biological activity; indeed, for a being who constructs, there is no good or bad, but the indifferent and the constructive, the neutral and the positive; the positivity of value stands out from a background of neutrality, and this neutrality is fully provisional and completely relative, since what is not yet useful can become so depending on the acts of the constructive individual who will know how to use it; on the contrary, what has received a functional role in labor cannot lose it again and is thereby always found to be invested with a characteristic of value; value is irreversible and completely positive; there is no symmetry between value and the absence of value.

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## Individuation and Invention

### 1. THE TECHNICIAN AS PURE INDIVIDUAL

Technical activity consequently can be considered as an introductory element to veritable social reason and an initiatory element to the sense of the freedom of the individual; in fact, the community identifies the individual with his function, which is organic or technical; yet, while it can totally identify the individual with his organic function and his organic state (the young, the old, the warrior), it cannot make him totally adhere to his technical function: for example, in the Homeric tales, the figure of the physician is depicted all by himself as equivalent to several warriors (πολλῶν ἀντάξιός ἐστι [pollon antáxiós esti])<sup>1</sup> and is therefore honored with this in mind. This is because the physician is the technician of healing; he has a magical power; his strength is not purely social, like that of the chief or the warrior; his social function is what results from his individual power, and not the other way around; the physician is more than man defined by his integration into the group; he is, all by himself; he has a gift that is given to him alone, that is not taken from society, and that defines the consistency of his directly grasped individuality. He isn't just a member of a society but a pure individual; in a community, he is like another species; he is a singular point and is not submitted to the same obligations and the same prohibitions as other men. The sorcerer or the priest are also the bearers of a superior technics through which natural forces are captured or divine powers are rendered favorable; one man alone can stand up to the leader of the army, one alone can command his respect: the prophet Tiresias is more powerful than any other being defined by his function, since he is the technician of foreseeing the future. Even a king is bound to his function, despite the fact that he may be *legibus solutus*, "above the law." In a community, the technician contributes a new and irreplaceable element,

that of direct dialogue with the object insofar as it is hidden from or inaccessible to the people of the community; from outside the body the physician knows the mysterious functions that take place within the organs. The prophet reads in the entrails of victims the hidden fate of the community; the priest is in communication with the will of the gods and can modify their decisions or at the very least know their judgments and reveal them.

Six centuries before the birth of Jesus Christ, the engineer in the Greek cities of Ionia becomes the technician *par excellence*; he brings to these cities the power of expansion, and he is the one who is εὐμήχανος ἐς τέχνας [euméchanos es téchnas], mechanically crafty and ingenious. Thales, Anaximander, and Anaximenes are technicians above all else. We should not forget that the first appearance of a free individual thought and a disinterested reflection is the product of technicians, i.e. men who know how to stand apart from the community in a direct dialogue with the world. Tannery has shown in his work *Pour une histoire de la science hellène* the dominant role of technical thought in what he calls the “Greek miracle”; the miracle is the arrival within the community of the pure individual, the one who joins the two conditions of reflexive thought in it: organic life and technical life. These first technicians have revealed their strength by predicting a solar eclipse, just like Thales did. Technics and labor cannot be conflated; in fact, by losing its characteristic of operating on a hidden object, labor is no longer a technics; the veritable technician is the one who is a mediator between the community and the hidden or inaccessible object. Today we call technicians those who in reality are specialized laborers but do not put the community in relation with a hidden domain; an absolutely elucidated and divulged technics is no longer a technics but a type of labor; “specialists” are not veritable technicians but laborers; the veritable technical activity today is in the domain of scientific research, which because it is research is oriented toward objects or properties of objects that are still unknown. Free individuals are those who carry out research and thereby institute a relation with the non-social object.

## 2. THE TECHNICAL OPERATION AS A CONDITION OF INDIVIDUATION, INVENTION AND AUTONOMY; COMMUNITY AND TECHNICAL TRANSINDIVIDUAL RELATION

The rapport of Man to the world can in fact be effectuated either through the community, i.e. through labor, or from the individual to the object in a direct dialogue, i.e. technical effort: the technical object elaborated in this way defines a certain crystallization of creative human action and perpetuates it in being;

technical effort does not submit to the same temporal regime as labor; labor exhausts itself in its own achievement, and the being who labors is alienated in his work, which increasingly becomes distant with respect to himself; conversely, the technical being realizes the summation of an availability that always remains present; effort, extended in time without dissipating, discursively constructs a coherent being that expresses the action or series of actions that have constituted it and that conserves them as always present: the technical being mediates human effort and confers an autonomy on it that the community cannot confer on labor. The technical being is participable; insofar as the nature of the technical object resides not only in its actuality but also in the information that it determines and that constitutes it, it can be reproduced without losing this information; as a being of information, it is therefore inexhaustibly fruitful; the technical object is open to being used or recreated by every human activity and is inserted into an impulse of universal communication. The Sophists understood and expressed this value of technical effort, which frees man from the community and makes him a veritable individual. Man is not just a ζῶον πολιτικόν [zoon politikón], or political animal, but also a ζῶον ἰεχνικόν [zoon technikón], or technical animal, and the communication of technical thought is imbued with the characteristic of universality down to its coarsest or most elementary forms. Auguste Comte noted the inherence of the “necessary seeds of positivity” to the technical operation.

The technical operation in fact brings about what labor or the other communal functions cannot: the reactivity of the act; constructive activity gives man the real image of his act, because what is currently the object of construction becomes the means for a later construction due to an ongoing meditation; this continuous and open regime of the time of technical effort is what allows the individual to have a reactive awareness of his own action and to be his own norm to himself. Furthermore, technical norms are fully accessible to the individual without the need to resort to a social normativity. The technical object is either valid or not according to its internal characteristics, which express the schematism inherent in the effort by which it is constituted. An intrinsic normativity of the acts of the subject, which requires their internal coherence, is defined based on the inventive technical operation. These norms are never enough to produce invention, but their immanence to the subject conditions the validity of his effort. The technician can only act freely, for technical normativity is intrinsic with respect to the action that constitutes it; this normativity is not exterior or anterior to action; yet action is also not anomic, because it is not fruitful unless it is coherent, and

this coherence is its normativity. Technical normativity is valid insofar as it exists veritably in itself and not in the community. The adoption or refusal of a technical object by a society means nothing for or against the validity of this object; technical normativity is intrinsic and absolute; it can even be said that the penetration of a new normativity into a closed community is made possible by way of technics. Technical normativity modifies the code of values of a closed society, because there is a systematic of values, and by admitting a new technics, every closed society that introduces values inherent to this technics thereby carries out a new structuration of its code of values. Since there is no community that does not utilize any technics or that never introduces new ones, there is no completely closed and unevolving community.

Every social group is a mixture of community and society, if a community is defined as a code of extrinsic obligations with respect to individuals, and if a society is defined as an interiority with respect to individuals. Communal effort and technical effort are antagonistic in a determined society; communal forces tend to incorporate techniques in a system of social obligations by assimilating technical effort to a labor; but technical effort obliges the community to always rectify its structure so it can incorporate ever new creations, and this effort submits the community's structure to judgment according to its own values by analyzing the community's dynamic characteristics that this structure predetermines. Positivist technicism is a very clear example of the way in which such a thought introduces new values into the community and is more than a sort of sociology. A sociology that believes itself capable of grasping human reality in its specificity does not take into account the pure individual and techniques in their genesis and therefore defines the social only by way of obligation, but, in doing so, it ignores an important part of social reality, a part that can, in certain cases, become more dominant. Collective reality is indissociably communal and social, but these two characteristics are antagonistic, and monistic sociology cannot account for this antagonism.

It would be incorrect to maintain that the community only reacts against the deleterious effects of the individual who seeks to satisfy his egoistic desires; an inventor or a scientist is no more egoistical than a painter or a poet; however, the community accepts the painter or the poet but balks at invention, since in invention there is something beyond the community that establishes a transindividual relation, going from individual to individual without passing through the communal integration guaranteed by a collective mythology. The immediate relation between individuals defines a social existence in the proper sense of the term, whereas the communal relation does not make

individuals communicate with one another directly but constitutes a totality through the intermediary of which they communicate indirectly and without a precise awareness of their individuality. A theory of community overlooks the dynamism of a society of individuals; to be complete, sociology must integrate a study of techniques. Just like the humanism of the Sophists, humanism must also integrate a study of techniques.

It could be objected that technical creation is something rare and that under these conditions individual behavior can only be very exceptional; nevertheless, there is a radiation of values around a behavior, and a behavior is not isolated in the sum of the individual's actions, no more than an individual is isolated in the social milieu in which he exists; the individual's very nature is to communicate, to radiate around him the information that propagates what he creates; this is what is made possible by technical invention, which is unlimited in space and time; technical invention propagates without losing strength, even when it is associated with another element or is integrated into a more complex whole; the work of the individual can indeed propagate beyond the individual himself in two ways: as a technical work properly speaking, or as a consequence of this work in the form of a modification of the collective conditions of existence, which imply values and requirements. Thus, the invention of a rapid means of communication is not nullified by the discovery of a faster means; even if the technical procedures are totally transformed, there remains a dynamic continuity that consists in the fact that the introduction of the first mode of transport into the community has developed a requirement of rapidity that serves to promote the second mode strongly: the first mode has created the function and inserted it into the set of dynamisms of the community. Every technical device [*dispositif*] modifies the community to a certain degree and introduces a function that can make possible the advent of other technical devices; thus, it is inserted into a continuity that does not exclude change but stimulates it, since requirements always exist before their realizations. In this sense, the technical being is converted into civilization; furthermore, a technical being, even when it is barely integrated into the community, has value as an object to be comprehended; it requires a type of perception and conceptualization that aims to comprehend the technical being by recreating it; the technical being therefore exists as a seed of thought that contains a normativity extending far beyond itself. The technical being in this second manner therefore constitutes a path that transmits from individual to individual a certain capacity of creation, as if there were a dynamism common to all research and a society of individuals who create technical beings.

This second direction also pertains to the transformation of the technical being into an element of civilization. Civilization is consequently the set of the community's dynamisms and of the dynamisms of different societies that encounter in the world of technical beings a condition of compatibility. Even if the notion of progress cannot be directly accepted and should be elaborated by a reflexive labor, it is indeed this compatibility of the community and of societies that finds a meaning in the notion of progressive development. Progress is the characteristic of development that integrates into a whole both the meaning of successive discontinuous discoveries as well as the stable unity of a community. Community and society can become synergistic through the intermediary of technical progress. Ultimately, the technical being's own consistency is constituted as an expanding reality within the temporal continuity of the technical universe, in which a twofold, simultaneous, and successive solidarity links technical beings together through a mutual conditioning; we could speak of an internal resonance of the technical universe within which each technical being effectively intervenes as a real condition of existence for other technical beings; each technical being is therefore like a microcosm that encompasses within its conditions of monadic existence a very large number of other valid technical beings; a circular causality creates a reciprocity of conditions of existence that gives the technical universe its consistency and its unity; this current unity persists through a successive unity that renders humanity comparable to someone (as Pascal says) who would always grasp everything without ever forgetting. The value of the individual's dialogue with the technical object is thus to conserve human effort and to create a domain of the transindividual, distinct from the community, in which the notion of freedom takes on a meaning and transforms the notion of individual destiny but does not nullify it. The fundamental characteristic of the technical being is to integrate time into a concrete and consistent existence; it is consequently the correlate of the individual's self-creation.

No doubt this aspect of the technical object hasn't been completely ignored; a particular form of the technical object as a seed of civilization has been recognized and honored for a long time: the artificial aesthetic object, i.e. the *objet d'art*. The religious and magical origins of the *objet d'art* were enough to indicate its value; but we should note that the *objet d'art* has become disconnected from its origins and has become a pure instrument of communication, a free means of expression, even at a time when the poet was still a soothsayer. However, the aesthetic object's status of existence is precarious; it is reinserted into the life of the community obliquely and is only accepted

if it corresponds to one of the already existing vital dynamisms. Every artist then remains the Tyrtaeus<sup>2</sup> of a community; this kind of recourse consists in forming a community of people of taste, an informed cenacle of authors and critics who cultivate pure art; but then pure art becomes the σύμβολον [súmbolon] of the members of this community and thereby loses its pure character; it closes in upon itself. Surrealism was the latest attempt to save pure art; this effort has a very noble sense; it is not up to us to say whether surrealism was paralyzed by its own effort and has ended up in an aestheticism despite itself; but we should note that the liberating paths of surrealism lead to the construction of an object that is stable, self-organized like an automaton, independent from its creator, and indifferent to the one who encounters it. Surrealism, so to speak, is in the hyper-functional manner of constructing the object; this object is neither useful nor agreeable; it is consistent unto itself and turned back to itself, and it is absurd because it has not complied with the obligation of signifying in a reality other than its own.

The object is endowed with internal resonance, which is palpable even in poetic forms or in painting. The surrealist object is an absolute machine. There is no function that remains essential to it, not even that of γοητεία [goeteía].<sup>3</sup> For it to be produced by chance would require an encounter that would break the natural finality of an ensemble and allow for the appearance of a being divorced from its function, which would consequently make this being absolute, “extraordinary.”<sup>4</sup> The surrealist object tends toward a positive surreal, and one of the paths of this surreal is that of the technical being, which is extraordinary because it is new and beyond utility. The technical being reproduced and disclosed through industry loses its surreal value to the extent that the anesthesia of everyday use deprives perception of the object’s singular characteristics. Seen as a utensil, the technical being no longer has meaning for the individual. The community appropriates it, normalizes it, and gives it a use value that is foreign to its own dynamic essence. But every technical object can be rediscovered by the individual whose “technical taste” and “technical culture” are sufficiently developed. Thus, the technical object is a surreal, but it can only be felt as such if it is grasped by the pure individual, by someone who can be creative, and not by a user who treats the technical object as a mercenary or a slave.

### 3. INDIVIDUATION OF THE PRODUCTS OF HUMAN EFFORT

Until now, we have not attempted to analyze the technical object other than indirectly through its rapport to the one who produces or uses it without

trying to define its internal structure and dynamism. However, if the object's rapport to man in this case presents the characteristics of a relation, we should rediscover in the technical object an analogical structure and an analogical human dynamism. These two internal characteristics of the technical object cannot be understood if the technical object is conflated with the tool, which then makes it lose its individuality and therefore its own value; as Piaget has remarkably shown based on archaeological and ethnographic considerations, the tool is deprived of its own individuality because it is grafted onto another individualized organism's body part and because its function is to extend, reinforce, and protect but not replace the latter. A spyglass is not a technical being endowed with its own individuality, since it supposes the eye and has no dynamic meaning except in front of an eye (or in front of a photographic apparatus which prepares the view that the eye will observe); its dynamism is incomplete; the spyglass is made to be manipulated and controlled by the individual who sees (or by the photograph), and these individuals are humans. Pliers are the refined and hardened extension of human nails or human hands. A hammer is an unfeeling and hardened fist. The evolution of the forms of the door knocker shows that in the beginning it was conceived as a hand holding a bronze ball, with the wrist being replaced by a pivot affixed to the door. The Greek key was originally a thinned arm ending with a hook, and one would introduce it into a narrow cleft in the door through which one could grab the interior bolt. Theocritus describes the priestess bearing on her shoulder the key of a temple, the insignia of her function and her majesty. The modern key in some sense is still a hook for opening a door. Conversely, rather than extensions of the human individual, motors are beings that contribute from outside an available energy according to the individual's needs; they are endowed with exteriority relative to the structure and dynamic of the individual. This is why they initially appear to be endowed with individuality; the slave is the primordial model for every motor; the slave is a being who contains his complete organization and his organic autonomy within himself, even when his action is subjugated by an accidental domination; the domesticated animal is also an organism. Even with the degradation of the state of domestication or slavery, the organic and living motor conserves an inalienable individuality due to its natural spontaneity. The blind slave who flees along the road from Larissa is an individual, just like the enraged animal that becomes wild again at the risk of its own life. The revolt of animals and slaves, despite the whip and the gallows, shows that these organic motors have an autonomy, a nature that can at least manifest its autonomy in destructive fury beyond any estimation of the dangers or

the chances. Despite the well-known definition, a slave is never completely a speaking tool: the tool has no individuality.

However, the technical being is more than the tool and less than the slave; it possesses an autonomy, but one that is relative, limited, without any veritable exteriority with respect to the man who constructs it. The technical being has no nature; it can be a functional analogy of the individual, but it is never a veritable organic individual. Let's suppose that a machine has been endowed with the most perfect teleological mechanisms by its constructors and that it is capable of carrying out the fastest and most perfect labors; this machine, which is functionally equivalent to thousands of humans, even so will not be a veritable individual; the best calculating machine does not have the same degree of reality as an ignorant slave, because the slave can revolt, while the machine cannot; with respect to man, the machine cannot have any veritable exteriority, because it has no veritable interiority within itself. The machine can lose its regularity and then present functional characteristics analogous to wild behavior in a living being. But it cannot revolt. Revolt in fact implies a profound transformation of *finalized behaviors* and not a *malfunctioning of behavior*. The machine is capable of self-adaptive behaviors; but there is nevertheless a big difference between a self-adaptive behavior and a *conversion* that no external resemblance can disguise: man is capable of conversion in the sense that he can change *goals [fins]* throughout the course of his existence; individuality is beyond teleological mechanism because it can modify the orientation of this finality. Conversely, the machine is more perfect when its automatism allows it to self-regulate according to its predetermined finality. But the machine is not self-creative. Even if we suppose that the machine regulates its own teleological mechanisms during its functioning, we only obtain a machine that is capable—by means of this teleology acting on a teleology—of integrating the results of the preceding stages of its functioning as data; this is a machine that increasingly *reduces* the margin of indetermination of its functioning according to the data of the milieu and in conformity with a convergent determinism. Consequently, this machine adapts. But adaptation is possible according to two opposite processes: the first is what we have described as training, which ends in a more or less stereotyped behavior and an increasingly restricted link with a determined milieu. The second form of adaptation is learning, which on the contrary increases the availability of the being with respect to the different milieus in which it is found by developing the richness of the system of symbols and of dynamisms that integrate past experience according to a divergent determinism. In this second case, the quantity of information characterizing the structure

and the reserve of the schemas contained in the being increases; the successive abrupt leaps that can be called *conversions* mark the moments where, because the unintegrated quantity of information has become too large, the being unifies itself by changing its internal structure to adopt a new structure that integrates the accumulated information.

This characteristic of discontinuity, this *existence of thresholds*, does not appear in the automaton, since the automaton does not change structure; it does not incorporate the information that it acquires into its structure; there is never an incompatibility between the structure that the automaton possesses and the information that it acquires, because its structure in advance determines which type of information it can acquire; thus, there is never a veritable problem of integration for the automaton but merely a question of the preservation of information that is by definition integrable, since information is homogeneous with respect to the structure of the machine that has acquired it. Conversely, the individual possesses an open faculty for acquiring information, even if this information is not homogeneous with respect to its actual structure; thus, in the individual a certain margin remains between the actual structure and the acquired information, which, since it is heterogeneous with respect to the structure, requires the being's successive recastings<sup>5</sup> and its capacity to call itself into question. This capacity to itself be one of the terms of the problem to be resolved does not exist for the machine. The machine has questions to solve, not problems, because the terms of the difficulty that the machine must resolve are homogeneous; on the contrary, the individual must resolve a difficulty that is not expressed in terms of homogeneous information but consists of an object term and a subject term. This is why the teleological mechanism of technical beings is universally constituted by a circular causality: the signal of the difference between the pursued goal and the effectively attained result is fed back to the controls of the machine so as to direct a functioning that diminishes the gap that has caused the signal. This reactive causality adapts the machine; but in the case of the individual, the signal is not that of a discrepancy between an effective result and a desired result: it is that of a dissymmetry between two finalities, one realized as structure, the other of which is immanent to a set of information that is still enigmatic and nevertheless imbued with value.

Clarity and compatibility do not appear in this virtual system unless the problem is resolved due to a structural change in the individual subject according to an action that creates a veritable relation between the previously structured individual and its new charge of information. The notion of adaptation remains insufficient to account for the reality of the individual; it

is in fact a question of a self-creation through abrupt leaps that reform the structure of the individual. The individual in its milieu does not merely encounter elements of exteriority to which it must adapt like an automatic machine; it also encounters information imbued with value that calls into question the orientation of its own teleological mechanisms; the individual integrates information through self-transmutation, which defines it as a dynamically unlimited being. The individual problematic is beyond the rapport between the being and its milieu; this problematic in fact requires solutions through overcoming and not through the reduction of a discrepancy between a result and a goal. The individual problematic can only resolve through constructions, through an increase of information according to a divergent determinism, and not through a calculation. All machines are like calculating machines. Their axiomatic is fixed for their whole operation, and the fulfillment of the operation does not react upon the axiomatic. Conversely, the individual is a being in which the fulfillment of the operation reacts on the axiomatic via intense crises that are a recasting of the being. The continuity of the machine's functioning is opposed to the continuity interspersed with discontinuities that characterizes the individual's life.

For this reason, reflection must refuse an identification between the automaton and the individual. The automaton can be the functional equivalent of *life*—for life includes functions of automatism, self-regulation, and homeostasis—but the automaton is never the functional equivalent of the *individual*. The automaton is communal and not individualized like a living being that can call itself into question. A pure community would behave like an automaton; it would elaborate a code of values that is meant to prevent changes of structure and avoid the position of problems. The meaning of societies, which are synergistic groupings of individuals, on the contrary lies in the search for the resolution of problems. Societies call their own existence into question, while communities seek to persevere in their being. Norbert Wiener has analyzed the way in which the community's powers of rigidity guarantee its homeostasis. The community tends to automatize the individuals that comprise it by giving them a pure functional signification. From then on, the individual's capacity to call itself into question is dangerous for the stability of the community; indeed, nothing guarantees the synchronism of individual transformations, and the inter-individual relation can be broken by a pure individual initiative. Consequently, as a superior formal coefficient that conditions the functional value of an individual in the community, *affective stability* becomes the fundamental criterion that allows for the ongoing integration of the individual into the group; this guarantee

of continuity is also a guarantee of social automatism. This stability is the correlate of the community's capacity to adapt. And yet, these qualities of direct adaptation through assimilation and of structural stability define the perfect automaton. Every civilization requires a certain rate of automatism to guarantee its stability and cohesion. Every civilization also needs the dynamism of societies, which alone have the capacity for a constructive and creative adaptation that does not lock itself into a stereotyped, unevolving, and hypertelic adaptation. Nevertheless, the human being is a fairly dangerous automaton that always risks inventing and equipping new structures. The machine is an automaton that is superior to the human being qua automaton, since it is more precise in its teleological mechanisms and more stable in its characteristics.

#### 4. THE INDIVIDUATING ATTITUDE IN THE HUMAN RELATION TO THE INVENTED TECHNICAL BEING

The following question therefore arises: which values are engaged in the relation of the individual to the technical being? We would like to show that every attempt to constitute a symmetrical relation between man and the technical being is just as destructive for the values of the individual as for those of the technical being. Indeed, one can try to identify the machine with the individual or the individual with the machine in an equally destructive way. In the first case, the machine becomes a property of man, and man takes great pride in his creature and only produces it so as to subjugate it to the needs or uses of each individual, thereby taking satisfaction from his mechanical servant down to his most singular fantasies: the taste for mechanisms in everyday life sometimes corresponds to an uninhibited desire to command through domination. Man behaves toward machines like a master toward his slaves, sometimes taking great joy in the excessive spectacle of their violent and dramatic destruction. This singular despotism of civilized man demonstrates a possible identification of man with mechanical beings. Circus games have evolved into competitions between machines, and gladiator fights have evolved into the demolition derbies of "stock cars."<sup>6</sup> Movies love to show the spectacular destruction of mechanical beings. The vision of machines can take an epic turn: man rediscovers a certain primitiveness in this vision. But this attitude of man's superiority over the machine precisely corresponds above all to leisure activities, to the relaxation of humans no longer restrained by the community, whose compensation is simple tyranny over enslaved mechanical subjects.

The inverse and complementary attitude is that of man in his communal function; there, he serves the machine and is integrated into this vaster machine that the community is by serving his particular machine according to the fundamental values of the code of automatism (for example, the speed of responses to signals). Sometimes the machine itself bears the recorders that will allow the community to judge the behavior of man at work (black box). The relation of the individual being to the community passes through the machine in a sufficiently industrialized civilization. Here, the machine assimilates man by defining communal norms. Moreover, a supplementary normality arises from the machine when this normality is used to classify individuals according to their performances or aptitudes; no doubt, it is never the machine that judges, since it is a pure automaton and is used only for calculating. But in order to be able to use the machine, men in their rapport to the machine must express themselves according to systems of information that are easily translatable with the machine's coding into a set of signals that have a meaning for the machine (i.e. that correspond to a determined functioning). This necessity for human action to be translatable into the language of automatism leads to a valorization of the stereotypy of behaviors. Lastly, the quantity of information itself, in a relation of individual to individual, becomes an obstacle to the transmission of this information via a path that utilizes automatism. For example, a civilization that adapts its means of communication to an automatic transmission of messages is led to replace the direct and particular expression of feelings in communal circumstances (already subject to various uses) for more perfectly stereotyped formulas that are inscribed in fine print on an invoice at the bureau of departure and imprinted with ready-made formulas at the bureau of arrival; it then suffices to transmit the address of the addressee, the number of the formula, and the name of the sender. Here, the atypical individual becomes paralyzed in his choice, since no predictive formula corresponds quite exactly to what he wanted to express. The atypical, which costs the community a very large expenditure of information, is a deficient being once information is indirectly transmitted from individual to individual through the intermediary of a device that utilizes automatism; a voice too deep, too shrill, or too rich in harmonics is more deformed by telephonic transmission than a voice whose average frequencies are situated within the telephonic bands and do not pose any difficult problem to equipment relative to transmodulation. Normality becomes a norm, and the average characteristic becomes superior in a community wherein values have a statistical sense.

However, these two inverse attitudes of stereotypy and fantasy, of private tyranny and communal slavery with respect to the technical object, stem from

the fact that the relation between man and machine is not really dissymmetrical. It is a double assimilation, not a constructive analogical relation. Conversely, let's consider the noble relation between man and machine: it seeks to degrade neither of the terms. Its essence resides in the fact that this relation has the value of being: it has a doubly genetic function, both toward man and toward the machine, whereas in the two preceding cases, the machine and man were already fully constituted and defined the moment they would have encountered one another. In a veritable complementary relation, man must be considered as an incomplete being made whole thanks to the machine, whereas the machine in turn discovers its unity, finality, and connection with the ensemble of the technical world through its relation with man; man and machine are mutually mediating because the machine possesses in its characteristics spatial integration and the capacity to preserve information through time, whereas man, through his faculties of knowledge and his power to act, knows how to integrate the machine into a universe of symbols that is not spatiotemporal and into which the machine could never be integrated by itself. A relation is established between these two asymmetrical beings due to which a double participation is realized; there is a chiasmus between two universes that would remain separate; it could be noted that the machine is based on human effort and that it is therefore part of the human world; but in fact, the machine incorporates a nature, it is made of matter, and it is directly inserted into spatiotemporal determinism; even though it originates with human labor, it conserves a relative independence with respect to its constructor; the machine can pass into other hands, it can become the link in a series that its inventor or constructor did not predict. Nevertheless, a machine only takes on its meaning in an ensemble of coordinated technical beings, and this coordination can only be thought by man and constructed by him, since it is not given in nature.

Man confers on the machine an integration into the constructed world within which it finds its functional definition through its relation to other machines; but it is the machine, and each machine in particular, that confers stability and reality onto this constructed world; the machine gives back to this constructed world part of the natural world, i.e. the condition of its materiality, its spatiotemporality, without which this constructed world would have no depth or consistency. In order for this relation between man and machine to exist, there must be a twofold condition in man and in machine. In man, there must be a technical culture (formed by intuitive and discursive, inductive and deductive knowledge) of the apparatuses that constitute the machine, implying awareness of the technical schemas and qualities

materialized in the machine. Man must be familiar with the machine according to a knowledge that is adequate in its principles, details, and history; at that point, the machine will no longer be for him a simple instrument or a servant that never protests. Every machine crystallizes a certain number of efforts, intentions, and schemas and invests a certain aspect of the nature of chemical elements. Its characteristics are mixtures of three things: technical schemas, properties of the elements of the constituents of matter, and the laws of the transformation of energy. True technical culture requires a scientific knowledge; it teaches us to not hold any technical being in contempt, including much older ones; in the old-fashioned or antiquated exterior characteristics, true technical culture rediscovers the meaning of a scientific law and the property of a material element; the technical being grasped in its reality defines a certain mediation between man and the natural world; technical culture allows us to grasp this mediation in its authentic reality.

A technical taste can develop that is comparable to aesthetic taste and moral refinement. Many men behave primitively and crudely in their relation to machines due to a lack of culture. The stability of a civilization that includes an increasingly large number of technical beings would be impossible to attain unless the relation between man and machine will be at equilibrium and imprinted with wisdom according to an interior *restraint* that only a cultural technology may provide. The frenzy for possessing machines and the excessiveness of their utilization is comparable to a veritable disruption of mores. Machines are treated as consumer goods by a crude and ignorant humanity, which passionately throws itself on everything that presents a character of external and created novelty to just as quickly toss them aside as soon as their novel qualities have been exhausted. Cultivated man must have a certain respect for the technical being, precisely because he knows its veritable structure and its real functioning.

The *truth* and *authenticity* of the machine must correspond to man's cultural refinement. However, insofar as human taste is corrupted, industrial civilization cannot produce truly authentic machines because this production is subjected to trending commercial conditions; it then must contort itself to the conditions of opinion and collective taste. However, if we consider the machines that our civilization allows the individual to use, we will see that their technical characteristics are obliterated and concealed by an impenetrable rhetoric, covered over by a mythology and a collective magic that can hardly be elucidated or demystified. Today, most of the contemporary machines used in everyday life are instruments of flattery. There is a sophistry of presentation that seeks to give a magical spin to the technical being in

order to lull the individual's active powers to sleep and lead him into a hypnotic state wherein he experiences the pleasure of commanding a throng of mechanical slaves that are not very faithful or diligent but are always flattering. An analysis of the "luxurious" characteristic of technical objects would reveal what deceptiveness they hold; for many apparatuses, the fetishism of the control panel conceals the poverty of technical devices, and the singular ignorance of their fabrication is hidden underneath an impressive streamlining. Sacrificing itself to a depraved taste, technical construction is an art of facade and sleight of hand. The state of hypnosis extends from the purchase to the utilization; in commercial propaganda itself, the technical being is already adorned with a certain communal signification: to buy an object is to acquire a title of belonging to a certain community; this is to aspire to a type of existence characterized by the possession of this object: the object is coveted as a sign of communal recognition, a σύμβολον (symbol) in the Greek sense of the term. Then, the state of hypnosis persists in its utilization, and the object is never known in its reality but merely for what it represents.

Consequently, besides the severe constraints that it imposes on the individual, the community offers a certain compensation that prevents the individual from revolting and having a keen awareness of his problems: the ever latent state of restlessness is always deferred through technical hypnosis, and the individual's life ebbs and flows in a balancing act between the constraints of social rigidity and the gratifying states that the community procures through technical incantation. This state is stable, since the commercialization of industry finds an easier path in the action upon collective opinion than in veritable research and real technical perfections, which would have no commercial values because they would remain misunderstood by the majority of people who are only informed by way of commercial pathways. To break this vicious circle, it is not enough to say that man must direct the machine instead of allowing himself to be enslaved by it; it must be understood that if the machine enslaves man, this is to the extent that man degrades the machine by turning it into a slave. If, instead of seeking states of hypnosis in the machine or a simple source of marvels for the ignorant, man associates the machine with states in which he is veritably active and creative, as is the case in scientific research, the communal aspect of the machine can disappear. If we consider the machines used in scientific research, we will see that, even when they utilize a very complex automatism, they do not enslave man and are no longer enslaved by him; they are not the object of consumption, and they are no longer beings meant to produce a labor that is predetermined in its results, expected and demanded by the community that

forces its obligation on the individual. Under these conditions, the machine is integrated into the causal chain of human effort; the goal of this effort surpasses the machine that is put into action. The machine then realizes the mediation with respect to the object of research and not with respect to the community. It is erased from the individual's field of perception; the individual does not act on the machine; he acts on the object and observes the object through the machine. Due to the machine, a cycle is established that goes from the object to the subject and from the subject to the object: the machine extends and adapts the subject and the object to one another by way of a complex interlinking of causalities. The machine is a tool insofar as it allows for the subject to act on the object, and it is an instrument insofar as it brings signals coming from the object to the subject; it conveys, amplifies, transforms, translates, and conducts an action in one direction and an information in an inverse direction; it is both tool and motor at the same time. The reciprocal characteristic of this twofold relation ensures that man is not alienated in the presence of this machine; he remains man, and it remains machine. The position of man and the position of machine are not symmetrical with respect to the object; the machine displays an immediate connection to the object, whereas man has mediate relation to it. The object and man are symmetrical with respect to the machine. Man creates the machine so that it can establish and develop this relation. This is why the relation to the machine is only legitimate if it flows through the machine without having as its destination the human in its communal form, but rather an object. The relation of man to machine is asymmetrical because this machine establishes a symmetrical relation between man and the world.

#### 4. ALLAGMATIC NATURE OF THE INDIVIDUATED TECHNICAL OBJECT

An attitude that would consist in considering that the machine can be grasped and known veritably as a crystallized human activity would overlook the very nature of the machine; this attitude would conflate the machine with a work of art.

The identification of the machine with man or man with the machine cannot take place unless relation is exhausted in the link between man and machine. But if relation is really in three terms, the mediating term remains distinct from the extreme terms. The absence of the object term is what creates the possibility for the domination of man over the machine or the machine over man.

If the true essence of the machine is to establish this communication, then the machine must be defined in terms of information and not according to a practical use in order to be able to analyze it; indeed, identical types of machines can be employed in extremely different industries and for extremely different practical ends; every technology that would begin with a principle of classification originating with industries or professions would end up in a certain failure in the attempt to seek to constitute a true technological culture. The machine does not allow itself to be known through its incorporation into a professional community. The technical being can only be defined in terms of information and the transformation of different types of energy or information, i.e. on the one hand as a vehicle of an action that goes from man to the universe, and on the other hand as a vehicle of an information that goes from the universe to man. Cultural technology becomes a mixture of energetics and information theory. Cybernetics, which is a theory mainly inspired by considerations based on the functioning of machines, would be one of the foundations of technology if it did not initially privilege a mixture of action and information called “feedback,”<sup>7</sup> or action in return (recurrent causality); a machine can indeed exist without contributing any relation between the chain of causality conveying the action and the chain of causality conveying the information; when the machine provides such a link, it contains an automatism; but there are machines that are not automatons or that at the very least do not convey automatisms except through secondary or temporary and occasional functions (for example, those that guarantee security, servomechanism, or remote control).

The notion of reaction, which is already a synthetic notion, is extremely useful but is not an original notion; it only takes on its meaning in a more general theory of transformations, which can be called general allagmatics. The machine is an allagmatic being. However, a pragmatistic theory that is preoccupied with action sees nothing in the machine but the motor role directed by man and acting on the world; the recurrence of information through which the machine brings forth messages from the world to the individual is naturally and functionally considered subordinate to the motor role. Nevertheless, “feedback” does not account for the informative role of every machine, in the sense that information can be anterior to the action of the individual. There is no necessary anteriority of this action over information; by considering information as the signal of the discrepancy between the result of action and the goal of action in “feedback,” cybernetics runs the risk of underestimating the role of direct information, which is not inserted in the recurrence of “feedback” and does not require an active initiative of

the individual in order to be formed. Unlike recurrent information, this direct information does not include a reference to the action of the subject and therefore is not evaluated as a mark of failure or success. When “feedback” information arrives, it is inserted as a form into this ground of non-recurrent information, such that the individual is in the presence of two informations: a broad and permanent information, which inserts it into the world as milieu; and a narrow and temporary, even instantaneous information that is mainly linked to action, is just as variable as action and is always renewed by action. This recurrent type of information does not include as much richness as the preceding type but is defined on the contrary by several concrete but very simple signals (color, form, attitude), which, due to their paltry richness in information, can easily be replaced or rapidly modified without the requirement of a large expenditure of nervous energy in the operator or a very complex transformation in the machine.

The difference between these two types of information becomes extremely palpable when one is forced to translate both into a single form that allows for their comparison; the difference between the two roles is then expressed as a considerable difference between the quantities of information. Thus, the indications that an airplane pilot receives from the altimeter only has value as “feedback” that allows the pilot to regulate his descent or ascent according to the indications of the needle on the dial; these indications are inserted as the form into a ground that is the overall and synthetic vision of the flown-over region and also of the state of the atmosphere or of the cloud ceiling; this “feedback” must be all the more precise as the practical consequences of the motor activity are important; for example, the simple altimeter of high altitudes cannot serve to evaluate the distance of the airplane relative to the runway at the moment of landing; one then employs a device that emits electromagnetic waves that reflect off the ground and return with a certain delay, which is evaluated due to a variation of the emission frequency with which the frequency of the reflected wave can interact: the signal is constituted by this interaction. In this first case, whatever the technical system employed may be, the principle is always the same: to grasp a variable parameter according to the results of the individual’s action and to return to the subject the signal that indicates the result of this action with respect to a term of fixed reference that is part of this goal. The signal can then be presented to the subject according to a simple intensive or extensive scale, corresponding to an oriented axis on which one point or line represents the goal, and another point or line represents the result of the action. This information can be represented by the displacement of a needle across a dial.

Conversely, if it is a question of transmitting information relative to the ground and not to the form, no procedure of information capable of inscription on a bipolar linear scale can succeed: the simultaneity of a multiplicity is necessary, and the individual is the center that integrates this multiplicity. All the procedures head toward the necessity to decompose the totality into simple elements transmitted in isolation, whether this isolation of the singularity is realized by a multitude of simultaneous and independent transmissions (as in the first television apparatuses) or by the distribution in a cycle that guarantees a synchronism at the beginning and at the end (since each element has its own instant in the cycle), supposing that information is invariable during a cycle. As in this case, it is not the machine that plays the role of integrator but the subject, the necessity of bringing to the subject various grounds and not forms translates into a requirement for an enormous quantity of information to be conveyed. This enormous quantity of information to be collected and transmitted without being integrated is what limits the finesse of electromagnetic detection via radar, which poses serious problems for the transmission of moving images in television by requiring it to adopt very elevated video frequencies that increase exponentially as the definition of the image increases. The quantity of information necessary for transmission can only be reduced due to a coding of the world to be perceived, a coding known to the subject, a coding that corresponds to a recourse to a perception of forms on a ground that is already known and no longer needs to be transmitted. In this sense, it is possible to replace observation of the terrain and the countryside traveled over by plane with a map on which the pilot marks his position by means of the phase relations between the signals coming from the three triangulated stations of electromagnetic transmission, as in the Decca piloting system, Shoran, or currently, via radio beacons. Here, the pilot carries with him an analog of the flown-over countryside (the map), and, due to a formalization of the world known and adopted by way of convention (the construction of three emitters and the apparatus of synchronization that links them together), the pilot realizes on the map a much simpler integration, since he operates on elements that are already abstract; here, there are two concentric integrations: an initial fundamental integration of the map of the world due to which the map can have a signification, and a second integration of received signals to the map that has been brought on board, which is simpler because the information is already selected by the passage from the concrete world to the map and from the multiple visual signals to the three Hertzian waves in a phase rapport. Here, the labor takes place on an image (the map) and on symbols (the signals coming from the

synchronized emitters). This is imbued with value due to a double localization: one through which the map is recognized as an image of a certain region by the pilot, and the other through which the pylons of the three synchronized emitters have been constructed via a certain spot of geographical territory, and not some other spot. The sources of symbols are localized in the image, and this image establishes a coherence without which piloting would be impossible.

The presence of the world is therefore never eliminated by the utilization of the machine; but the relation to the world can be fractioned and mediated by several stages of symbolization, each of which corresponds to a technical construction; these stages distribute valid points of reference across the world according to a perception mediated by the machine; this perception is not much more automatic than direct perception via the sensory organs; but it corresponds to an integration through stages and is specialized to a certain extent according to each type of activity. But the concrete, even if it is fractioned, remains the concrete; the relation of the ground and the form is inalienable. Pure artificiality would lead to the conflation of the ground and the form, such that the individual would find itself facing a simplified world where there would be neither universe nor object. The perception of the individual totally integrated into the community is to some extent an abstract simulated perception; instead of extracting the object from the world, it cuts up the world according to categories that correspond to the classifications of the community, and it establishes bonds of affective participation between beings according to these communal categories. Only a profound technological education at the level of the individual can release the individual from the confusionism of stereotyped communal perception. An image is not a stereotype.

The values implicated in the relation of the individual to the machine have given rise to so many confusions, because the recent development of machines and of their utilization by communities has modified the rapport of the individual to the community: this relation, which used to be direct, now passes through the machine, and machinism is somewhat linked to communitarianism; the notion of labor is no longer a directly communal value, since the passage from human effort through a mechanical organization affects the work of a coefficient relative to this labor: *productivity*; a morality of productivity is about to take shape that will be a new type of communal morality. Individual effort is not intrinsically imbued with value; it also must be rendered effective by way of an extrinsic grace that is embodied in the notion of productivity. This notion has a certain invasive power and is widely deployed

beyond commercial or industrial operations; it affects every educational system, every effort, and every labor. A certain communal resurgence of pragmatism confers on ethics a new type of heteronomy concealed under the guises of a desire for rationality or concrete preoccupations. When an idea or an act are rejected because they are judged inefficient and lacking in productivity, this is because they actually represent a creative individual initiative and because the community rises up with a perpetual misoneist instinct against everything that is singular. Misonieism targets the new, but above all it targets what is singular and therefore individual in what the new presents. The new, insofar as it is collective, has citizenship in the form of the mode; it is even found to be prominently valued by the community. The individual new is what is pursued and expelled as deprived of productivity. The criterion of productivity is the imprint of collective subjectivity and manifests the grace that the community affords or refuses individual creation. It is not because a civilization loves money that it becomes attached to productivity, but because it is first a civilization of productivity that it becomes a civilization of money when certain circumstances turn this mode of exchange into the concrete criterion of productivity.

Nevertheless, despite appearances, a civilization of productivity, regardless of the apparent civil liberties that it leaves to individuals, is extremely restrictive for them and prevents their development, since it simultaneously enslaves man and machine; it realizes through the machine a restrictive communal integration. Under the influence of a humanist preoccupation, man must not revolt against the machine; man is only enslaved to the machine when the machine itself is already enslaved by the community. And since there is an internal coherence of the world of technical objects, humanism must seek to free this world of technical objects, which are called upon to become the mediators of man's relation to the world. Until now, humanism has hardly been able to incorporate the relation of humanity to the world; this will that defines humanism—i.e. the will to give back to the human being everything that the various paths of alienation have deprived him of by decentering him—will remain powerless insofar as it will have not understood that the relation of man to the world and of the individual to the community passes through the machine. The old humanism remained abstract because it defined self-control only for the citizen and not for the slave; modern humanism remains an abstract doctrine when it believes to save the human from all alienation by believing to struggle against the machine, “which dehumanizes.” It struggles against the community by believing to struggle against the machine, but it cannot manage any legitimate result because it accuses the

machine of what the machine is not responsible for. By deploying itself in total mythology, this doctrine deprives itself of the strongest and most stable ally that would give humanism a dimension, signification, and opening that no negative critique could ever offer it. According to the path of research presented here, it becomes possible to search for a sense of values other than in the limited interiority of the individual being folded back onto himself in denial of the desires, tendencies, or instincts that invite him to express himself or act outside his limits, without thereby being doomed to nullify the individual facing the community, as the sociological discipline does. Between the community and the individual isolated in himself, there is the machine, and this machine is open to the world. It goes beyond communal reality to establish relation with Nature.

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# History of the Notion of the Individual

## INTRODUCTION

This text is a preparatory work that was written during a time period spanning 1952–1958 and constitutes a supplementary series of reflections according to a previous “general plan” of the thesis: (I) Individuation in light of the notions of form and information; (II) Genesis of the notion of individuation relative to other problems. The manuscripts present several other formulations of the title: “Genesis of the Notion of the Individual,” “Historical Genesis of the Notion of Individuality.” This study was neither integrated into the doctoral thesis nor fully completed and has been preserved under the title “History of the Notion of the Individual.” The translations of the Greek and Latin expressions in parentheses are provided by the editor.

The search for individuality in the Greeks and Romans is characterized by the fact that the principles of individuality are discovered according to the order of simultaneity. A permanence can be grasped across a wide variety of systems: that of the search for the individual’s conditions of intelligibility. Although the temporal and operative characteristics of individuality are not ignored, they are subordinated to the structural characteristics and the characteristics of actual relation. Conversely, within initiatory sects and with the decadence of ancient civilization, the temporal and operative characteristics become primordial in an esoteric or belated manner: it is at this point that the characteristics of simultaneous relation and of structure are subordinated to the other characteristics and incorporated into them as consequences.

Before this disjunction, which opposes Greco-Roman thought to the thought of decadence and the Middle Ages, a time of awakening for ancient thought unfolds during which, in the absence of a restrictive methodological tradition, philosophical thought was able to define extremely broad reflexive problems by the questions that they put forth more so than by the answers

that were contributed. We can search among the pre-Socratics for thinkers who posed the problems of reflexive elaboration for centuries. Before this long disjunction between the structural aspect and the operative aspect of beings contemplated by reflection, a certain number of pre-Socratics experienced and defined the fundamental aspects of the problem of individuality.

At the dawn of Greek philosophy, two types of reflection and two aspects of the problem of individuality stand out among the different schools: the reflection of the Ionian physiologists who seek to discover the fundamental element, and Pythagorean and Parmenidean reflection, which seeks to discover the structure of each being qua geometrical or arithmetical structure, and usually a mixture of the two.

THE IONIAN PHYSIOLOGISTS:  
THALES, ANAXIMANDER, ANAXIMENES

According to the first Ionian physiologists (Thales, Anaximander, Anaximenes), the fundamental search proposed for reflection is that of the element which—through its substance, dynamism, and transformations—can explain the existence, appearance, and particular characteristics of beings that actually exist.

The element in fact is what initially existed in the state of original indistinction, of internal unity due to homogeneity; this unity of primordial homogeneity indicates the element as the first aspect of the substance of beings and as anterior with respect to them; this element is the undifferentiated absolute, anterior in its unity to any appearance of heterogeneity or any fragmentation. The most remarkable aspect of this conception is the identity of the two aspects that will be distinguished later: homogeneity is unity, and unity is homogeneity. Natural models—like clouds, air, and water—make this bond of unity and homogeneity tangible. Homogeneity is not just the absence of limits; positively, it is the condition of coherence; the similar adheres to the similar due to an internal bond of homogeneity. Homogeneity is continuity; indivision is coherence. Elementary water for Thales, air for Anaximenes, the ἄπειρον [ápeiron] (the “infinite”, the “indefinite”) for Anaximander are these elements that are continuous and singular due to their fundamental homogeneity. Perhaps it is necessary to see here an initial aspect of the idea of matter, anterior to any distinction between matter and form.

Nevertheless, a dynamism of development and of growth—more universal and more powerful than what makes plants and animals grow—is added to this first characteristic of consistency and coherence: *physis*. This dynamism

pushes the homogeneous element to designate within it a heterogeneity whose terms are symmetrical with respect to the primordial state of undivided homogeneity; the element condenses and rarefies, thereby generating the derivative elements, which are distinguished and distributed in a discontinuous but internally ordered series; water becomes air by rarefying, and then, due to a new rarefaction, becomes fire, which is lighter than air; by condensing, it becomes earth. There can be intermediary states between these degrees of condensation and rarefaction, thus revealing the continuity of the process of *physis*: before being air, water is cloud, vapor. Before being earth, water initially condenses as ice, which is more compact than water but less compact than earth. Consequently, we can pass from one state of the fundamental element to another due to the play of *physis*. When the states of the element are constituted, it is possible to modify one state by means of another in order to return the element to another place in the ordered series: fire returns ice to water and returns water to the state of vapor; it returns earth to the state of water.

In this sense, the element is the substantial matter of beings and the dynamic cause of their appearance, since the element is both the substantial matter and source of *physis*, the power of heterogeneity. The particular being is consequently not primordial; it is carved out from the substantial matter of the primordial element by a power of differentiation that belongs to this element; the particular being participates in the primordial element within the matter that constitutes it, and it results from the action of this *physis*, which is the power of the development of particular states and beings. The *physis* of the primordial element is at the origin of the existence and characteristics of particular beings. There is no *physis* of a particular being, only a *physis* of the universal primordial element, which is diversified into states and beings. According to this primordial conception, the principle of individuation cannot be sought in substance-matter; the principle of individuation is, if not exterior to the individual, then at least anterior to the latter; it persists in the individual as a dynamism of growth.

#### PARMENIDES

The Parmenidean conception of being is completely different. The being is grasped in its indivision and initial interiority; individuality is primordial; it is this absolute of the being without parts, complete in its circular fullness. This unity is no longer that of homogeneity due to the positive continuity of the homogeneous with respect to itself, according to the indefinite contact of substance with respect to itself. The homogeneous continuity of the

Milesians does not imply, in order to exist, either the totality or limit that distinguishes Parmenidean being from what is not itself. The homogeneous unity of the indefinite is an elementary unity, that of the singular stuff comprising all things, that of the earth from whence all plants arise by receiving their substance. Parmenidean unity requires external nothingness in order to exist; it is the interiority of a structure with respect to itself, the coherence of a whole without parts that is self-contained and unengendered. There is no becoming for Parmenidean being, whereas becoming appears in Ionian physiology as the link of continuity that connects particular beings (productions of *physis* immanent to the element) to the original element in its indefinite continuity. The being of the Eleatics consists in itself and neither participates nor proceeds; it supposes neither the element nor *physis*. Its unity is that of a totally self-contained structure: the sphere. For the Ionians, the particular being is not first; it is nature, or rather it is produced by the unique nature of indefinite being. The particular being is that which appears in a continuous temporal series, parallel to a series of transformations of the primordial indefinite element; yet these transformations are the appearance of heterogeneity, and the totality of the primordial indefinite subsists throughout the simultaneity of various states, which are nothing but the simultaneous expansion of the diversifications of the element; order of the simultaneous series, the primordial element subsists as the diversity of states. The individual thus remains connected to this substance of which it is a part; the individual is inserted into a temporal order, but temporal development is at the same time a production of the order of simultaneity, the diversification of which is the operation of *physis*; *physis* is the dynamism of the primordial element, from whence arises this link of succession and simultaneity in the diversification of the indefinite. Conversely, what indicates the Eleatic conception of being is a disappearance of the temporal series. Being can no longer proceed from or participate in another reality than its own, which consequently excludes becoming. A sphere is substituted for Anaximenes's eternal and imperishable substance, and this sphere is perfect and limited, equally massive outward from the center in all its directions, uncreated, continuous, indestructible, immobile, and finite. The Ionians acknowledged a primordial substance, which at the same time is and is not what is derivative, is the same as its properties without being the same. According to Parmenides, what leads to Ionian physics is the misleading path of opinion. What cannot be accepted, as with the Ionians, is the birth of things and the subjacent force (*physis*) that makes beings grow. What is cannot come from what is not. What is has no degrees and cannot be less in one place than in another; mobile beings cannot

be conceived, because there is neither birth nor corruption. The ἄπειρον [ápeiron] does not fully exist; its lack of determination does not grant it any reality. In this sense, Parmenides refuses to consider the fundamental philosophical problem to be a problem of genesis. What is is an absolute of the geometrical order, a divine Pythagorean structure, like the order of the world for Heraclitus. The completely immobile Parmenidean sphere represents the absolute individual, which can only be thought rationally or evoked mythologically, but which could not be discovered in the everyday experience of the external world, insofar as the latter only corresponds to the path of opinion. This conception of absolute and unengendered individuality therefore characterizes a type of thought constituted by an alliance of rationalism and mythology, the result of a veritable rupture practiced in experience that divides the world and knowledge so as to oppose itself to the genetic and experimental positivism of *physis*.

It is important to understand how this Parmenidean dualism was able to emerge in order to present a mode of conceiving the individual opposed to the one that arises from Ionian physiology. Indeed, Parmenides is the “father of Plato’s thought,” and every later aspect of the problem of individuality in Greek philosophy—in order to define and specify itself—is approximate to the Eleatic conception in some way.

#### THE PYTHAGOREANS

In the Pythagorean association of Crotona, a vast amount of attention is paid to individual life grasped in its temporal aspect, i.e. relative to the search for salvation but also to political life; the Pythagoreans sought power. They disrupted the dominant equilibrium in the Milesian conception between the temporal order and the order of simultaneity; they introduced an original dualism in place of the Ionians’ unity of the primordial element: according to Herodotus, the Thracian Zalmoxis, after having been the slave of Pythagoras in Samos, learned from him “the Ionian way of life.” Pythagoras taught that the world is submerged in an infinite air from which it absorbs the closest parts, which, as they enter the world, separate and isolate things from one another, thereby creating number and multiplicity; this unlimited air is also called darkness, night, or vapor. The principle of individuation in this tradition is consequently distinct from the principle of unity. Particular beings do not proceed from a single principle, i.e. the element, but from two principles: the world, which is the principle of existence, consistency, unity, and the unlimited, which is darkness and night; according to the Pythagoreans, to

explain the particular being, a positive principle and a negative principle must intervene; the undetermined is a negative principle, whereas with the Ionian physiologists, the indefinite was the positive principle within which *physis* through its development produced heterogeneity. Multiplicity arises from a negative characteristic for the Pythagoreans, whereas it expresses the positive characteristic of the *physis* of the element for the Ionians.

#### HERACLITUS

With Heraclitus, a meditation on the human individual initiates and cultivates the relation between the meaning of human life and a doctrine of the universe. The birth and conservation of individual beings are due to a conflict of contraries that oppose and maintain one another. What the unity of Milesian *physis* becomes for Heraclitus is antagonism, bipolarity, tension of an ongoing opposition between contraries that form couples. For dynamic unity, Heraclitus substitutes a dynamic dualism that is marked (according to the order of simultaneity) by the reciprocal limitation of simultaneous contraries and (according to the order of succession) by the orderly sequence of lack and excess, of satiety and famine, which limit themselves in time. This dynamic duality introduces a unity constituted by ambivalence: the individual being itself is rendered bipolar, and each of its acts becomes ambivalent: unity is in the exchange of all things; a being lives the death of one and dies the life of the other; becoming is this ongoing contradiction, this destruction created by birth and this birth created by destruction; the young becomes old; life gives way to death, wakefulness to sleep; cold things become hot; what is humid dries out. Within each thing exists the opposite of what we initially see in it; seawater is the purest and the most impure, healthy for fish, deadly to humans; for pigs, mud is more valuable than clear water, and for donkeys, straw is better than gold. Permanence and change are two complementary aspects of reality; the consistency of a being, its reality, and in some sense its unity, depend on its power of contradiction. Unity is the measure of duality. The unity of things is the unity of fire, into which all things are convertible; but they are convertible into fire only insofar as fire is convertible into all things, like the phoenix that rises from its ashes; to convert into fire is also to convert into oneself. The being that changes is affirmed in itself. This unity of becoming is expressed in the doctrine of the return of time and the Great Year, which makes it such that the transformation of all things into fire is counterbalanced by the transformation of fire into all things: the “path up” and the “path down” are traversed by the same movement; at the same time,

fire “disperses and gathers back together, advances and retreats.” Simultaneous affirmation and negation are organized in each particular reality; the world itself is day and night, winter and summer, “wants and does not want to be called the name Zeus.” In the living individual, what constitutes health is the adjustment of two forces, that of moving fire and that of nourishing water. According to this Heraclitean conception, which we are aware of from the treatise *On Regimen* and which is contained in the Hippocratic writings: “everything is similar, being dissimilar; everything is identical, being different; everything is in relation and without relation; everything is intelligent and without intelligence.” In the *Cratylus* and the *Theaetetus*, Plato shows the representatives of a Heracliteanism that has essentially become a universal mobilism pushed to its extreme consequences. Heraclitus said: “You cannot step into the same river twice, because new waters are always flowing around you.” The identity of the river depends only on its perpetual change; it is not material identity; the particular being is inseparable from this continual movement: “beer decomposes if it is not stirred.” This doctrine makes sense for Heraclitus because the particular being is a microcosm and is only maintained by an ongoing exchange with the realities of the world and the antagonistic forces that maintain a perpetual tension therein. For the Heracliteans of whom Plato speaks and particularly for Cratylus, this mobilism ends in the refusal to express any judgment that would suppose the permanence of the contemplated being. This doctrine is hostile to the dialectical rationalism that originated with Parmenides; it remains very close to Ionian physiology but is distinguished from it by substituting the antagonistic pluralism of the couples of contraries for the monism of *physis*. Parmenidean being hurls the cosmology of contraries and becoming back into the world of opinion; the σφαῖρος [sphairos] (“sphere”) of Parmenides is the complete opposite of Heraclitus’s being. Thus, in a certain sense the doctrine of Heraclitus was able to prepare the doctrine of the Eleatics because, inspired by the Ionians, Heraclitus pushed cosmological dynamism to its limit. In this way, it led to a doctrine that is forced to ask discourse to always contradict itself and not to respect the principle of identity; this is the price for a dynamic vision of the individual being and its rapports with other beings to become possible without contradiction in the object; the only contradiction was in expression. Heraclitus expresses at the same time existence in the successive order and existence in the simultaneous order. On the contrary, with Parmenides we see a rational and rationalist thought that prefers to give an “axe-blow” within the world to separate on one side what can be expressed rationally according to the principle of identity, i.e. the absolute individual, and, on the

other side, everything, including becoming and multiplicity, that can only be known according to the misleading path of opinion. It should never be forgotten that this appearance of Eleatic dialectics coincides with renouncing a complete vision of the universe and the beginning of a rupture between philosophy and the knowledge of all things. The Parmenidean conception of the individual appears after a methodological renunciation. However, it may be that one of the important aspects of the problem of individuality, i.e. that of the being's identity, originates with this adoption of the unique rational and critical method, the starting point for the entire philosophical dialectic in Greece.

#### EMPEDOCLES

Ionian thought does not stop when Eleatic thought comes on the scene; but it changes direction in some way, thus abandoning the dynamistic theory of *physis* and renouncing the unity of the homogeneous elementary principle; alongside the elements, the number of which increases, a force or a principle appears that organizes elementary disorder. Thus, with Empedocles a physical dualism emerges that acknowledges the existence of four elements or roots of things—fire, water, air, earth—and two active powers, that of Hate, which separates elements, and Love, which brings them together. The elements are relative to individual beings, like the colors used by the painter, or like the water and flour with which dough is made; everything stems from their union, their separation, their various doses; none of them is first; they are equally eternal and do not arise from one another. As a result, individual beings are produced by the action of these two powers. The multiplicity of individual beings is explained by the progress of Hate; a world where all individuals were similar, insofar as they were all androgynous, has been supplanted by a world where the difference of the sexes bears witness to the progress of hate; nevertheless, the organic unity of each individual is a constructed thing that will be reconstructed after the progress of hate when the age of hate will be followed by the slow rise of the multiple toward the one and of division toward union: then the scattered members come together and unite, sometimes by forming monsters, sometimes by bringing forth viable beings. The individual being is therefore produced by Love as an organic unity yet produced by Hate insofar as it is opposed to other beings or is distinguished from them, for example through sexuality. The individual being appears at a certain moment in this vast cyclical evolution, or rather two times per cycle, either when Hate, beginning to take control of the universe, has not yet managed to completely triumph, or when Love, beginning to progress, still

has merely extended its influence over the four elements very incompletely. Because it results from a composition, the individual being is determined by the proportion and mode of relation of the elements that constitute it: the conception of Philistion's medical school originates with Empedocles's physics; the warmth of fire, the cold of air, the humidity of water, the dryness of earth are the active forces, a certain combination of which produces health, the degree of intelligence, and the various temperaments or characters.

The dualism of Empedocles's conception is also revealed in the conception that Empedocles forms of everyday life: the mortal life of the soul is an atonement for a crime it has committed; it must reincarnate for thirty thousand years, sometimes in the bodies of animals, sometimes in the bodies of humans; it is at this moment in the cave, in the joyless country where there is death and anger; this cave is the earth. There is a duality in the individual itself, that of the soul and the body. This conception is not so different from that of the Orphics, but it is in line with a conception of the universe that is not monist and that distinguishes between elements, which are from now on material (whereas they were not just material in the Ionian physiologists), and forces, which are distinct from these elements and are able to guide them; thus, the distinction between body and soul corresponds within the individual to the distinction in the world between elements and powers.

#### ANAXAGORAS

Anaxagoras considers every individual being to contain an infinite number of indecomposable quantities; the production of beings is merely a separation from a state in which a certain quality is invisible due to its combination with too many quantities of certain other qualities. The appearance of generations and corruptions originates with the variations of quantity in beings; but these changes of proportions do not prevent beings from always having the same composition. Generation is an extraction more than a synthesis; the transformations of things are infinite, as if every individual being could be the ore from whence every other being will emerge; this conception of the rapport of simultaneity and succession between beings is the close relative of Ionian physiology, in the sense that each being contains the seeds of all things (what Aristotle calls *homoeomerias*), which is what guarantees a continuity of the common material substance of which beings are made and a rapport of simultaneity between them. Furthermore, the continuous transformations via extraction are not that different from the state changes of the fundamental element for the Ionian physiologists. Nevertheless, there is a very

big difference between the physics of homoeomerias and that of Thales, Anaximander, Anaximenes, a difference that stems from the replacement of monism with a pluralism: a single element can be animated by a unique *physis*; on the contrary, the infinite multitude of homoeomerias cannot conspire without a force external to all the homoeomerias that presides over all successive extractions; the unity of the order of simultaneity and the order of succession can no longer be found in a single and immanent power of growth; this reality, superior to homoeomerias, is Νοῦς [Nous] (mind), which produces the circular movement that separates things from one another, like a swirl of water separates sand from the fine inclusions of raw metal that it contains; the world is the result of this analytical emplacement due to a vortex. This dualism of matter composed of homoeomerias and the Νοῦς that governs it is also found in the structure of the microcosm that the living individual is: all living beings, including plants, have a fragment of universal intelligence in them. What is abandoned is the notion of *physis* along with the monism that characterizes it on behalf of a more artificialist representation, seeming to take as the model for the production of beings the operation imposed onto matter by an external agent in the extraction of a metal out of an ore; the substantial matter of the element loses its own power of transformation when the element is replaced by the infinite plurality of homoeomerias. With passivity and inertia, the Aristotelian conception of matter is already foreshadowed. In Anaxagoras, matter is still the reservoir of qualities that the homoeomerias are (substantial and stable qualities), even when they are not apparent because they are not dominant; but matter is no longer the agent of transformations, since it no longer has *physis*. Generation becomes analysis, but not growth. The *matter*, which is no longer capable of developing by itself, is ready to receive external structuration from the *form*. This sets the stage for the impasses that the notion of individuality will take on when it will be represented as the union of matter and form.

#### LEUCIPPUS AND DEMOCRITUS

By continuing Milesian physics and founding atomism, Leucippus and Democritus definitively leave aside the dynamism of *physis*; this abandonment was prepared by the physics of Empedocles and Anaxagoras, who created the dualism of matter and force by representing the forces of transformation as external to elementary matter: it is often said that Leucippus and Democritus minted Eleatic being, because in their doctrine, each of the atoms have the same substantial aspect of the absolute individual as the Σφαῖρος

[Sphairos] of Parmenides; this is no doubt exact; but what also needs to be added is that the dualism of Empedocles and Anaxagoras was able to play a role in the refusal of qualities in physics; in fact, qualities are dynamisms inherent to elementary matter; *physis* is the source of all qualities. By eliminating qualities, Leucippus and Democritus create a physics exempt from the consideration of qualities in beings. The absolute individual, the atom, is absolutely exempt from qualities and therefore does not possess any dynamism of its own, any *physis* or power of self-transformation. These atoms could not exist as individuals if they were not separated from one another by the reality of this fully negative principle that the void is, which is also exempt from all dynamism, from all *physis*. In the world of Democritus, everything is actual; the only relation is the arrangement into various figures and structures of all these elementary individuals, the atoms, which Democritus calls ideas. The world is created by a vorticial movement; there is no veritable individuality of the *cosmos*, since the *cosmos* is nothing but a composite, without its own unity or dynamism; it is reduced to the set of its parts. Movement, which is the principle of composition, does not stem from the dynamism of the real individuals that the atoms or ideas are, since these ideas are deprived of dynamism. There is no relation of interiority between this movement and the absolute individual realities that the atoms are; there is consequently also no relation of interiority between the composite and the atoms. There are no longer several echelons of individuality; one alone is real, that of the atom. Consequently, the temporal dimension of individuality disappears in mechanistic physics: the Democritean atom is eternal.

#### THE HIPPOCRATICS

The thought within which the doctrine of *physis* is best preserved is perhaps that of the Hippocratic authors, or at the very least that of the Hippocratic authors who are physiologists, like the doctors that Plato evokes in the *Phaedrus*:<sup>1</sup> the nature of the soul cannot be defined without that of the universe; without this method, one cannot even speak of the body. Due to the study of the relation of the individual with the whole, one can define the combinations of actions and passions of each of the parts that constitute it.

#### SOCRATES AND PLATO

The notion of individuality takes on several aspects in Plato; but after the first dialogues, a veritable evolution takes shape that brings the problem onto a

physical, metaphysical, and political terrain, whereas in the first dialogues, the interest of this problem was mainly ethical; at the same time, what is primordial is no longer the temporal dimension of the individual but its dimension of simultaneity, that which allows it to actually insert its structure into the structure of the city and participate in the latter. The example of the exceptional individuality of Socrates—who is barely integrated into the city, but who has a direct participation in immutable values like Justice—is primordial from the start. The individual is this singular, irreplaceable, amazing being that paralyzes with his presence, like an electric eel with its stinger. This being has a destiny more so than a place; he wants to “escape from the earth,” and, if he accepts remaining on earth, this is by comparing himself to the beast among other domestic beasts in the pen that the Gods have constructed for humans. The individual lives as he must when he sticks to his destiny, i.e. when he is not in contradiction with himself. By remaining in Athens when he could have gone elsewhere, Socrates accepted in an implicit contract to obey the laws and to respect them. The unity of the individual, his coherence with himself, is essentially founded on the steadiness of this life throughout successive moments; Socrates is not just faithful to the implicit contract that binds him to the city; he is also the one who knows how to evoke again through myth certain things that seem forgotten or out of season; his order and his continuity are deployed according to the temporal dimension; for the present, he lives so little according to current events that he is nowhere and everywhere, from nowhere and from everywhere: ἄτοπος [átōpos] is the deeply ambivalent qualifier that his enemies apply to him and that Plato could also attribute to him in the first dialogues; this ἄτοπος presents all the paradoxical characteristics that reveal veritable individuality in its rapport either to societies, to institutions, or to intellectual modes: in the name of the old Athenian spirit, Aristophanes attacks him as a Sophist. Plato shows in him the adversary of the Sophists, attacked by those who reproach him for not being able to defend himself when he is accused before the tribunals. This being of contradictions is coherent only according to a temporal order, not according to the system of different successive actualities. Knowledge itself is something that is not an integral part of the system of actuality: knowledge is buried within the deepest recesses of the individual being and the purest part of himself. Only contradiction, in the sensible form of pain or the logic of the dialectic, can prevent the individual being from remaining in the pure system of actuality and force him to seek reminiscence in it, like the forgetful slave questioned by his master. Socrates only sends back to the Sophists the young men who do not have within themselves a veritable richness of

interiority and cannot give birth to any truth, even if they are entrusted to this midwife of minds. The art of Socrates is to draw the individual being out of the system of actuality that absorbs him by way of an interrogation that embarrasses him; like his mother Phaenarete, who knew with song how to excite or calm the pain of women giving birth in order to hasten or delay labor, Socrates knows with speech how to stretch or relax the effort of his interlocutor toward the truth, which is not yet elucidated. This necessary contradiction of the individual by himself, this opposition to oneself (for the veritable dialectic does not require a contradiction between the propositions of interlocutors, but between each of the interlocutors and himself) decants and reveals the individual extracted from all the dregs. Plato said later that the great king himself, if he were not contradicted, would remain impure to the bottom of his heart. Opposition to oneself is a purification and a rediscovery of oneself beneath the easiness of present appearances. Sensations and the habits of everyday life hide the individual from himself, isolate him from himself with a screen of illusions. The physics of Anaxagoras uproots man from the effort in which he can turn toward himself. The act of opposing oneself is the most primitive form of action upon oneself, and it turns the individual into a being who not only is and thinks objects, but who knows that he is and who thinks himself. The positive form of this return to oneself, which is expressed in the formula inscribed on the pediment of the temple at Delphi “γνωθι σεαυτόν” [gnothi seautón] (“know thyself”), requires, as its condition of validity, the preliminary existence of the power to deny oneself, to be opposed to oneself, to doubt oneself. Socrates attributed to his δαίμων (“daimon”) certain warnings, which were always negative and took the form of inhibition or refusal and which intervened every time he risked allowing himself to be carried away by a momentary impulse or to succumb to the entreaties of his friends by ceasing to be himself, like at the moment of his death, when the boat that should have delivered him from his fate had just landed near his prison. An order according to time that detaches from the order according to the instant intervenes in this splitting into self and δαίμων that makes possible action upon oneself and then self-knowledge: moral individuality is not part of the system of actuality; this first splitting results in a second: that of the soul and the body, which no longer have the same destiny; the body is the sign and tomb of the soul, σωμα σημά [soma sema]. Plato did not add features (of which Spintharus makes us aware) to the portrait that the contemporaries of Socrates have left us in conformity with this evocation: the extraordinary power of Socrates, the force of his wrath, and his singular ugliness. Socrates was an exceptional being for his contemporaries; what he

was for himself, he was for others: "attached to the Athenians by the will of the Gods to stimulate them like a gadfly would stimulate a horse." Negation and contradiction allow for each person to know themselves, at least those who are -something: Charmides, a reserved adolescent, does not know what reservation is; Laches and Nicias are two brave heroes who are unaware of what courage is; the pious Euthyphro does not manage to say what piety is; in his interrogations, Socrates turns these beings who were ignorant into beings who are self-aware; however, just as every fault stems from ignorance, and no one is wicked voluntarily, this change in self-knowledge for the individual is a veritable transformation of the individual being, not to become other but to affirm oneself in oneself. *Knowledge has the value of being*, for it modifies action; the complete individual is the being who knows himself and to that extent is consequently the cause of himself. Nevertheless, it should be noted that the self-knowledge that the pious, the reserved, the brave acquires is a knowledge that does not reach individual particularity qua absolute originality but instead the fundamental force of personality, which valorizes the individual and makes it such that he is known as a man who excels by such a virtue. In some way, self-consciousness guarantees the dominance of a basic virtue around which the whole personality is constructed; Socratic knowledge reaches the personality rather than individuality; this is why it founds the coherence of the successive.

This vision of the individuality of the human being is not sufficient for Plato, who, quite preoccupied with political problems, wants to assign a place to the individual being in the city as well as to each being in the universe. At the same time, the dialectical method changes direction: in the first dialogues, dialectics is essentially an interrogation of the interlocutor by Socrates; Socrates does not bring forth any doctrine; he merely forces the individual being to know himself; conversely, later on it is no longer the individual who is the depositary of truth: dialectics becomes a dialogue between two opinions, two theses that face off; there is no inherence of truth to the individual being. Finally, in the last dialogues, the relation of truth to an individual existence further degrades: Socrates or the Eleatic stranger are merely Plato's spokesmen, and their discourse becomes a didactic monologue at the limit. The life of the individual, the destiny of his soul are less and less the object of a very rigorous search; myth alone is the means for expressing that which is of the order of becoming; the evocation of destiny is therefore integrated into a cosmology that turns the world into a great living being; the world becomes the scene in which the souls of men and the Gods evolve; what is sought here is no longer individual interiority; individuals are grasped as the

matter of a general eschatology that links astronomical speculations to the myth of the soul. The *Timaeus* reveals the birth of the world soul and the formation of its body, which it has organized itself.

The individual, and the philosopher in particular, must establish his place in the city; and, in the depiction of the philosopher, Plato reveals what could be called the paradox of individuality, which remained hidden in Socrates because Socrates didn't seek to define a place for the philosopher in the city: according to the *Phaedo*, the philosopher is the man who, purified of the taints of the body, no longer lives except by way of the soul separated from the body; in the *Theaetetus*, he is still the man who, inept and clumsy in his rapports with men, will never have a place within human society and will remain without influence; according to the *Republic* and the *Laws*, he is on the contrary the guardian of the constitution and the magistrate who imposes on the village's inhabitants the belief in the gods of the city or the perpetual prison. This is the ever-present conflict in the individual being between the necessity of "escaping from earth"<sup>2</sup> to purify himself in the contemplation of the ideas, whose sister is the soul, like a contemplative thinker who has retreated from the world to gain self-knowledge, and the other necessity, which is the construction of the just city structured according to the exact and rigorous rapports that are the object of contemplative science. True individuality is perhaps in that which forms the link between these two orders according to which the individual affirms himself in himself within solitary self-knowledge and expresses himself via the creation of an objective work, a work as real as things, in the society of other men. In addition to these two traits of pure interiority and pure exteriority, there is also in Plato an aspect of individual existence, which is like a mixture of the two: the enthusiasm and inspiration of the *Phaedo* and the *Symposium*; the individual is that which can only be generated or created in the Beautiful.<sup>3</sup> Within the individual being, there is a force that is the daughter of Poros and Penia, which is both a positive and a negative thing, satisfaction and lack. Love is one of the forces that joins in them isolation and presence to others, self-affirmation, and the search for another reality; beauty therefore corresponds to these two aspects of the individual being: every individual existence supposes self-affirmation and a search for something else; affirmation and searching are correlative and complementary; the erotic dialectic, which leads from beautiful bodies to beautiful souls, then from beautiful souls to the ideas in which they participate, accounts for this apparent paradox of the nature of the individual. Nevertheless, this conception is possible only due to the relation of participation, and this relation of participation itself leads to supposing the independence of ideas and

the objects that participate in these ideas. Here is where Plato diverges from the Socratic conception of individual reality: for Socrates, the search for self-knowledge led to a discovery of the unique characteristic due to which a thing is what it is (and which could be called the nature of a being). This is why Socrates seeks to reach in Euthyphro what makes Euthyphro pious. For Socrates, this characteristic is something that resides in the individual being. This search was possible for Socrates because it was limited to virtues or vices, i.e. to moral things, which can be grasped in human individuals. On the contrary, Plato wants to apply the method of seeking ideas to all beings, to mathematical beings in particular: the properties of mathematical beings are visibly independent from the sensible characteristics according to which a certain triangle or a certain circle exists because it has been traced in a certain spot, at a certain moment, and in a certain way. Straightness and circularity are not contained in this object like piety in Euthyphro or wisdom in Socrates; these mathematical realities exist outside the objects that reveal them to the senses; similarly, in physical things, a quality like whiteness will exist more so in a small amount of pure white than in a large amount of greyish white: this is because the sensible object contains neither straightness nor circularity, nor whiteness, but merely participates in these realities that Plato calls ideas. This "separation," which Aristotle severely reproached Plato for in the *Metaphysics*, prevents Plato from directly accepting the Socratic conception of individuality. Since the ideas themselves are discovered as hypotheses, it is necessary to rise back up to the unconditioned term in which they participate. Science therefore requires anterior to life a vision of ideas, which implies the preexistence of the soul. However, just as certain individuals, like Pericles or Aristides, without possessing science (since they have been unable to turn their sons into politicians) nevertheless possessed the capacity to govern the city well, the existence of right opinion must be supposed in them. This right opinion is not a characteristic that belongs to individual reality, like piety or wisdom in Socrates's theory: it is not "that by which a being is what it is", e.g. "that form itself that makes all pious actions pious,"<sup>4</sup> but the force that makes a man do what he does. It then must be acknowledged that right opinion derives from the inspiration of the gods;<sup>5</sup> philosophical inspiration is itself an aspect of the madness of love, for it is spiritual generation in the soul of the disciple; the life of the mind in the individual being is just like that of the body: the love of beautiful bodies extends the life of one individual into another; the love of beautiful souls extends the powers of the intelligence from the teacher to the disciple.<sup>6</sup> The individual being therefore learns to go beyond himself; this beyond is not the same as

the one Socrates indicated when he invited the soul to escape from the earth. Plato's individual is surpassed by a progress into universality and not by a μετάβασις εἰς ἄλλο [metábasis eis állo] ("migration toward elsewhere"); from the love of a body to the love of every beautiful thing, from the love of beautiful objects to the love of beautiful souls, from the love of beautiful souls to the love of beautiful ideas, then to the love of the immense sea of the Beautiful from which all these beauties originate, there is a progress toward universality. The poet instructs future generations through inspiration; it is also through inspiration that the Pythia "perform that fine work of theirs for all of Greece," whereas in her right mind she performs few or none;<sup>7</sup> amorous inspiration, the starting point for philosophy, gives wings back to the soul. Without this inspiration, the soul attains nothing but a cunning skill: "have you never noticed this about people who are said to be vicious but clever, how keen the vision of their little souls is ( . . . ), so that the sharper it sees, the more evil it accomplishes."<sup>8</sup> Conversely, the individual soul, thanks to inspiration, sees operating in it a conversion of becoming to being, which takes place with the entire soul. The isolated being in its individuality is the fallen soul of the *Phaedrus*; this is the prisoner who, in the cave of the *Republic*, expects the dialectic to come and give him a movement of conversion toward the light.<sup>9</sup> The individual is thus capable of passing through two states, that of isolation, which is consecutive with the fall of the soul from the sky down to earth, and that of rising back toward the world of ideas, of the return to the vision of which the soul is a part; the temporal circularity of the succession of these two aspects establishes a coherence of their opposition.

However, this first conception of the individual conforms to the validity of true opinion and—recognizing within the individual a mediating reality between being and nothingness and therefore a being in becoming—is incompatible with the critique of participation in the *Parmenides* and the critique of science in the *Theaetetus*.

The political exigency is an exigency of unity, as much for this unity that the human individual is as for this other organized individual that is the ideal city constituted by classes or castes, which are like social individualities with their own structure. The unity of the individual will be obtained and maintained by the unicity of its social function: in the just city, it is necessary to regulate the activity of citizens in such a way that "each of the other citizens is to be directed to what he is naturally suited for, so that, doing the one work that is his own, he will become not many but one, and the whole city will itself be naturally one not many."<sup>10</sup> The citizen is then singularly defined in his relation to the other occupations; Plato is consequently far from the

myth of the primordial hermaphrodite, which shows veritable individuality in the couple and not in man or woman; in the ideal city, the individual is indeed the particular being; individuality is given from the start by the rigorous determinism of the character chosen by the soul before incarnation; individuality is no longer an optative—that of the incomplete soul, forgetful of itself and the ideas—throughout the avatars of incarnation and successive lives, or in the search for its half from which it has been separated by divine wrath, according to the old Hesiodic myth. The individual becomes the elementary unity by means of which the order of the city is constructed; it is no longer what contains right opinion and this amorous madness that brings the individual to surpass himself and to extend beyond himself through his body and his thought. To be an element of the ideal city, the individual on the contrary must remain in his place, in the narrow limits going all the way to the fixity of the level of wealth. Women will occupy the same places and fulfill the same functions as men. By a sort of reversal of the second conception of individuality, Plato returns to a vision of individual reality that is no longer dynamic and expansive (like that of the *Symposium* and the *Phaedrus*) but structural (like the one that Socrates seemed to search for): just as Socrates sought in Euthyphro what makes Euthyphro what he is (i.e. a pious man), Plato searches for what makes an artisan an artisan or a warrior a warrior; in this conception, there is a return to immanence; what makes a warrior a warrior is not his participation in the archetype of the warrior or his aspiration toward the ideal warrior, but the fact that he has within himself, within his individual reality, a certain character that consists in a definite rapport of powers of the soul and functions of the body; this character is like a sign engraved in the individual being; this character is the structure of the individual being and determines it in its actions; here, there is no longer even the aspect of transcendence that appeared in the conception of Socrates by this idea that—thanks to self-awareness, which requires detachment with respect to the order of actual things—the being accomplishes within himself what he is essentially due to his fundamental virtue, i.e. that in which he excels. In the city, detachment is unnecessary for the individual to be himself. The structure that constitutes his individuality is not in fact a structure independent from the order of the city, i.e. the actual order; the structure of the individual is in a rapport of analogy with the structure of the city, and the social order is constituted by the rigorous insertion of these individual orders into a vaster order; the individual is a finite reality, and the city is also a finite reality; individual and city are like microcosm and macrocosm, and the rapport of analogy that exists between them is an identity of rapports internal

to each. The order of succession is incorporated into the order of simultaneity, for the order of succession has no creative value; philosopher-magistrates must look after the maintenance of the laws and the structure of the city. Recently, we have called the Platonic city a "city without friction," i.e. a system in which the play between the different elements is null, insofar as it does not allow any indetermination to remain between the relative displacements of the different elements, albeit without any force of friction despite this rigorous mutual adaptation. In the city where the different functions play without friction like the organs of a theoretical machine, no free force of true opinion or enthusiasm is left to individuals; the citizens are who they are depending on their place, and the temporal dimension, for the city as well as the citizen, is reduced to the most perfect approximation of permanence possible. The only natural and spontaneous evolution in fact is decadence. Consequently, the social relations that the individual involves with other individuals indicate the internal relations that constitute what we would call today the psychology of the individual; there is reversibility between the social order and the psychological order; there are as many functions in the city as there are faculties in the individual soul; concupiscence corresponds to the function of the artisan, insofar as it is lodged in the stomach and the genitals; the passion of wrath corresponds to the function of the warriors; reflective intelligence corresponds to the function of the guardian; the seat of the passion of anger is the heart and more generally the thorax; on the contrary, the seat of reflective intelligence is the head. This structure is deeply inscribed in the individual being, since it corresponds to a topology of the organism; the concupiscent appetites lodged in the stomach can act upon anger, since the stomach is only separated from the thorax by the supple partition of the diaphragm, allowing for movements to pass and impulses to communicate. By contrast, the head is separated from the thorax by this isthmus that the neck is; the independence of the reflective intelligence relative to the passion of anger and the concupiscent appetites is therefore much more easily than the independence of the passion of anger relative to the appetites. This psychology easily translates into ethics according to a schema that should be analyzed. In every Greek civilization, virtue is presented as an excellence. But with Socrates, virtue is directly the excellence of what makes each individual be himself, an excellence of which the individual becomes aware and which fixes and stabilizes him through self-awareness. On the contrary, with Plato virtue is excellence only indirectly for the individual; indeed, for the concupiscent appetite, the passion of anger, and the reflective intelligence there is an excellence proper to each of these three faculties:

temperance, courage, and prudence. But, unlike with Socrates, the veritable virtue of the individual is not the dominance of the faculty that characterizes it: the order of these faculties is what subordinates the appetites to the passion of anger and the passion of anger to the reflective intelligence; this observation of a rapport is not an excellence, a dynamism, but a structure, or rather the condition for the maintenance of the fundamental structure of the individual being in society and of the city itself. Such is justice for the city and for the individual; it is the supreme virtue, but, unlike particular virtues, it is not an excellence, a dynamism; justice is the stability of a structure due to which reciprocity is established between the interior order of the individual and its exterior activity constituted by social rapports. An excellence can be maintained by itself in the isolation of individual existence. Conversely, the stability of a rapport requires reciprocity between the internal relation and the external relation. The man who is just in himself is just around himself, while the man who is unjust outside himself cannot conserve within himself this justice, which is constituted by the justness [*justesse*] of rapports and is founded in being; just as a tool engaged in an incorrect usage (one that does not correspond to its structure) not only distorts the objects to which it is applied but also distorts itself and can then no longer operate according to its veritable structure, the unjust man in society loses this internal justice that was the justness of his agreement with himself. Whence the idea that fault is not a positive harmfulness that expresses itself but the result of an error or lack. In this sense, we see how Socrates's teaching is again found in Plato's last works, but it is oddly transformed insofar as it no longer includes this aspect of the aspiration and opening of the individual being, which is what gave Socrates's teaching the force of novelty that terrified the opinion of the old Athenians expressed by Aristophanes. From Socrates to Plato (at least to the Plato of the last dialogues), a displacement occurs that transferred self-awareness from the individual to society; for Socrates, the γνωθι σεαυτόν [*gnothi seautón*] is said to the individual; for Plato, it is society that must know itself through the philosopher-magistrates; to know itself, it must be fixed and limited, for the recurrent action of self-knowledge cannot be effectuated in the indefinite or the unlimited, and even less so in the undetermined; and the individual is known only through the city's knowledge of itself as the elementary part. Justice, the virtue of structure and not the virtue of excellence, allows for this immediate contact and this play without friction between the city and the individual; the city knows the individual by knowing itself. At the level of the *Laws*, the veritable individual is the city.

Does this conception of individuality result from the need to conceive a stable city, or, on the contrary, does it stem from the critique of knowledge and the conception of being in the *Theaetetus*, the *Sophist*, and the *Parmenides*? It does not fall within the scope of this study to ascertain if Plato was motivated by the will to found the political order or if his conception of the political order mostly results from the methodological and theoretical discoveries that follow in the dialogues of the critical period. But it should be noted that the conception of the individual being conforms both with the demands of political thought and the discoveries of logical and metaphysical thought. The stable is also the perfect: "above all, the laws need to be stable."<sup>11</sup> The politician is one who knows how to make the most stable mixture possible. The political problem is a problem of measure; antithetical constitutions, whether despotism or democracy, are bad when they are isolated; they must be joined together in a stable mixture, a well-proportioned blend produced by the good constitution.<sup>12</sup> The city is "a friend to itself"<sup>13</sup> when there is harmony in it between sensibility and the intelligence, which judges; taken away from the human individual, love and enthusiasm reappear at the level of the city, such that the law is not sufficient unto itself and is thereby preceded by prologue, which is addressed to the free inclination of the gathering of citizens. Man seems like "a toy for God"<sup>14</sup> because the veritable individual is the city, and because the particular being contains within himself neither the whole development of his explanation nor the ethics that legitimizes and organizes his existence.

The consequence of Plato's critique is in fact to displace the points of application of theoretical thought. A philosophy of relation follows after the primordial philosophy of being; in the first two periods of the development of Plato's thought, a Parmenidean conception of being remains behind the Socratic search for essential virtues; this conception, which is clear in the first period, is corrected in the second period by the dynamism of true opinion and the erotic dialectic; the individual is always isolated from the order of actuality, but he is not self-enclosed, in the sense that he involves a relation of participation with the ideas and the anhypothetical term that the ascending dialectic supposes; the sensible is nothing but the occasion of this uprising of the soul, which is at the same time a detachment; but in order for the sensible to be the occasion of this uprising, it already must be the image of the archetype; dynamism is a detachment, no doubt, but the occasion of this discovery of the soul's uprising is a contact with the sensible, which contains in it more than it is, i.e. the image of the world of ideas; the order of actuality only intervenes as image, but, nevertheless, there is a certain figuration

of being in γένεσις [généσις] (“generation,” “creation”) and φθορά [phthorá] (“destruction”); the structure of the sensible is not achieved in itself, since it is not just the occasion of uprising, but the first image of the intelligible. Yet, this detachment of the sensible is possible due to the great law of universal paradigmaticism that turns the structure of the sensible into the analogue of the structure of the world of ideas. It is precisely through this schematism of analogical participation that the *Parmenides* contributes a decisive critique. If several things participate in the same idea, the idea cannot be separated from itself in order to be in each of the things, or to be in them partly, because then the rapport of the total idea to the parts of the idea is inconceivable. We see here that the idea is treated like Parmenidean being, which is singular and homogeneous and consequently indivisible, i.e. complete in each of its parts: Parmenidean being is strictly imparticipable because it has no *physis* and is not an element, properly speaking. Furthermore, the unity of the idea above the multiplicity of the terms that participate in this idea is impossible, because in order to guarantee the participation of multiple things in a single idea there must be another idea above the ensemble formed by the multiple things that participate and the idea in which they participate; the difficulty that Plato encounters by wanting to remain faithful to the Parmenidean conception of being consists in the impossibility of conceiving any relation that would not be a being, that would not be endowed with the characteristics of indivisible and static individuality that Parmenidean being presents; consequently, the relation of participation can only be grasped as a supplementary being added to the system formed by the idea and the realities that participate in the idea. This process of position of new beings for constituting the relation between participant and participated goes to infinity; moreover, it is not a necessary result of the unicity of the idea and of the multiplicity of things that participate: the difficulty would be the same with a single participating being; what requires this position of an infinity of beings is in fact the individualizing and static conception of being, which comes from Parmenides; participation presents such difficulties because Parmenidean being does not include relation within it; here, the multiplicity of things only intervenes to require the exteriority of the idea; once the exteriority of the idea is posited, the indefinite reduplication of beings arises only from this exteriority and not from the multiplicity of beings that participate; the argument could apply to the relation between a single thing and the idea in which it participates. The third man argument, which we find in Aristotle and which aims for the separated character of the idea, depends on the same foundation as the one that Plato establishes against his own theory of participation in the

*Parmenides*.<sup>15</sup> The relation of resemblance is powerless to resolve this problem,<sup>16</sup> even if the relation of part to whole is replaced with that of portrait to model; in order for there to be resemblance, there must be participation in the same idea, which leads back to the previous case. Ultimately, knowledge cannot be explained by the relation of participation, for there is an incompatibility between the nature of the idea and its existence within us when it is known; a reality in itself can only be known by a science in itself within which we do not partake.<sup>17</sup> Here again the point of view is the same; the relation that knowledge is is incompatible with the idea envisioned as Parmenidean being. The being is deprived of *physis* and does not have a power of relation or production within it; the being is a static individual, an absolute individual, and is consequently imparticipable.

As a theory of knowledge, the *Theaetetus* reveals the same difficulty relative to relation; against Heraclitus and Protagoras, Plato refuses to see in sensation the relation of an agent to a patient that would be valid;<sup>18</sup> sensation and sensible quality, which arise from this relation, are nothing without one another and are not stable. No quality is a reality in itself. Consequently, to know is not to feel. But to know also cannot be to judge, for there is no relation between knowledge and ignorance, since there is no mediating reality between being and non-being; this mediating state that true opinion would be does not exist.<sup>19</sup> True judgment is not science; Plato is opposed to the thesis of Antisthenes, who made of science the enumeration of the elements of which reality is composed and the way they are grouped.<sup>20</sup> Nevertheless, Plato does not want a science that would be a knowledge of the rapport between terms that would themselves be unknown. This relation, which would not have its *raison d'être* in the terms and would not result from the nature of the juxtaposed elements, cannot be thought.<sup>21</sup> The only acceptable relation would be a relation founded in being; but the *Parmenides* establishes the impossibility of a relation that would not be a being.

The second part of the *Parmenides* opens a new path that is no longer that of participation in being, but that of relation such as hypothetical research discovers it; there is relation of a hypothesis to a consequence, and this relation is that of the attributes that can be given to a subject; we can therefore wonder what are the most general attributes that can be granted or refused to any subject whatsoever: whole and part, beginning, middle, and end, straight and circular, in something else and in itself, mobile and immobile, same and other, similar and dissimilar, equal and unequal, younger or the same age. These categories are not categories prepared in advance for research; these categories are veritable relations, for they increasingly arise from demonstration,

like a mathematical figure whose properties are discovered based on a consequence that is also a reconstruction. Relation becomes, without participation, of being; it is interior to being. This indicates that being is no longer Parmenidean being, an absolute individual that consists in its individuality. Whether we hypothesize that the one is or the one is not, we are led to affirm and then deny (about the one as well as things other than the one) all the couples of contraries: knowledge will merely have to limit this indefinite fruitfulness of the relation between ideas. The inconceivable relation between idea and things is replaced with the relation between idea and idea. Participation will be replaced with the communication of ideas. The *Sophist* shows that a thing cannot be defined in itself; it can only be defined by relation. "That which wholly is"<sup>22</sup> is opposed to the multiplicity of Phaedo's isolated and fixed ideas: that which wholly is "has intelligence, life and soul [but is] at rest and completely changeless even though it's alive."<sup>23</sup> Being contains both the force to act and to be acted upon. Being, limited by itself, is too poor. Being includes not just the idea or object that is known, but the subject that knows it, the intelligence and soul within which relation is incorporated; relation, such as it appears in the *Sophist* as a sort of table of categories, should not be considered as a simple aspect of the mind; it is real, and we see these categories in some way become various elements in the *Timaeus*.

Nevertheless, the Eleatic stranger of the *Sophist* does not want to give being an overly rich concept that surpasses it.<sup>24</sup> The problem will then be a problem of measure; relation is interior to being, but it is limited by a measure, which is like the constitutive structure of relation insofar as relation is being. Consequently, it is necessary to study the communication and blending between terms, such as being, movement, and rest. What thought attains are never isolated elements but always mixtures; a concept is attained only with the relations that it has with other concepts: dialectics is the art that provides rules for the blending of concepts, just as music provides rules for the union of sounds.<sup>25</sup> But these concepts are part of the total being; relations between concepts are not artificial; they are analogous to the relations between beings and are themselves relations between beings. There is no logical individuality of concepts prior to this relation that dialectics establishes: for whatever attribute that can be given to a notion, the latter possesses the former not by itself but by participation in another idea. Thought passes from the undetermined to the determined; it does not remain content with establishing rapports between already determined ideas, as Aristotle's logic will be willing to do. Dialectics consists in grasping this "willing" (i.e. that which signifies the idea that is examined profoundly) and in following what is seen

in the notions.<sup>26</sup> Each notion returns us from itself to the notions with which it must combine. This intellectual intuition that grasps relation as being is incompatible with the Parmenidean conception of being.

Being is then defined as a mixture; the individual is no longer absolute unity but the stability of a relation. Already in the *Phaedrus*,<sup>27</sup> the synthetic apprehension of being is prior to any analysis; this analysis, a division which leads to the definition, carves up the real κατ' ἄρθρα [kat' árthra], according to natural articulations, which supposes that the individual being possesses an analyzable relation in its unity. The exercises of division that we find in the *Statesman* and the *Sophist* could make us believe that division only bears upon the extension of a concept; but it in fact leads to a definition, like, for example, that of the sophist as the guileful hunter of young rich people, or the definition of politics as prescriptive theoretical science: this division, which is practiced by means of intuition, always bears upon the totality of being, without which it would be arbitrary; a group must not be defined negatively by exclusion but positively; in this way, there is between the two groups arising from division a veritable relation that is not a simple logical distinction: the division of "man" into Greeks and Barbarians is not κατ' ἄρθρα, since the term "Barbarians" is only defined negatively by exclusion of the term "Greek." On the contrary, the division of "man" into male and female is founded on equally positive characteristics; it is founded on a veritable relation.

The individual, which is a veritable mixture, is not an arbitrary fusion but a well-defined combination of two elements: an undetermined or unlimited element and a fixed limit or determination. The undetermined is a couple of opposites, like "larger and smaller," "higher and lower," "hotter and colder." The limit is a fixed numerical ratio, like double or triple. Being, which is a mixture, results from the introduction of a fixed rapport into the couple of opposites: octave, movement, forms are therefore mixtures. It seems that Plato reintroduced something of Ionian physics into his conception of being; the indefinite dyad somewhat plays the role of the element; but *physis* is no longer immanent to the element; the undetermined of the dyad indeed provides the matter of the rapport, but the limit intervenes in this undetermined externally in some way; what is missing to conceive the unity and consistency of the individual being is the relation between the πέρας [péras] ("limit") and the ἄπειρον [ápeiron], which is neither limit nor unlimited; the individual is this rapport between limit and unlimited. Thus, Plato grants a sort of privilege to the limit over the unlimited, a privilege that prepares the Aristotelian theory of the activity of form and the passivity of matter in the individual. Indeed, for Plato the limit is an object of science, which grasps the fixed rapports

introduced into the ἄπειρον by the πέρας, i.e. the μέτριον [métrion] (“the well-measured”). Moreover, since the unlimited and the limit are not named (*Philebus*) and are not implicated, there must be a fourth genus of being to link them that is different from them as well as from the blend, i.e. the cause of the blend.<sup>28</sup> Consequently, the mixture does not harbor within itself a *physis* that would contain its own explanation; the cause of the blend is one for a multiplicity of beings and is above them; it is final cause, grasped in the form of beauty, symmetry, truth.<sup>29</sup> This end, the cause of the blend, is the unconditioned of the *Republic*. The individual is consequently inserted into a *cosmos* that is the most beautiful of sensible mixtures, a stable blend organized according to fixed rapports. The world is a living individual endowed with soul and intelligence.<sup>30</sup> But *physis* is replaced with the demiurge.<sup>31</sup> This demiurge operates on a world that already includes individualities, since the four elements of earth, water, air, and fire therein are composed of elementary particles; the corpuscles of a certain element can be identified by their specific shape; they have the form of the four regular polyhedrons (cube, icosahedron, octahedron, tetrahedron); brute necessity appears in the arrangement of these corpuscles, which depend on the way they react to the tremors of the indefinite space in which they exist. It seems that to conceive elementary physical individuality, Plato applied a Pythagorean representation perfected by Theaetetus’s recent discoveries in stereometry to the conception that the Ionian physiologists presented for the element: the indefinite nature of the element has become that of the space or receptacle, “χώρα” [chóra]; conversely, what was positive in the material substantiality of the unique primordial element has become geometrical form, the elementary triangle with which Plato tried to compose all regular tetrahedrons so as to explain the continuity of the transmutation of the elements; a corpuscle of water contains as many triangles as two corpuscles of air plus a corpuscle of fire, and a corpuscle of air contains as many triangles as two corpuscles of fire;<sup>32</sup> thus, despite its division into elementary corpuscles, there is a certain homogeneity of all matter due to the fact that elementary corpuscles are themselves composed of triangles; only the corpuscles of earth resist this decomposition that establishes the continuity of transmutations; in this way, the smallest element of elementary matter already has a form; pure indetermination has been rejected in the “bastard,” hardly believable concept of the χώρα.<sup>33</sup> But elementary triangles are not enough to constitute the *cosmos*: starting with elementary triangles, pure necessity can engender nothing but the elementary corpuscles of the four elements. Polyhedrons do not go beyond the determination of fixed rapports of largeness and smallness.<sup>34</sup> This incapacity

of the *χώρα* and of elementary triangles to make complete organized individuals appear stems from the fact that Plato has not conserved the *physis* of the Ionians. It is consequently the demiurge who intervenes to give form to the ensemble constituted by the *χώρα* and the polyhedrons in order to make them into a *cosmos*. The demiurge creates that which in individuality is organization and structure of the ensemble, finality, organic relation; it creates the world soul; the world soul, which is a mixture, is composed of *πέρας*, which is the indivisible essence, and *ἄπειρον*, which is the divisible essence.<sup>35</sup> To this is also added the same and the other, which only enter into the blend by force and which remain the principle of indetermination. This world soul composed of mixture, of same and other, constitutes the structure of the *cosmos* by providing that of the astronomical system. Here, relation becomes constitutive of being itself: the mixture is divided into two branches that cross at an acute angle and curve into circles with the same center. The circle of the same is unique, while the circle of the other is divided sevenfold. It is animated by a movement that is inverse to the preceding movement. The whole *cosmos* is penetrated by finality down to its last details, and, according to the tenth book of the *Laws*, divine providence is everywhere. The theory of the world is a narrative of the providential work. The individual being is never certain about penetrating the intentions of providence; the knowledge of the *cosmos* consequently remains intuitive and partially conjectural. A veritable dualism then arises: by bending necessity to intelligence, the demiurge encounters resistances; the first mixture, the body of the world, is so well made that it is immortal even though it has been engendered,<sup>36</sup> but partial mixtures (like the bodies of animals), which are made by the gods imitating the demiurge, are subject to death.<sup>37</sup> In this sense, mixtures are increasingly less perfect individuals endowed with less and less coherence and stability.

This search for the reality of relation as constitutive of a being seems as though it were quite particularly expressed in Plato's oral teaching; the number-ideas are defined by rapports, not by a series of units added together. They define the most essential relations, those which are constitutive of beings; these numbers are individuals because, according to what Aristotle tells us, they result from the one and from the indefinite dyad of the large and small.<sup>38</sup> The one is that which introduces the *πέρας*, while the dyad is *ἄπειρον*. The *Philebus* already showed that form can be made to emerge from a fixed rapport of largeness and smallness.<sup>39</sup> These ideal numbers, which consist of fixed but really existing rapports, are fundamental structures that can define the being independently of every sensible given. In the number-idea, relation

has become the foundation of the being, the first intelligible structure. Ideal numbers constitute the laws for the combination of mixtures as beings; the problem of participation that animates the first part of the *Parmenides* is resolved here by a sort of reversal that transports the veritable individuality of the being to the relation between mixtures by defining the number-ideas as the principle of the eternal model of the world.<sup>40</sup>

It is certainly difficult to penetrate the exact meaning of Plato's esoteric teaching toward the last years of his life. Nevertheless, it seems that this teaching sought to discover a way to think becoming, just as political science requires. Correlatively, the human individual seeks to be immortalized in the sensible, i.e. in becoming. And yet, in order for becoming to become the substance of an immortality, there must be—at the heart of this movement, of these generations and corruptions that are the stuff of being—not the stability of a being in the Parmenidean sense, since becoming excludes it, but the stability of a rapport between movements; consequently, this rapport can no longer be constituted by a fixed form or an archetype of static structure, but only by the number-idea that characterizes this rapport; this number-idea is not a quantity formed by the addition of units, for it is indecomposable; it is form insofar as it contains a rapport; it is permanent, but not fixed. If such is the number-idea, according to the law of analogy that defines the structure of the Platonic world, it may be thought that the imperfect individual (like man) is a being that to some extent harbors a form, a permanent rapport, like a number-idea. The *Cratylus*, which is a dialogue whose study is generally left aside, informs us about a conception of individuality that brought this point of view to light: Plato sought not only what forms the correctness of denominations but also the particular reality of the individual to which the name can be referred insofar as it is a proper name: what is the Socrativity in Socrates? This question remains without a precise answer in that which concerns persons; yet, by contrast, the solution given to the question of common names could be suitable to a certain extent for proper names: the name is a hypothesis about the static or dynamic structure of the thing; it aims to account for the nature of the thing, whether this nature be static or dynamic; the broad lines of the system of thought of those who have established it can even be rediscovered through an analysis of vocabulary; and Plato believes to be able to point out two very different layers of vocabulary, one of which would arise from the work of mobilist philosophers and the other from the work of immobilist philosophers. It is only regrettable that this dialogue does not leave us with a deeper analysis of the conditions for the correct application of proper names.

Ultimately, it must be noted that Plato does not present a single type of conception of individuality, but two: strictly speaking, there is the individuality of the elementary tetrahedrons composed of triangles and the individuality of the *cosmos* or of number-ideas. The individuality of tetrahedrons is constituted by the arrangement of the elementary triangles that constitute their faces; these individuals are wholes composed of parts, and the fact of having integrated the tetrahedron of a particular element does not prevent one of the triangles from being integrated into another element in a transmutation. What is fixed and unalterable is the elementary triangle; the elementary tetrahedral individual is already a composite, perfectly defined yet imperfectly stable; there is no property of the whole that does not result from a property of the parts in the individual. The genesis of the individual is explainable by causality alone. It results from necessity and does not imply an intelligent and providential finality. On the contrary, if we consider the *cosmos*, we realize that each of its parts is fashioned so as to be integrated into the whole, and that the whole is anterior to the parts instead of resulting from their encounter or their assemblage. The world supposes an intelligent finality, that of the One, the Good, or the Demiurge; the role of the *πέρας* is not the same in the elementary individual and in the cosmic individual; in the elementary individual, the triangular form remains veritably adherent to the triangular particle, which, in its association with the other particles, composes the tetrahedron: the *πέρας* is already present in the part. Due to its geometrical nature, every triangular form can be combined with other triangles to create a definite number of regular tetrahedrons; there is homogeneity and continuity between the form of the regular tetrahedron and the form of the elementary triangle. Conversely, there is no continuity between the matter that the demiurge informs and the order that it establishes to make the *cosmos*; to create the *cosmos* individual, blind necessity and space or the undetermined movements of the *χώρα* will not suffice: the form of the whole is not homogeneous with the form of the parts; it comes from outside and on high to impose an order onto the world of blind necessity; the individual according to finality is not composed like the individual according to causality. Man remains between these two orders of magnitude, which are two types of incompatible composition; man is individual neither according to geometrical necessity nor according to the finality of the *cosmos*. Plato consequently attempts to give man a place in the order of finality by making each individual man with his characteristics be born providentially where he must so he can be integrated into the city. Man is individualized according to the finality of the *cosmos* and not according to the causality of the elementary individual.

The conception of individuality in Plato stems from the dissociation of the element of the Ionian physiologists; the order of succession has become finality applied to cosmic individuality; the order of simultaneity has become the individuality of the particle applied to the elements. Between the two types of individuality, that of the elementary particle and that of the whole, there would have to be a mode of composition; it is this mode of composition that we are unaware of; perhaps it was studied in Plato's esoteric teachings; but it is lacking in the extant texts. Plato's last word relative to human individuality, which is precisely situated in this interval, is not a theoretical examination but a practical attitude of the legislator composing the ideal city: the individual is treated according to the city's order of simultaneity, and this order is inserted into a world organized according to finality. Perhaps it is necessary to see the will to reconcile order according to simultaneity and order according to succession in the principle of eternal return and the Great Year. If becoming is circular, the order of finality coincides due to its limited nature with the order of simultaneity. The individual being is consequently in a becoming that is already, *qua* becoming, penetrated by an intelligibility and an order that are not incompatible with the order of simultaneity. The cyclical movement of the astronomical system subtended by the world soul is the mobile image of eternity. The structural order of the city attempts to maintain the stability of the laws and institutions and to prevent decadence; since absolute fixity is impossible, Plato rediscovers a sort of fixity in the cyclical and therefore regulated nature of becoming. Nevertheless, this cyclical aspect of time, which permits bringing a certain type of simultaneity or at least an analogue of simultaneity into succession, subordinates the order of succession to the order of simultaneity.

This conception is therefore equivalent to privileging order, measure; art is anterior to nature in the order of the world as well as in the individual, of which it is the foundation of virtue, and in the city, the stability of which it guarantees. Nevertheless, since there are two types of orders, one that leads to the formation of elementary tetrahedrons and one that organizes the *cosmos*, it is difficult to define the exact relation of individual reality to order; that of the elementary corpuscles is interior to the individual, but that of the *cosmos* is exterior and superior to it; whence results an ambivalence of the individual that is both the source of every legitimate reform (philosophers would need to be kings or philosopher kings) yet precisely establishes a reform in which it disappears as individual, since the city is that in which individuals are nothing but citizens. It is at the level of the city that the order of causality and finality reinforce one another and coincide; the city is the veritable

individual, carefully placed far enough away from the sea so as not to be involved in multiple expeditions, situated in a region with a suitable climate, benefiting from an exceptional independence. The human individual is incomplete by himself, whether he have power or whether he be in a precarious situation. The tyrant is precisely the completely isolated individual who breaks every bond with society, exiling the good people whom he fears, living under the protection of his bodyguards whom he has acquired by freeing the slaves. The dissociation of the city reaches its terminus here; the tyrannical man is the individual who takes himself as an absolute, without friends, always despot or slave, but ignoring true freedom and true friendship.<sup>41</sup> In opposition to this individual who takes himself as an absolute, there is the individual who accomplishes a technical work, particularly the political technician, the veritable absolute, living, and sovereign law of the city, like the shepherd with his flock; more generally, the human arts were bestowed by the Gods upon man, who was always confronting great difficulties; all kinds of techniques are necessary when beings manage to arrive with great difficulty through all kinds of obstacles to their achievement; only the individual being can exert techniques, even if they require assembly<sup>42</sup>, for technics is what is applied to changing, various things; when it comes to political art as well as the other arts, “the dissimilarities between human beings and their actions, and the fact that practically nothing in human affairs ever remains stable, prevent any sort of expertise whatsoever from making any simple decision in any sphere that covers all cases and will last for all time.”<sup>43</sup> The technician is the individual who knows how to apply himself to becoming. However, judging according to the effective results of Plato’s teaching, it can be seen that a very large number of students of the Academy were legislators, and that the Academy was the greatest school of political technics the world has ever known. It is quite probable that Plato’s oral teachings sought this possession of political techniques; if we join this fact with another, i.e. the information according to which the doctrine of number-ideas were part of this esoteric teaching given to the students but not published in the dialogues, then we may think that the number-ideas are precisely the notion of the realities upon which a technics (political technics, in particular) can be founded. The knowledge of the number-ideas gives an activity to the individual that forces him to not take himself as an absolute and to insert himself in becoming by immortalizing himself in the sensible; the individual avoids the degradation of the forms and stabilizes becoming by organizing it. Despite the conjectural aspect of this reconstitution of Plato’s esoteric thought, it definitely seems that there was in this relation of the individual being to becoming an

extremely profound view, albeit one that could not be immediately fruitful in the society within which Plato lived, since it was so difficult to comprehend. The tyrant is an individual, but the philosopher is also an individual: it is a question of passing from the individuality of the tyrant to that of the philosopher. It would therefore not be entirely correct to view Plato's last effort to think individuality as an effort to incorporate it statically into the city; but it is true that what was retained from Platonism is indeed this static representation of individuality according to the order of the simultaneous. Plato's doctrine deserves to be renovated and continued today by means of information theory. In a certain sense, the individual is a puppet: "each of us living beings is a puppet of the gods. Whether we have been constructed to serve as their plaything, or for some serious reason, is something beyond our ken."<sup>44</sup> But, in another sense, he is the one who, by learning philosophical metrics, becomes, thanks to the number-ideas, one who knows this puppet and who stabilizes its becoming through the discovery in each circumstance of this justness that Platonic justice is: this technician of pure technics that the philosopher is operates on becoming. It is in the knowledge of becoming that he discovers the model of his action: the philosopher has become his own δαίμων [daimon] unto himself.

#### ARISTOTLE

Aristotle conserves and fixes this dismemberment of the unity of the element of the Ionian Physiologists. If we wanted to express in Aristotelian terms the theory of the element with its own *physis*, we would have to say that potency is always contemporary with act and yet that act admits an extremely broad variety of forms, without there being any privileged and definitive form relative to the forms that have preceded it or will be able to follow it. Conversely, for Aristotle act is anterior to potency in the logical, temporal, and substantial sense; the notion of being in potency implies that of being in act; being in act does not arise from a being in potency except under the effect of another being that is already in act; the being in potency derives all its essence from a being in act. Existence can only be given as actual integrally determined substances, and the indetermination that may exist in the world can exist only relative to forms that are more complete.

Aristotle defines every existing being as an individual, and his conception of individuality radically excludes becoming, because *quiddity*—that which without progress or deficiency integrally belongs to a given being from its birth to its disappearance—is not susceptible to more or less: one is not more

or less man. For the individual being, essence is the fact of continuing to be what it was, τὸ τί ἦν εἶναι [τὸ τί ἐν εἶναι]. This essence or form does not include becoming; becoming in fact consists in the union of a form with a being that can receive it; this being in potency is matter. Act is the center of reference with respect to which beings in potency, which are conceived as such not through what they are but through what they can become, are ordered and situated.

According to this principle of the anteriority of act, Aristotle cannot accept the atomistic form of the genesis of elementary individualities, which Plato accepted and perfected by means of stereometry. The being's unity does not result from the conjunction or juxtaposition of material parts, since these parts are posterior to the being. According to Aristotle, the material parts of a being are posterior to its existence: in this sense, the material parts of a circle are the segments into which it is divisible; only the formal parts found the being's unity through their union. Conversely, the material parts are posterior to the being in act of which they are the parts; thus, the definition of the semi-circle first requires that of the circle, since the latter implies the former; the acute angle, a material part of the right angle, is nevertheless logically posterior to the right angle, since it is defined as the angle smaller than a right angle. Similarly, the hand is posterior and not anterior to the essence of the living body, since it would not be able to exist as a hand apart from this body.

Furthermore, the genesis of individual beings based on a primordial productive force like *physis* is impossible; Aristotle does not suppose that an undetermined element, an ἄπειρον containing a dynamism of development, can exist; Aristotle can conceive beings only as already individualized. Aristotle does not conceive that the being can be in act without already being individualized; the elements of the Ionian Physiologists are not the being in act. Here, there is a radical difference in the conception of being; potency, which for Aristotle is merely a possibility, was for the Ionians—to the extent that this concept was distinct for them—an active and positive capacity of individuation within the indefinite element. The Ionians considered that the observable state of the world, wherein the separation of the elements and the individuality of beings is revealed, results from an equally actual primordial state, but a state in which being was neither separated into elements nor carved up into individuals. Aristotle not only conceives the individual as always in act, which is expressed by the permanence of quiddity, he also considers that there is no part of the being that is not individualized; the whole being is composed of individuals. In the Ionian conception of the world, there is on the contrary a great reserve of non-individualized being from which and to

which individualized beings arise and return. Plato had begun to individualize everything by including the whole universe in the providential order of the *cosmos* as it is thought by the demiurge; in his doctrine, only the  $\chi\omega\rho\alpha$  still constituted that which of being is not individualized. But the individuality of the *cosmos* is an individuality that comes onto the world from above and envelops it in a somewhat loose manner: since all things are part of this universal individuality, the attachment of each sensible being to this principle of cosmic order can only be theoretically constrictive; the “separation” of the ideas leaves a certain *de facto* consistency to particular individualities. In Aristotle, on the contrary, “beings do not wish to be badly governed,” and, moreover, form is interior to each being; the individuation of all beings is consequently much more precise. However, it is because everything is an individual that potency cannot be anything but an apparent inconsistent virtuality qua virtuality anterior to act. In order for potency to be anything but this pure virtuality thought λογικως [logikos] or by way of the *logos*, there would have to be, before the state of individualization, the possibility of a state of actual non-individualization for the being. Plato’s thought considerably reduced the possibility of this state of non-individualization, and Aristotle conserved this reduction from Plato by emphasizing it through the refusal of what he calls separate ideas. This is how we wind up with a system of pure actuality with Aristotle. The theory of knowledge itself is consequently transformed; dialectics disappears, and the universal is known in sensation: “for though one perceives the particular, perception is of the universal—e.g. of man but not of Callias the man.”<sup>45</sup> Essence, οὐσία [ousía], is veritably being qua being, i.e. that which does not refer to a superior principle, that which is truly radical principle. Every genetic explanation of essences is henceforth impossible. Moreover, every indetermination must be explained as relative to forms that are more complete. Nevertheless, the relation for which Plato accounted by means of the number-ideas becomes difficult to think in Aristotle’s system; this is why it is contemplated in the physics more so than in the metaphysics; motion is the act of the possible qua possible.<sup>46</sup> The rapport of form to matter consequently takes on an important meaning and requires a certain anteriority of potency relative to act; physics reinstates what metaphysics denies, but it does so by conserving the idea of a potency already included in an individual: potency is potency of the individual: the child grows insofar as it is a child, i.e. because it has the possibility of reaching adult size and not insofar as it is a living being of a certain size. *Physis* is not denied but incorporated into the individual as a rapport of form and matter, after which the existence of the non-individualized being has been nullified so as not to

admit any other reality than one that is fully active. Motion must belong to a subject that does not change during becoming.<sup>47</sup> This is why Aristotle excluded generation and corruption (the birth of a substance and its death) from the types of motion; this passage from being to non-being and from non-being to being is not a movement like alternation, augmentation, or diminution, local movement. Indeed, the starting point for these three types of movement is the privation of a certain quality, and the endpoint is the possession of this quality. Every movement takes place between contraries. However, “no substance has a contrary.” The generation of a substance is abruptly discontinuous; it arises in an indivisible instant. Aristotle thereby affirms that indefinite and unlimited *physis* conceived as universal flux does not exist; there is no flux of substantial forms; the substantial form, which as final cause has directed the series of modifications that have primed matter to receive it, remains stable and identical: science penetrates moving things, yet this is to affirm that motion is the motion of individual beings.

Not a single aspect of the Ionians’ element remains but the continuous milieu, i.e. time, place, void. Aristotle endeavors to render relative to form and to essence these milieus that are even less consistent than the *χώρα* of the *Timaeus*, which was the non-individualized, even though it exists. Place is not a universal and indifferent, non-individualized, independent milieu. Aristotle attacks the Platonic thesis of the infinite as separate and absolute reality by declaring that every reality of this type is a substance and that for this reason it is individual, whereas the infinite cannot be anything but divisible.<sup>48</sup> The infinite is therefore nothing but the attribute of a substance. The infinite is merely in potency. There is no container or infinite element that would be the ever-rejuvenating source of worlds; the infinite and the unlimited are terms that are always relative to the finite, to the completed, in which they are situated as a matter and with respect to which they take on a meaning: “it is absurd and impossible to suppose that the unknowable and indeterminate should contain and determine.”<sup>49</sup> Furthermore, becoming is not endowed with an unlimited fecundity, since becoming goes from being to being; an element can only be destroyed by giving birth to another; becoming finds the sources of its own rejuvenation within itself and not in the infinite.<sup>50</sup> Ultimately, the conception of place ends up turning it into an attribute of the body. The *χώρα* of the *Timaeus* is refused; place must be attached to the body so as to turn it into an attribute all while leaving it separate, since local movement shows that “where once there was air, now there is water”. “The place exists at the same time as the thing, for limits are with the limited”. According to Aristotle, the notion of the void is unacceptable; insofar

as motion always arises between an initial state and a final state, local movements are movements directed toward the proper place of each thing; they are natural movements of the body toward its proper place, or instead they are violent movements that remove the body from its proper place and that stop when the moving cause ceases to act. These movements could not take place in the void because there would be neither height nor depth, and consequently there would be no reason for the mobile to stop anywhere or continue moving indefinitely. This second supposition (which constitutes a formulation of a principle that will later be called the principle of inertia) is initially avoided by Aristotle because it is contrary to his representation of the individual, the being in act: motion, as E. Bréhier notes, would in fact be considered apart from its physical properties. However, since everything is individual for Aristotle, motion cannot be considered without considering its properties; it can be nothing but an aspect or a consequence of its properties; a body in the void would be a body without any physical properties. Here, Aristotle invokes false or poorly observed experiences; due to the efforts of a sailor, a boat only moves or displaces if the efforts surpass a certain limit; the movement of the boat stops as soon as the efforts stop; speed is not proportionate to force but inversely proportionate to the resistance imposed by the milieu; in the void, the speed of a body would therefore be infinite. Time itself cannot be numbering number, as Plato would like; it is in fact numbered number. Time is in each movement, whatever it may be; each movement has its duration, like an attribute that belongs to it; it is the “number of movement according to the anterior and the posterior”; neither movement, the infinite, place, nor time can be conceived as independent from the individualized being, i.e. from substance. Movement in particular is conceived as consisting not in what it is at each successive instant but through what it realizes overall in the being, which is its center; it is not this quasi-substance proclaimed by Protagoras; Aristotle imagines a substance whose only role is to move regularly, the substance of the heavens, which is different from the four elements. The simplicity of its movement is based on the unity of the intention that it manifests. Perpetual and necessary motion is obtained in this way without beginning or end. For Aristotle, the mover cannot be moved; it is in act what the mobile is in potency; it is, for example, the hot insofar as it is warming up; it is the knower insofar as he is being instructed. Plato considered the mover as moving; Aristotle refuses this doctrine; the unmoved mover is the being in act insofar as it has encountered a mover capable of passing from potency to act.

There nevertheless remains a difficulty in this world composed solely of individuals, and this difficulty is paramount: is the substance of a being the

composite of form and matter or instead substantial form, which is the being's essence? This problem is not posed for God, who is pure act, and in whom thought has no other conditions besides itself, since it is without matter. God is eternal substance identical with his essence; there is consequently a vast law of imitation; God is the type that will undertake imitating the substances born from the combination of form and matter. But this conception of a relation of imitation supposes a system in which an individual being is not solely what it is, since it tends toward another being superior to it. If particular beings were substances, they would not need to be governed; yet, Aristotle cites Homeric verse, which he takes as the expression of the reason why he adopts monotheism: "The rule of many is not good; let there be one ruler."<sup>51</sup> The science of natural things becomes the effort to know the echelons of a hierarchy of unmoved movers, all the way from God to souls and to every form; in this hierarchy, each term is the final cause that orders the inferior terms . . . "for all things have by nature something divine in them:"<sup>52</sup> "man is begotten by man but by the sun as well." All changes have their material conditions in elementary forces, but they have their veritable and final cause in the form toward which they are oriented.

The living individual manifests this aspect of finality very particularly: in their exercise, the vital functions reveal the purpose [*fin*] of the organs and of their components (bones, muscles, nerves). The soul, substantial form, is the first entelechy of a natural body that has life in potency. The soul is therefore the principle of vital activity, the unmoved mover of this activity; consequently, the soul is part of the individual, whereas in Plato, it was a migrating voyager, ever tormented by the desire to "escape from the earth," thereby fulfilling its proper destiny by passing from body to body. Soul and body arise and disappear together; each living being has a unique soul.<sup>53</sup> The individual is the being that transmits to another perishable individual the form of the fixed incorruptible species. There is always a specific identity between the generator and the generated. There is a continuity between species, but this continuity is rigorously static; unlike in the evolutionist thought of Empedocles, there is no dynamism of the species and of all species together that would constitute a unity of *physis*; species are solely constituted by individuals, and there is no force of the species that would be exterior to the individuals. The complete and absolute character of each individual does not allow a specific dynamism. The similar always produces what is similar to it. This is how the living being can imitate the course of the stars and attain perpetuity. In the living being, the faculties of the soul are principles of unity through the finality of the functions they control. Thus, the sensible function controls

the anatomical and physiological function of the sense organs; the nutritive function controls a whole mechanism of corporeal actions that effectuate the assimilation of food by the body. Furthermore and inversely, the study of each of the functions is oriented toward the study of the superior function, particularly that of intellectual thought; consequently, sensation already separates form, which provides intuition of the sensible proper, from the matter of objects; this intuition prepares the highest intuition, which is the intelligence's intuition of indivisible essences; the intelligence perceives the forms or essences without matter extracted from all the particularities that accompany them in the sensible; by way of abstraction, it makes the intelligibles, which were merely in potency in the sensibles, pass to act; in this sense, there is in the organization of the individual's functions a certain finality that establishes a convergence and a unity of structure. Nevertheless, there remains a serious difficulty in the conception of the individual: the intelligence that thinks passes from potency to act; however, in virtue of Aristotle's conception of being, only a being in act can make another being pass from potency to act; the intelligence in potency therefore requires an intelligence in act in order to think. Is this intelligence in act interior or exterior to the individual? This incorruptible and eternal intelligence can be a part of the individual soul only with difficulty, since the entire individual is submitted to generation and corruption; moreover, if the intelligence is exterior to the individual, the problem of the rapport between the human individual and this separate intelligence becomes quite difficult to resolve if we remain faithful to the Aristotelian conception of individuality; in fact, it seems that the intelligence in act can be assimilated to the mover of the spheres, which is eternally actual thought.<sup>54</sup> Consequently, something remains that is in the individual without being a part of the individual properly speaking: Aristotle says in the *Generation of Animals* that the intelligence is added to the soul by a sort of epigenesis and enters into it "from outside."<sup>55</sup> It therefore seems that the individuality of the soul loses its distinctness: all the faculties of the soul are oriented toward a term that is superior and in some sense transcendent to them: the soul is made only to be in its superior form a spiritual image of reality, just as in its inferior form it is the sensible: "the soul is in a way all existing things; for existing things are either sensible or thinkable, and knowledge is in a way what is knowable, and sensation is in a way what is sensible."<sup>56</sup> The doctrine according to which reality is only composed of individuals becomes complete in an impossibility of enclosing the individual within itself.

Here again, we can grasp this paradoxical aspect of the notion of individuality: if individuality is conceived as an open reality that participates in

superior realities and seeks to identify with them, even at the price of its primordial unity (as in Plato), the temporal series of the efforts and conversions through which this ascension is effectuated confers upon the individual being a stable consistency and interiority. Conversely, if the individual is first defined as absolute and as the constitutive element of the real, only the two poles of the movement of thought through which this individual is in relation with other realities are conserved: the soul is essentially sensation and intelligence, i.e. other than itself; everything that is the return of the individual's causality to the individual—reflection and self-consciousness—is absorbed and vanishes in the relation to these two fixed poles wherein the soul is made purely representative and intuitive of reality. To grasp the being in its activity proper, the relation that joins it with other beings must first be privileged; to grasp relation, the being must first be privileged; individual reality, which may only be known through a simultaneous grasping of the being and of relation, always escapes.

The difference between Plato's ethics and Aristotle's is particularly clear in the following sense: Plato defines virtue as an internal structure of the individual, a regulated rapport between reflective intelligence, anger, and the concupiscent appetites; the just man is just in himself before any exercise of social rapports; he could be just in solitude, and the social condition in which he finds himself does not change this fundamental structure; conversely, for Aristotle virtue is an acquired disposition that loses its whole meaning when the material conditions of action are absent: "one who is liberal needs riches to act liberally, and the just man needs social exchanges to be just; for intentions are invisible, and the unjust also brags about his will to justice." Human virtues are inseparable from the social milieu; courage, liberality, politeness can only be exerted on a certain social level: "Hence a poor man cannot be magnificent, since he has not the means to spend large sums fittingly; and he who tries is a fool;"<sup>57</sup> "for it is impossible, or not easy, to do noble acts without the proper equipment. In many actions we use friends and riches and political power as instruments."<sup>58</sup> In this sense, morality is above all an art of mediation, both in the choice of the means of action exterior to the individual as well as in the choice of the ends, which must correspond to moderation and to measure, such that a man of tact can define it; virtue is a milieu that is completely relative to the condition of the individual in society, like, for example, liberality, which is the virtue of the individual whose condition is easy yet moderate, whereas magnificence is the virtue of the rich magistrate who benefits his city; the rules of action are all pronouncements of relation; when it is necessary to act "at the right times, with reference to the right

objects, toward the right people, with the right aim, and in the right way.”<sup>59</sup> The Platonic image of the wise man in the brazen bull cannot be suitable for Aristotle’s morality.

There is thus an incompatibility between two manners of contemplating the reality of the individual when the individual is envisioned as a being included in the order of simultaneity; this order indeed can be grasped either as a relation of the individual being to other beings and to itself or as absolute substantiality, which supposes that every being is an individual; but the psychological and ethical consequences of these two conceptions of individuality crisscross to oppose one another once again and at their respective starting point; the individual grasped as the term of a relation appears to be subtended by the internal activity of reflection, of conversion, and to be internally structured in its own way; conversely, the absolute individual loses its independent internal structure on behalf of a relation that is sensation or intellectual intuition in knowledge and that becomes virtue conditioned by the rapports inherent to the social situation in moral life. The reality of the individual evades ancient thought, which cannot grasp it stably but can merely surround it with two attitudes that would be complementary if they were not incompatible. With Plato, the individual loses its original independence, since it has a place in the *cosmos*; with Aristotle, it loses its unity, which was established by Socrates due to the link established between self-mastery and reflection; ethical virtues and dianoetic virtues become separate. The irrational part of the soul remains as an irreducible element that reason can govern but not absorb; wisdom and justice become separate virtues again. All these virtues tend toward the virtue *par excellence*, which is divine and transcendent to human virtues, no longer implying the union of the body and the soul: the faculty of intellectual contemplation.<sup>60</sup> This virtue is isolated and suffices unto itself; this virtue implies a transcendence on the same order as that which characterizes intelligence in act; it turns leisure into the end of action; this search for knowledge, which is like an absolute and is separate from political life, introduces a dissociation in individual ends; social life conditions the contemplative life of the scholar, but there is nevertheless a transcendence in this separated life that is hard to reconcile with the absolute character of the individual. The same difficulty, which leads to a contradiction, manifests in politics: the independence and autarchy of the city are necessary conditions of its validity; Plato defined the city as a set of relations; Aristotle renovates him and affirms that a city is not constituted just for living but for living well, which implies that its end is in itself. But, in order to realize this independence of the city, the natural economy and the

economic independence of the family as an economic unit must be realized. Yet, this independence can only be realized due to slavery, which is made possible by nature in its obedience to finality; humanity is naturally divided into free men and slaves: in the tropical climates of Asia, there are intelligent and inventive men whose lack of spirit reveals that they are made to be slaves; conversely, the temperate climate of Greece produces intelligent and high-spirited men who are free by nature, not by convention. Slaves are tools whose will is merely that of their master; the city's functions of production are entrusted to peoples of another race. In the family, authority is held by the head of the family, who presides over the imperfect souls of the women and children. Therefore, the independence of the family is initially compensated by a dependence of the city relative to the countries that produce slaves; on the other hand, the independence of the head of the family citizen is conditioned by a necessary inequality within the family; the political individuality of the family represented by its head results in the maintenance of a double relation of exteriority: on the outside due to the necessity of slavery, and on the inside due to the hierarchical structure of the family, which deprives slaves, women, and children of independence. The city is composed of a very small number of complete individuals (citizens) and a large number of imperfect beings who make the existence of these perfect individuals possible; moreover, the perfection of the Greek city is conditioned by the imperfection of the immense, indefinite boundaries of Asia, from whence men who are naturally slaves come.

This incompatibility between the Platonic attitude and the Aristotelian attitude marks the end of a period of history concerning the problem of individuality; in the following age, which extends into the Hellenistic and Roman period and then into the Christian period up to the Renaissance, the traditions arising from Platonism and Aristotelianism succeed one another by diversifying and sometimes by undergoing changes; but a new path of research opens that attempts to discover the reality of the individual, not in an order of simultaneity but in an order of succession. Whether the individual is considered in the rapports that it involves with other realities or within its own limits and its particular being, these rapports, these limits, and this being are essentially temporal. The same incompatibility between the interiority and exteriority of the individual becomes manifest here, but this incompatibility appears in terms of life in time and not in terms of structure and rapports defined in an order of simultaneity. It may be that the political and social changes indicating the decadence of Greek cities contributed to new conditions upon which philosophical thought was able to exert itself; the

aspects of becoming are most striking and unexpected in this period of troubles when philosophers are no longer always citizens of the strongest countries and most stable cities, but often come from nations desolated by war or devastated by conquest. Uprooted from his native terrain, deprived of his possessions, or living in the anxious abeyance of certain events that are always part of the horizon of the possible, man no longer seeks to define his individual being with respect to an order often less durable than he: city, collective belief, political and social order. He cannot define himself except with respect to himself or with respect to a revelation that lifts him above all the vicissitudes of human affairs. The veritable individual is no longer the city but in fact the human being, and often merely one part of the human being that is considered to be more real and more stable than the other: the soul. Sometimes the very fragility of the individual composite and the narrow limits of his life are what constitute the basis of wisdom for the individual.

#### THE SOCRATICS

The two great dogmatic schools founded after the death of Alexander the Great, Epicureanism and Stoicism, were preceded by the Socratic schools, which have prepared their doctrine and reveal a certain number of characteristics that announce a new thought. Already from the outside, there is a palpable difference between the Platonic-Aristotelian attitude and that of the Socratics; the schools of Plato and Aristotle are not just gatherings of individuals, but juridically recognized religious associations that are capable of having a foundation and surviving afterwards; conversely, the Socratic schools are simple gatherings of individual listeners who revolve around a teacher whom they pay. The preoccupation is directly practical; whereas Plato requires a long propaedeutic, Antisthenes and Aristippus turn their disciples away from astronomy or music, which are considered useless because they do not speak of goods or ills. The appeal to direct and personal impression replaces reasoning and dialectics. The individual, with his immediate impressions and his preferences, is made into the judge of a truth that directly interests his tendencies and preoccupations. Reflexive elaboration is considered something artificial. The political question disappears from this teaching.

#### THE MEGARIANS

The Megarian school seeks to establish the impossibility of participation. For Euclid of Megara, concepts can only be joined together if they are identical

and can only be distinguished if they exclude one another: "The good is a single thing, whether it be called by different names: science, God, intelligence, or still other names." These terms were the ones that Plato in the *Timaeus* sought to join together through hierarchization and to distinguish by putting them into relation; according to Euclid of Megara, there is nothing similar that is neither identical nor different; the analogical and paradigmatic method is therefore unfeasible; and yet, Plato used this method for knowledge of the individual's structure, particularly when he attempted to grasp the relation between reflected intelligence, anger, and the concupiscent appetites in the individual by means of the relation that exists in the city between the class of philosopher-magistrates, the class of warriors, and the class of artisans and peasants. Analogy supposes the reality of an order of simultaneity wherein relation is real and stable.

Eubulides of Miletus, Aristotle's successor, on the contrary is hostile to Aristotle's thought, above all to the principle of contradiction; all the sophisms Diogenes Laertius ascribes to Eubulides consist in taking an individual being and showing that the principle of contradiction applied to the judgments that can be formulated about this individual leads to logical impasses. The sophism of the liar is exactly like this: "if you say that you are lying, and you speak truthfully, then you are lying." This sophism presents a remarkable theoretical interest; indeed, it is not merely a specious reasoning that would put a philosophy of the concept in an awkward position: it shows that the activity of the individual being, reacting on itself and taking itself as the object of its own affirmation, leads to a mode of being that is not a stable state, but a self-sustained oscillation between two poles that are the active negation of one another and therefore negate themselves insofar as they affirm themselves; only an active individual being, expressing itself in an indefinite sequence of definite states, can be the agent and theater of such a logical phenomenon. This is also the difficulty of limiting a composite, a difficulty that forms the basis of the very important argument known as the "sorites" paradox: a heap of wheat still remains a heap when a grain is removed from it; if one removes from a heap all the grains that constitute it except one, this single grain is both a heap, insofar as it is a residue of the heap, and a single grain in itself. This argument was very well-known for the Romans; Horace indicates it in his *Epistles* with the expression "*ratio ruentis acervi*" ("the steady principle of the sinking heap").<sup>61</sup> The argument of the bald man is founded on the same schema as that of the sorites; a man who loses a single hair is not a bald man; but if this process continues progressively, the man who no longer has but a single hair is not bald insofar as this

hair is still his hairstyle, and he is bald because a man who has merely a single hair is bald; this is indeed still the same argument, which consists in all its forms in considering an ensemble as absolutely reducible to the sum of its parts; the hairstyle is reducible to the sum of all the individual hairs, just as the heap is reducible to the sum of all the grains of wheat (the *σωρός*) [sorós]. No unity of the ensemble qua ensemble, whether it be that of a form or a separate idea, constitutes the basis of the object's identity. This is why one can be made to accept in an illusory way by the adversary that it is possible to remove a grain from a heap and a hair from a hairstyle without modifying them; this is where these arguments are in fact specious: if the reality of a heap of wheat or of a hairstyle only consists in the addition of elements, the subtraction of an element modifies the reality of the ensemble; if, on the contrary, there is a veritable unity of the ensemble, the subtraction of an element does not modify the nature of the ensemble; there is sophistry because the meaning of "heap" or "hairstyle" is not univocal in reasoning, and because we pass from the ensemble as organic unity to the ensemble as composite reducible to the sum of its parts. The sophisms of the Megarians suppose an intellectual method that seeks to isolate the parts from a whole, in order to stop only at the individuality of the parts, by refusing to recognize a definite reality constituting the composite qua composite. It makes sense why the Stoics were very annoyed with the sorites and were led to declare it "*vitiosum et captiosum genus, lubricum et periculosum locum*" ("a vicious and deceitful kind, a lewd and dangerous place").

Stilpo of Megara shows that no concept can characterize an individual being: the ideal man is not such or such, for example speaking and not speaking; the man who speaks, stops, and speaks again is not man. The ideal vegetable is eternal; however, this living vegetable here did not exist a thousand years ago; it is therefore not a vegetable. In all these reasonings, the characteristics of the change in aspects based on the temporal succession of the individual's states and acts introduce contradictory aspects with respect to the identity of a concept that is applicable to several individuals; the ideal man cannot account for the fact that this man here speaks at this moment, and the ideal vegetable cannot account for the fact that this particular vegetable has just grown. According to Stilpo, predication is impossible if we want to think not via individuals but via definite and stable concepts: to affirm that the horse runs or that the man is good is to affirm that the horse or the man are something other than themselves; on the other hand, if one responds that the good is effectively the same thing as man, this is to be prohibited the right to affirm the good of the remedy or of food. In this sense, what must be

suppressed are realities like potency in Aristotle or non-being, which Plato accepts as existing, i.e. realities that would make it possible to account for becoming while retaining the fixity of the essences; dynamism, the power of changing, is internal to the individual being and characterizes it by excluding all determination from a fixed essence. By way of the so-called “master” argument, Diodorus Cronus wants to exclude the notion of potency from philosophical thought; the affirmation of the possible is incompatible with the principle of contradiction; indeed, if it is admitted that every proposition is true or false, the principle is valid for future events as well as for the past; there is consequently no indetermination, no possibility of being or not being for the future event. The possible is interior to the individual, which is consequently no longer submitted to the principle of contradiction because it lives and develops in time. The master argument consists in forcing a philosophy of the order of simultaneity to account for an order of succession, which is something that puts it into self-contradiction. Epictetus gives a very complex and elaborate form to this argumentation, which shows how much importance this argument had to have had for the philosophers of this era;<sup>62</sup> this is because the *κυριεύων λόγος* [*kurieúon lógos*] (“master argument”) provides a vision of being that considers it according to becoming and not according to its integration into the order of simultaneity.

In the domain of ethics, the opposition of the Megarians to Plato and Aristotle is quite clear: the individual is cultivated for himself and considered a being to be constructed, to be fashioned; he is one who becomes and consequently one who must be guided, educated; leaving aside scientific education, which gives knowledge to the being, Alexinus of Elis (in his treatise *On Education*) takes the side of formal education, which teaches themes and provides know-how [*savoir-faire*] instead of knowledge [*savoir*]; knowledge integrates the individual into the order of things that he cognizes; know-how, by allowing him in discussions to triumph over the plausible, gives him the capacity to succeed throughout various political changes; it turns him into an individual being who is confident in his means.

#### THE CYNICS

The great importance of *paideia* in the formation of the individual is also found in the Cynics; according to these philosophers, man can be formed and transformed according to rational methods. Menippus, a third-century Cynic, recounts in his *Sale of Diogenes* that Diogenes, who was being sold on the slave market, responded to the buyers who asked him what he could do:

“command men.”<sup>63</sup> The individual is the object of an inner reform that becomes an example to the outside; the Cynic reforms himself and becomes a model, sometimes shown ostentatiously to tyrants themselves, who are reproached for their insatiable desires. The individual is denuded of his social dress and uproots himself from any regular society, going from city to city, sleeping in his monk’s robe; the Cynics bragged about belonging to the state of πήρα [péra], the bag that they brought with them from village to village, sometimes welcomed, sometimes chased out. Antisthenes declares that “virtue can be learned,” albeit not through dialectics or the sciences; these activities are without value because one can only speak and think about a thing itself, as the Megarians acknowledged. This “slow-witted old man,” according to Plato’s expression, this “crude and silly person,” according to Aristotle, despised mathematics and astronomy, declaring that “those who had attained discretion had better not study literature, lest they should be perverted by alien influences.”<sup>64</sup> Giving lessons for four or five minas like the Sophists, he promised to educate his students about the path to happiness. He uses Homer’s poems as a means of edification. In the *Ion*, Plato shows the arbitrariness and lack of seriousness in these exegeses. Nevertheless, Cynicism can take any myth whatsoever as a basis for teaching because it is a question of the individual’s formation: “virtue is in the acts” according to Antisthenes “and requires neither the various discourses nor the sciences.” An act is not taught; one ends up acting due to exercise and training, which is where the importance of individual ascesis comes into play. The individual builds himself a stronghold; prudence, an intellectual virtue, helps build this stronghold: “[it] is a most sure stronghold which never crumbles away nor is betrayed. Walls of defense must be constructed in our own impregnable reasonings.”<sup>65</sup> Myth intervenes as a source of examples borrowed from life and the great acts of illustrious people: in this sense, the force of virtue does not pass from the idea to the individual but from individual to individual. The titles of Antisthenes’s works on morality are the following: *Helen and Penelope*, *The Cyclops and Odysseus*, *Circes*, *Odysseus*, *Penelope*, and *the Dog*; the heroes emerge victorious from these ordeals.<sup>66</sup> Hercules is the quintessential Cynic hero; he is the absolute individual, the type of unswerving willpower and complete freedom. Morality involves imitating Hercules or Diogenes because the Cynic plays a role of his very own that characterizes him as an individual; the image of the world considered as a theater wherein every man is an actor perhaps comes from Antisthenes’s *Archelaus*. Little by little, the Cynics distinguish themselves due to their type of life; they are beggar-sages completely untethered from any social group; according to Diogenes Laertius,

the sage is a “homeless exile, to his country dead. A wanderer who begs for his daily bread”; he has a vocation, which is to be Zeus’s messenger, responsible for observing the vices and errors of men. Diogenes declares to Philip that he is the observer of his insatiable desires; Menedemus, a contemporary of Philadelphus, dressed up as a Fury and announced himself as one of Hades’s observers responsible for reporting the sins of men to the demons. Antisthenes wrote a dialogue called *On the Observer*.

Diogenes of Sinope shows that the strength of the individual resides in exercise, ἄσκησις [áskesis]: “we see in the mechanical arts and the other arts how artisans acquire through exercise an extraordinary know-how,” such as in athletes and flute-players. “Nothing in life is successful without exercise; with it, one can overcome all things.” Diogenes includes within exercise both manual and physical activity as well as inner meditation. Ethical individualism is expressed by way of a complete trust in effort, a trust founded on experience, which, by avoiding “useless troubles,” allows for the choice of “efforts in conformity with nature.” Philosophy is useful for every individual; its goal is the individual’s happiness; it consists in “choosing efforts in conformity with nature to be happy.” This free individual, brimming with strength, sure of himself due to exercise, maintains customs and institutions with great contempt; he is able to critique the absurdity of the νόμοι [nómoi] (laws), and the perspicacity of his critical mind allows him to free himself from all the conventional values of society; this critique does not seek to establish a better social order but to free the individual from all constraint; the individual is able to make himself superior to social institutions because he understands them and knows how to parody them: Diogenes brags about helping his son, a banker and counterfeiter, falsify νομίσματα [noumísmata] (coins), thus proving his disdain toward all human institutions. This internal and individual reform consequently occurs on the margins of every social order without acting on this social order; the constant preoccupation with the totality of the order of simultaneity in Plato no longer exists for the Cynics; moral life is separate from the social problem; at the same time, the knowledge of the universe produced by the exact sciences is cast aside as useless for the formation of judgment; neither the social order nor the order of the *cosmos* are objects of preoccupation. The scientific spirit and the civic spirit do not serve to free the individual. The Cynic proclaims himself citizen of the world; his politics follows “the laws of virtue more than those of the city”; he seeks the least closed and least organized forms of political life that permit the itinerant individual the greatest freedom, like the Persian empire or the empire of Alexander; three of the works of Antisthenes bear the title

of *Cyrus* and perhaps inspired Xenophon's *Cyropaedia*; Onesicritus, one of Diogenes's disciples, wrote a history of Alexander's education, which, according to commentators, imitates Xenophon's *Cyropaedia*.

#### THE CYRENAICS

For Aristippus of Cyrene and his disciples, the individual is unleashed both from the weight of the exact sciences and from social organization. Along with the obligations that it brings, the life of society is so frustrating that only a madman will impose upon himself all the troubles and expenditures that these magistrates "whom the cities use as their own slaves" must take on. The individual's purview is nothing but himself; he merely desires to lead an easy and agreeable life. For Aristippus as well as for other hedonists (Eudoxus, for example), pleasure is the goal of possessions; this primordial obviousness should not be superposed with any rational perspective; it is necessary to trust in the immediate impression and appreciation given to each individual. This primacy of pleasure is opposed to wisdom, which is essentially stability, the invariance of thought and judgment amidst generational change and corruption, the possession of a stable and unending happiness, whereas pleasure is something fleeting and mobile. Aristippus considers this supposedly stable and unending happiness as the sum of all the pleasures of successive moments; just as for Eubulides a heap of wheat is nothing but the ensemble formed by the addition of all grains one by one, and just as a hairstyle is the sum of all the hairs taken one by one, for Aristippus the sage's happiness is not an ensemble that envelops all the successive moments in an absolute unity, but an open sequence formed by the successive addition of each moment. The notion of time is no longer the same as in Plato or Aristotle; time is no longer the rhythm of the return of becoming back to itself at the end of the Great Year; it is no longer the measure of movement according to anterior and posterior; it is neither part of the circular becoming of the *cosmos* nor the activity of each individual; it is an open series without a predetermined coherence, a series that has no unity through which the whole governs the parts, because the parts are anterior to the whole, which is expressed by the successive arrival of ever-new moments added to the preceding ones. The individual is the being for whom moments are added to moments and constitute life according to an additive process. Pleasure is pleasure in motion; happiness is merely a result formed by the union of all the pleasures. The individual being is one for whom the moment exists because he is occupied by a "painful movement" (pain) or an "easy movement" (pleasure). Intellectual

constructions should not succeed in modifying the pleasure of the moment because they are "a vain opinion": this is due to the fact that intellectual construction, instead of respecting the pleasure of the moment in its purity, unity, and unicity, creates an order of simultaneity that is superposed onto the order of succession. To pose the problem of the combination of pleasures is in fact to no longer respect this successive nature of moments and to replace separate and autonomous moments with a superstructure that seeks to stabilize becoming, to fixate the moral being in becoming. Moreover, intellectual construction is uncertain, and only the impression given in the moment and to the individual can be the object of an affirmation that would not be misleading: "that we experience the impression of white or sweet is precisely what we can say with truth and certainty without lying; but that the cause of this impression is white and sweet is what cannot be asserted in particular." Knowledge remains purely individual; it does not make possible any harmony among men because it is strictly personal and because one cannot conclude from an impression that is experienced to that of one's neighbor; language alone is held in common, but the same word designates different impressions in each individual.

Rejecting intellectual culture and civilization as a whole, uprooting himself from the order of simultaneity given by the city and the knowledge of the *cosmos*, man seeks a support in himself and in himself alone. At the same time, the structure of simultaneity that was justice or virtue, organizing the faculties of the soul and the relation of the different parts of the body wherein they have their respective center, is replaced with an order of pure succession, a pure succession of the moments of life added to one another without combining.

The Hellenistic period is quite important for comprehending the implicit contents of our civilization; the Hellenic tradition is mixed together with Oriental contributions; philosophy above all is addressed to the individual being on behalf of his salvation and to give him a rule for living; theoretical reflection gives way to these practical preoccupations; the only theory is the one that remains necessary for founding the knowledge of the individual being, but this theory is already fully penetrated by an intention: to situate the individual being in his rapport to the natural world and the supernatural world so that he better understands his destiny and can obtain salvation; the intention of the moral reform of the individual is upheld throughout all these elaborations of philosophical thought; this is why the individual seems like a being who is essentially one who exists in time and must preoccupy himself with the ordered series of his actions more than with his relation to society, to the world, or even with the knowledge of his internal structure.

Starting with the third century, the sciences are expelled from philosophy and continue their autonomous life. The third century before Jesus Christ is the century of Euclid, Archimedes, Appolonius of Perga, and Eratosthenes the geographer. Conversely, after the violent return of the individual to himself, in the tension of effort or the enjoyment of the moment, which marks the thought of the end of the fourth century, philosophy no longer returns to the disinterested search for knowledge of the *cosmos*; the rupture between the theoretical and the practical, between the sciences and philosophy, will last until the Renaissance; research concerning the nature of things will no longer have their end within themselves at the heart of philosophical thought; knowledge of the *cosmos* is the principle of practice.

### THE STOICS

The Stoic school appears in a world in which the Greek cities are dominated by much vaster and more universal powers, those of Alexander's successors, who penetrate their influences into the most closed cities and bind them together, just like the Stoics' "artistic fire" penetrates and subtends all parts of the world. Amidst the reversals and changes of constitution that follow, a new permanence of becoming, a background of cosmic power, is able to arrive on the scene. The abrupt dislocation of the Greek cities in the age of Macedonian conquests freed the individual, who no longer sought support except in himself or in the examples of heroes; in the third century, the individual no longer seeks this absolute independence; he once again seeks to incorporate himself into an order that surpasses him; but this order is no longer sought in the city and in the stability of its laws and institutions: the Stoic finds the foundation of personal ethics in the cosmic order grasped as a dynamism, a law of becoming. The notion of a role to be played is substituted for the notion of place; place integrates the individual into the order of simultaneity, whereas the role inserts him into the order of universal becoming.

As E. Bréhier has noted, the first Stoic philosophers are not Greek citizens: they come from countries on the fringes of Hellenism situated outside the great civic and Panhellenic tradition subjected to the influences of the Semitic peoples. Zeno is from Citium, a city of Cyprus, and Chrysippus was born in the city of Tarsus or Soli in Cilicia. Herillus of Carthage and Boethus of Sidon come from countries that are Semitic properly speaking. Later, Diogenes of Babylon and Apollodorus of Seleucia will come from Chaldea. Only Cleanthus, Sphaerus of Bosphorus, and Dionysius of Heraclea come from Hellenized countries. However, the necessity of voyages and commerce turned these

villages into sites of passage more so than the closed cities, who were aware of the strength of their traditions and the stability of their institutions. Their inhabitants were prepared to venture into every country without being pre-occupied with local affairs; their universe extended to the limits of the known world. The relation of the individual to the *cosmos* does not pass through any sort of mediation like the city; the Stoic is called upon directly to insert himself into the becoming of the world. The Stoic feels that he is more so a voluntary friend of a successor<sup>67</sup> who founds an extensive State than the citizen of a Greek village. Like the Cynics, they admire the kings of Macedonia; the kings, moreover, sense the strength and novelty of this philosophy that is commensurate with the foundation of an empire; they ply the Stoics with flattery and lavish them with abundant remunerations: Antigonus II Gonatas is an admirer of Zeno and Cleanthus; he attends their lectures; with Zeno's death, he calls upon the city of Athens to build a tomb in Zeno's honor in the Kerameikos. Yet, this bond is not fortuitous; it is nothing more than the product of a simple calculation: by vocation, Stoicism is the philosophy of a self-founding empire, i.e. the power of an individual man who depends neither on tradition nor the laws to establish an order that extends into a multitude of cities and peoples with their various constitutions and different languages. This man is no longer the defender of the stability of a city or a constitution because his role is to change the face of the world; his work has a meaning in time through its dynamism, not in the order of simultaneity that produces the stability of a city.

The importance of cosmic dynamism appears in Zeno, who wanted "to read the ancients" and who found in Heraclitus's thought a physical theory that could serve as a starting point for his meditation. An ample vision of the universe truly dominates primitive Stoicism. The medical schools that existed before Plato and Aristotle also presented a dynamistic theory, not of the *cosmos* but of the living individual: health is constituted by the equilibrium of four forces, i.e. the humors of yellow bile, black bile, acid phlegm, and salty phlegm; following Galen, Zeno was adept in this doctrine and founded a medical school himself, that of the "methodicals." According to this school, disequilibrium among the humors stems either from the excess or lack of one of the humors or from a disruption in the continuity of the parts of the body. The living individual is therefore the unity of a whole constituted by forces that counterbalance one another. In the fourth century, Diocles of Carystus, a physician who adheres to this physiological theory, thinks that every phenomenon of animal life is regulated by hot and cold, dryness and humidity, and that there is an innate heat whose alteration of integrated

nourishment produces the four humors (yellow bile, black bile, acid phlegm, salty phlegm), the proportions of which explain health and sickness. Moreover, the external air, which is attracted toward the heart through the larynx, the esophagus, and the pores, becomes in the heart the psychological breath within which the intelligence resides and which expands throughout the body by providing it with tension and activity, which give rise to voluntary movements; this fire is the potency that animates the body. This potency circulates in the blood vessels; sickness occurs due to the accumulation of humors that prevents this potency from passing. This conception of the physiological individual is eminently dynamistic; the role of the activity that establishes communication and maintains life has been relegated to a material (or rather, energetic) soul, i.e. a soul of fire. The static structure of the body is not what explains and produces life; instead, vital activity is what radiates throughout the body in order to animate it.

According to Diocles of Carystus, the Stoics considered the whole world to be an immense individual organized in the manner of a living being. The πνεῦμα [pneuma] (“breath”) of the *cosmos* penetrates everything, just as the fire of the soul of a particular body penetrates every organ, thereby subtending it and animating it. Stone and iron are different degrees of this τόνοσ [tónos] (“tension”) of igneous breath that suffuses all things. All active functions are concentrated in this fire known as seed-fire, creative and artistic fire. Potency is the principle of form and the reason for this or that state; it is the igneous breath that sculpts particular beings. What reappears here is the second aspect of *physis* (that of productive dynamism), which is something that was left out by Plato and Aristotle but was conserved by the medical schools. The Stoics also benefited from the works of the Pythagoreans, who established the mathematical laws of harmony and understood the law of acoustics, which links the length of the vibrating chord, its weight per unit of length, and its tension to the pitch of its emission. Furthermore, phenomena of resonance became the object of experiments, which was possible due to the mathematical foundation provided by the discoveries of the Pythagoreans. Nevertheless, resonance far surpasses the framework of the experiments of acoustics in extension and generality: it shows that the exchange of energy between two bodies depends not just on the proximity or distance between these two bodies but also and essentially—when it is a question of two elastic bodies and a vibratory energy—on the degree of tension of these two bodies, which defines for each of these bodies (relative to their dimensions and mass) a frequency of resonance that is also a frequency of oscillation proper when each body is submitted to a vibration. The exchange of energy between these

two bodies remains quite low when the frequencies proper are not equal to or multiples of one another; on the other hand, when the frequencies are equal, the exchange of energy becomes so significant that the phenomenon of resonance seems to be the evocation of a spontaneous activity within the resonator, whereas it draws all its energy from the oscillator. However, for experimenters, what was particularly striking in the study of resonance was this possibility of establishing or interrupting the coupling between two bodies not through the interposition of a screen or by distancing them from one another, but by acting solely on the internal tension of the resonator or oscillator to bring the two vibrating bodies into resonance. Resonance is called *συντονία* [*suntonía*], i.e. equality of pitch and also equality of tension, for the pitch is most easily varied by modifying the tension. This surprising phenomenon, although quite easy to realize and perfectly rationalizable because it follows from the rapport of numbers, is for the Stoics not just the principle of the dynamic organization of the living individual (like man) and the principle of the organization of this immense individual that the world is, but also the principle of the dynamic relation between microcosm and macrocosm. The coherence and unity of the microcosm and macrocosm depend on *συντονία*; illness is a lack of tension that forces an organ to no longer participate in the ensemble due to its disharmony. Thought itself is *τόνος*; it is attention to the object it wants to grasp; attention is a tension of the mind that allows it to become syntonic with the object it wants to think. Mind and object are thereby in harmony. The order of the world is a cyclical movement with a determined frequency; in the individual microcosm, wisdom is the realization of syntony with the rhythm of the universe. The contradictions between individual freedom and determinism disappear because a resonator resonates precisely on the frequency that would be its own if it emitted free oscillations.

However, this theory, which is so seductive and has been reprised in so many forms, presents an internal fault that was only partially accounted for by the Stoics: in order for the possibility of establishing resonance between microcosmic individual and macrocosmic individual, microcosm and macrocosm must be the seat of a recurrent activity for one another. Yet such a condition, if it leaves freedom in determinism to the individual being, nevertheless supposes that this being does not advance in time and always acts in the same way: the activity of the sage cannot be conceived as anything but a perpetual iteration. The brute order of the universe, however, does not always offer the aspect of a profound and essential regularity of events; this regularity must also be hidden and revealed for the eyes of the sage alone:

the rhythm of the universe is what the providential will of God, immanent to the universe and reigning over all its infinite wisdom, wills; the universe is known by way of a physics fulfilled in theology. This God is not an incorporeal; it is active body, possessing the characteristics that today we will attribute to what we call energy; it is moved mover and is immanent to the thing that undergoes its action, to the matter that passes under action, just as incense expands in air and wine suffuses the mass of water, however large, with which it is mixed.

A new physics takes shape with the Stoics, that of the total mixture; the Platonic conception of the elements formed by regular tetrahedrons (which were themselves constituted by elementary triangles) as well as the Aristotelian conception of the proper place gave a real impenetrability to each body; a body could not be anything other than what it was; moreover, mechanistic geometrism leads to a representation of the homogeneity of things; in Plato, all elementary triangles are similar, just like the tetrahedrons of each element. Conversely, the Stoics adopt a representation of singular bodies that is quite different and is closer to that of Anaxagoras's theory of "homoeomerias": a body can be constituted by a mixture that is absolutely homogeneous in continuous and unspecified proportions for an unspecified number of fundamental elements. Two bodies can unite by mixing via juxtaposition, just as different types of grain are mixed, or by conflating the two into one, as in an alloying of metals; but they can also mix together in a total mixture in such a way that, without losing their substance and their properties, they expand throughout one another, which results in the fact that these two bodies are found in any portion whatsoever of their shared space. There is no impenetrability. Aristotle on the contrary supposed that too small a proportion of one of the constituents of a mixture or alloy leads to the disappearance of that proportion of components, which was consequently in a state of inferiority: a small amount of tin added to bronze (which Aristotle no doubt considered a pure metal) does not modify its characteristics and only changes its color. In this sense, the agent expands throughout the patient, the soul throughout the body, the *logos* throughout matter. Each singular body therefore owes its individuality neither to its internal geometrical structure nor to its place in the order of simultaneity of beings, but instead to the proper mixture that characterizes it; it is idiosyncrasy in the proper sense of the term; the temporal series of the influences (also in the proper sense) that it has undergone is within it as constitutive of its idiosyncrasy; its entire past existence is really contained in it materially or at least corporeally. To know what a singular being is, one must know the series of the successive instants of its

existence in time or at least the drama of the successive passions that have influenced it. Since this succession of passions is different for each being, the individuality of a being is constituted by its singularity; there is indeed a proper quality of each being (its *ἰδίωμα* [*idioma*]) that corresponds to the idiosyncrasy. This proper and somewhat personal quality always distinguishes one being from every other being; this quality allows *φαντασία* [*phantasia*] to be *φαντασία καταληπτική* [*phantasia kataleptiké*], comprehensive representation, i.e. according to Zeno, “the representation imprinted in the soul based on a real object and in conformity with this real object, such that it would not exist if it did not come from a real object.” This comprehensive representation produces true perception with the same necessity that a weight lowers the tray of a scale. Knowledge is this relation of an object (which is real and recognized as real due to its individual singularity) to a subject that is equally real and individual. In this theory, no matter what may constitute knowledge, relation has the value of being, for it is solely corporeal, and it modifies terms materially; it is not a simple rapport; it is definitively inscribed in the terms by becoming an integral part of their idiosyncrasy. Intellectual elaboration can only consist in the act of grasping the sensible object; one can only abstract, add, compose, transpose, while never getting out of sensible givens.<sup>68</sup> The propositions obtained in this way do not express a rapport between concepts; their subject is always singular, and the attribute is always a verb, i.e. something that happens to the subject. The matter of dialectics consists in the stated facts of singular subjects. The syllogism is a rapport between facts, each of which is expressed by a simple proposition and the rapport of which is expressed by a composite judgment. The logical bond is always expressed as a bond observed between facts and stated by language. This notion of fact, which governs the entirety of Stoic philosophy, is extremely important for the conception of the individual: the individual is the being that results from a series of facts organized into a drama; there is no longer a distinction between substance and accidents in the individual: the being is what it is, or rather, it is what it has been; the fact of being what it was no longer refers to a permanent quiddity but to the novelty of an indefinite drama. The individual is the being that is constituted by a singular drama and accumulates within itself in its idiosyncrasy the substance of all these events, all these relations that transform into being because they are corporeal. Facts are all that exist, and the individual is not merely the result but the corporeal product of a series of facts; it is like time condensed in a body; in this vision of the world, relation is an exchange of being, a contribution of being, a total mixture. At any rate, the notion of substance in the Hellenic sense is destroyed,

since every accident contributes substance, which is incorporated into already-existing substance by mixing with it. Spiritualism and materialism coincide in this doctrine because the total mixture can be considered as a type of relation that is valid both for two matters as for a matter and a spiritual principle: the relation between a passive body and an active body prefigures that of a soul and a body, whether the soul be conceived as corporeal or incorporeal; its role is in fact that of activity, which expands throughout due to the total mixture, and not that of a passivity, which is relegated to the body. This theory turns the individual into a fact or a result of a series of facts; it gives the individual an absolute singularity but takes away from it its return to itself as an active capacity of creating itself and defining itself. The individual becomes the subject of states rather than acts; its activity is a result of relation rather than an initiative; for the individual is only alive to the extent that it can still accommodate other facts and events that will mix new inputs with its substance. It is perpetually itself and other than itself; whence results in ethics a sort of splitting of the being relative to itself; there is the individual qua singularity, and there is also what happens to the individual; nevertheless, the individual is indeed formed by the ensemble of what has happened to it; but a sort of privilege of interiority is created in favor of what has already happened in the past and thereby forms part of the individual; thus, to found ethical theory, the Stoic is forced to introduce a blunt distinction between the things that depend on us and those that do not: τὰ ἐφ' ἡμῖν, τὰ οὐκ ἐφ' ἡμῖν [τὰ eph' emin, τὰ ouk eph' emin]. However, this distinction is fake, because in the *cosmos*, everything is in everything, and everything is linked together; universal unity is broken for the needs of action; what must be designated are limits (artificial ones if necessary) to the *de jure* individual, to the individual who will accept becoming responsible for himself. This *de jure* individuality consequently becomes distinct from *de facto* individuality, which is singular and always in becoming; the person, the mask that creates a stability of the role, appears over the individual and transforms the temporal series into a rapport of simultaneity between different roles constituting the drama; the word drama itself has a double meaning; this is because drama, for the spectator who is not forewarned, is at every moment something new and the appearance of peripeteias; but for the protagonists and especially for the author, this order is in fact an order of simultaneity; necessity reappears at the heart of becoming. Furthermore, the Stoic theory, if only due to the distinction between what depends on us and what does not depend on us, introduces the notion of ἀδιάφορα [adiaphora], indifferent terms of action which are neither good nor bad and which do not allow for a motivated

decision. Instead of being the rigorous ordering of becoming, wisdom becomes a state, a sort of fact; the primordial dynamism condemns itself and destroys itself: as soon as *σόφος* [*sóphos*] has come to knowledge, to wisdom, it is syntonic relative to becoming, and this harmony no longer ceases: it is united by will with respect to the *cosmos*, which it accepts and desires; it wills what happens. But this state of syntony cannot be attained incrementally according to a progress in time: harmony is effectuated in a single stroke. The *φάυλος* [*phaulos*] (“the mediocre”), who are not taut enough to be able to resonate with the rhythm of the universe, never make it to wisdom; there are no degrees in the acquisition of wisdom: just as pups who have never seen the light of day would never know what light was if they died before opening their eyes, and just as the swimmer who is sinking but almost reaches the surface also drowns just as fatally whether a foot or twenty fathoms below, the man who has not realized within himself the appropriate tension for resonating with the rhythm of the universe remains as much a miserable wretch as he would have been if he had never made any effort. Merit and progress do not exist for the individual in this philosophy, which assimilates wisdom to a state, a degree of mental tension. While this theory should lead to an affirmation of the continuous, ethics is concentrated in an affirmation of the essential discontinuity of ethical states in an inexorable law of all or nothing. Ethics does not perfectly agree with physics, for which “movement in each of its instants is an act and not just a passage to the act.” The internal difficulty of Stoicism precisely depends on this omnipotence of fact, which evokes the thought of the Bible; the individual being does not find within himself the reason for his successive states because he is what happens to him; what happens to him is incorporated into his being; there is no return of the being’s causality to himself; this pure singularity is split with respect to itself; the individual can act upon himself and contemplate himself only with respect to the mask of the role; the recurrence of causality occurs by way of an exterior path, a path which the being cannot create but which is given to him; the being is not the one who gives value to it; it is given to him as already laden with value. This individual is far removed from the substantiality and aseity of Parmenidean being. It is easy to understand how this doctrine for quite some time was able to encounter and accompany the doctrines of Eastern Christianity; it is also easy to understand how Stoicism became the quintessential civic doctrine: the city needs the valorization of a fact; it also needs the formalism of the role. The notion of the pure and the impure, the chosen and the damned, the state of sin and the state of grace, is based on the interiority of the fact qua state to the exteriority of ritual formalism; yet, for the

Stoics there can be no formalism properly speaking: every relation, and consequently every action and therefore every gesture, involves corporeal reality; a gesture is never a pure symbol; the gesture modifies what it achieves. Transubstantiation is conceivable in Stoicism precisely because the idea of substance has disappeared or at least has become quite different from what it was in Platonic geometrism or Aristotle's thought. Similarly, the civic form of Latin Stoicism can be understood as a consequence of this real nature of relation; the mask of the role is as real as the face of the individual who bears it. This profound ambiguity of Stoicism is due to the fact that the individual is a singular being but not a substance. All the efforts to define individual reality based on Stoic thought are burdened with this fundamental difficulty: for the individual to accomplish his fulfillment, the succession of his acts and states must be rigorously ordered; but this temporal order has to occur definitively with respect to an exterior reality, i.e. the world; thus, a theory of time that encapsulates the succession of instants in a definite form must be created; the future itself must be part of this necessity of time; succession becomes an uncoiling, and the life of the individual is fully contained within itself: each being lives its destiny, and destiny is "*quasi rudentis explicatio*," like the uncoiling of a cable around a capstan when sailors set out to sea: the knots, stains, accidents of the cable do appear when the cable uncoils; but they were already contained and predetermined in the spirals coiled around the capstan. A certain artificiality remains in this life of the *persona*; something remains unsatisfied in the human being, who cannot be fully accepted as a given. The singularity of the individual is saved by the Stoics but to the detriment of substantiality.

#### THE EPICUREANS

Epicureanism in a certain sense is the contrary of Stoicism, but in fact it stems from the same desire to discover a meaning in individual reality and to unleash it from the order of the simultaneous. Epicureanism is also a philosophy that seeks to discover in the being a consistency that is independent from every actual relation; but the path of the search is inverted; instead of considering the temporal series as vaster than the human individual, who is integrated into it like an episodic role is integrated into a vast drama, the Epicureans consider temporal genesis as involving a level quite inferior to that of the human individual; the individual is a relative being, as with the Stoics; it is not a veritable substance by itself; but with the Epicureans, it is a composite, whereas with the Stoics, it was a component grasped in the becoming

of the macrocosm; for the Stoics, veritable substantiality is quite above the human individual, whereas for the Epicureans, it is quite below. In both doctrines, the individual being remains on a level that is not the level of veritable substantiality. In the Epicurean doctrine, the atoms are what is eternal, just as in the Stoics the macrocosm is what is eternally reborn in the rhythm of the return of the Great Year. Undoubtedly, unlike in Stoicism, individualities are not the inexplicable *ἰδίως ποίον* [*idíos poíon*], which is a fragmentation of the primitive fire, and individual destinies do not depend on celestial influences; there is no privileged moment in individual becoming, no moment in which the becoming of the individual is inserted into the vaster becoming of the *cosmos* through the privileged occasion, the *καιρός* [*kairós*]. The Epicurean individual is apart, like a world isolated from another world in the infinity of space; it is the composite being that seeks to flee from relation to conserve a precarious impenetrability that is constantly threatened; the defensive attitude of the Epicureans involves saving the instant and preserving this short moment of duration that the life of the individual is, not allowing it to be traversed and dilapidated by inessential relations, the results of illusion and error or fear, which makes man blind; unlike the Stoics, the Epicureans are not those who think a new world and establish the monarchy of reason parallel with political monarchy in its goal of conquering and unifying the world. Cosmopolitanism is not what animates the thought of Epicurus; the society that he founds is quite limited; it is a little circle wherein everyone knows everyone else individually and can isolate themselves from the city and remain independent from the great monarchic enterprise undertaken by the Stoics. Alexander's hostility, which will force Epicurus to leave Athens for several years, shows that this society of philosophers was really independent from the vast political enterprise. Epicurean physics is quite different from that of the Stoics and evinces a very different mental attitude in the conception of the individual: for the Stoics, the veritable individual is the world, an organized being whose different parts present a finality that binds them together in the dynamic unity of the whole; the source of the dynamism is in this reality of the whole, in the seminal fire or artistic fire that suffuses all things by containing them; there must be an individuality of the whole so that relations between singular individuals can exist within this individuality due to its organization and the dynamic relations in which the fire is involved. The resonance that couples a resonator and an oscillator requires a milieu within which energy can propagate; according to the Stoics, energy propagates like a packet of fire that animates the whole; much more than a coupling of two identical oscillators wherein each can be an oscillator or

resonator at any moment, the Stoics saw in resonance the example of a relation between a milieu (which is vast and animated by the soul of the whole) and a singular being within this milieu; the milieu dominates the singular being as though the latter were suspended in the former, inundated by it; the singular individual is in a state of energetic inferiority and spatial subjection relative to the milieu; at any rate, the milieu is not limited; its indefinite nature makes it the depository of dynamism and this self-return, this causal circularity that confers upon a being its autonomy and veritable individuality. The milieu is not the whole qua sum of all existing bodies but the whole as active energy of the whole, the whole as unity of circulation communicating with itself, which is the veritable physical individual in the theory of the Stoics. In relation with the dynamic milieu, the singular individual does not itself possess a dynamism except insofar as it receives a packet of this igneous energy that animates the dynamic milieu. One question that is difficult to fully clarify nevertheless remains: is this dynamic milieu inert by itself, a simple vehicle which transmits the energy of the world soul to singular individuals, or instead is it the source of activity itself, the soul properly speaking? It seems that it plays both roles at the same time, and this is why the situation of the singular individual in the milieu, which not only attaches it to the whole but also constitutes the activity of the whole, remains ambivalent. Conversely, in Epicurean theory the milieu is not what subordinates the singular individual to the whole, for the milieu loses its character of activity proper: it is nothing more than the void; it is not capable of transporting itself in the form of an impact, a certain quantity of energy arising from another body: it is only that which, due to its emptiness, makes possible the passage of every emanation, corpuscle, or thin layer with the form of the object that has emitted it. This essentially neutral and inactive, non-resistant, propertyless milieu allows singular individuals to act upon one another by way of emission. Only movement and contact can put singular individuals in relation; yet these actions are reciprocal and rigorously reversible, whereas the action of the milieu on the singular individual is the quintessence of irreversible action. In the Epicureans, the theory of sensations, just like that of the formation of composites, conforms with this principle of the milieu's emptiness and the reversibility of actions. The first consequence of this refusal of the active milieu that binds all things together is the rejection of necessity (εἰμαρμένη [eimarméne]) or destiny: Epicurus says that "it were better, indeed, to accept the legends of the gods than to bow beneath that yoke of destiny which the natural philosophers have imposed."<sup>69</sup> For the Epicureans, there is no idea of a determined order that transforms the *cosmos* into a rational

work wherein every event happens the moment it must happen due to a providential order. The ensemble of all things is nothing but a sum, Lucretius's *summa summarum* ("the sum of all sums"), and not an individual being. This sum is infinite, and there is an infinity of worlds in an infinite space and an infinite time. The events that happen are not events of the *cosmos*: they are merely the result due to the chance encounters of elementary particles. Dynamism is not a dynamism of the *summa summarum* with fixed and determined intentions; it belongs to the elementary particles. This is how the notion of *παρέγκλισις* [*parékklisis*] or *clinamen* ("inclination") can be understood, a notion which is accepted by Epicurus and added to the atomistic physics of Democritus. The *clinamen* in fact attributes to the elementary particles an absolutely autonomous movement; this absolute initiative designates the particles not as simple parts of the whole but as constituents; movement is inherent to the particles; this physical individual, the particle, is the absolute origin of movement. This is because in Epicurean physics the particle is not just that which remains at the end of the process of division originating with a body of great size and which is forced to halt at a minimum beneath which it cannot descend for physical or logical reasons; the Epicureans undoubtedly do not refuse this existence of minima, but they do not turn these minima into the whole reality of the elementary particle; the minimum in fact does not contain as reality anything but that of the fragmented whole, to which is added the failure of the human (ideal or real) operation of division. The minimum thus takes its reality from the whole in which it previously participated because it was a part of the latter when this whole was not yet submitted to the operation of division. The minimum *qua* minimum is therefore not a first reality; it is not an individual by itself but solely due to the succession of an operation that has divided a whole and halted at some point, at a certain level. This individual is a result and, as we will say today, an artifact, even if the failure of the operation of division, which in itself is indefinite, is due to a cause originating in the object grasped in its structure. Conversely, the Epicureans's elementary particle is a constitutive particle; it exists in the free state from the start; it is molecule and not atom, the seed of things and not a result of their division. Its indivisible nature pertains to and stems from what it is, not from what it can be. In this sense, we feel the declination of the soul, the movement which allows it to modify the attitude of the body; it is in this way that we must envision the declination of molecules, i.e. as a spontaneous movement. Molecules therefore have a real positivity and independence. They are what constitute the composite; they exist and move prior to being the parts of a given composite; the forces

by which they are joined do not depend on the whole within which they are found but solely on the rapports of form and movement between molecules, which are in contact with one another. The fact that action through contact is the only one retained as capable of explaining the phenomena of nature reserves for the molecules the initiative of any transformation that intervenes in the composite. The composite is a sum, a finite sum, whereas the world is an infinite sum. The elementary molecule is what possesses an immanent and perpetual movement. There is one exception to this rule of the spontaneity and independence of molecules: the eternal fall of molecules through the infinite void: strictly speaking, it would be necessary to explain the existence of this field of gravity; however, the Ancients did not have ideas as clear as those provided by Newton's system; weight should appear to the Epicureans as a property of the molecule and not as a force proportionate with the product of two masses and inversely proportionate with the square of their distance; weight is not distinguished from mass and therefore can be considered as a characteristic proper to the molecule, whereas in fact mass alone is a characteristic proper to the molecule. In this way, the notion of field and force of attraction does not intervene; at any rate, it would be contrary to the presuppositions of this physics because it would create a causality of the whole accompanied by a possibility for the whole to impose a movement of the ensemble onto all singular individuals. The idea of a field of forces implies another conception of the rapports between elementary individuality and totality, whether this field of forces be conceived as immaterial or as materialized by a milieu. In this refusal of everything that would be assimilable to a field, Epicurean physics is distinguished not only from Stoicism, which materializes the field of forces under the auspices of seminal and artistic fire, but also from Aristotle's rationalism: any attraction of the inferior by the superior, any direction through a unique principle imposing a rational finality upon everything that happens in the universe is inconceivable when every influence at a distance (i.e. every field of forces) is denied. It should also be noted that no field is absolutely necessary for explaining the combination of molecules: the principle of inertia and the conservation of movement would suffice; the Epicureans suppose a fall of the molecules in the infinite void because this fall is an inexhaustible reservoir of potential energy in each molecule, which makes possible the explanation of all the combinations that form beings in the course of time; under these conditions, the quantity of energy that represents the *clinamen* is extremely low: the greatest part of the energy necessary for the formation of composites in reality originates from the movement of falling in the void, which is deviated by the

*clinamen* but which acts in accordance with its own energy. The *clinamen* is an extremely low control energy that occasions the manifestation of much more considerable quantities of energy; furthermore, it must be acknowledged that the *clinamen* is proper to each of the corpuscles, whereas the fall in the void does not distinguish one corpuscle from another (since all movements are parallel); consequently, the fall cannot produce an action that would be an expression of the spontaneity of each molecule; it cannot have any productive initiative, and it has to be brought to act at a determined instant by something that comes from the particular individual. This initiative constitutes the rigorously irreducible aspect of the physical individual.

The Epicureans's atomic molecule is therefore something other than a minimum; it is that which has an unalterable magnitude and form and can be endowed with initiative and spontaneity.

#### LUCRETIVS

However, alongside this vigorous restoration of physical individuality, it seems that there is for the Epicureans (at least for Lucretius) a certain omnipresent or at least subjacent idea of the force of the universe in its ensemble *qua nature*. The sum of sums is indeed also substantial; it is just as substantial as each of the elementary corpuscles because it is composed by their infinite sum. Yet it seems that this infinity of the sum is also more directly contemplated in the Ionian sense of the term, i.e. as the power of making beings grow after having engendered them, the power of ensuring that individual after individual succeeds in propagating the species, reentering into nothingness after having momentarily carried the flame of life, like runners in a relay race who hand off the flame before collapsing in exhaustion. Lucretius has sung the immortal verses of this intuition of the continuity of life, its power to ever be born and reemerge. He invokes this fertile nature through the strongest and most prestigious images of Greek or Oriental mythology: Demeter, Gaia, Cybele, and the Kouretes are evoked in the memories of Ionian physiology. The goddess of amorous desire is invoked first through the vision of a subjugated world in which the elements are active and present. Venus is not just "*hominum divomque voluptas*" ("joy of gods and men"); she is also "*alma Venus*" ("Venus the life-giver") who fills with life "*mare navigerum*" ("the sea that carries the ships") and "*terras frugiferentis*" ("the land that bears the crops"). The sky changes its own appearance for the Goddess: the winds, rains, and clouds depart, and an immense luminous peacefulness spreads over the horizons:

*Te, dea, te fugiunt venti . . . adventumque tuum . . .  
Placatumque nitet diffuso lumine caelum.*

(“Thou, goddess, thou dost turn to flight the winds . . . and the sky, its anger past, gleams with spreading light.”)

The fertile breeze of *favonius* thaws the frosts and brings forth life: *viget genitabilis aura favoni* (this term *viget* deserves to be highlighted for its expressive value; this is Venus’s creative ardor, which exerts itself by exhibiting itself in the four elements; Venus is the *physis* of the four elements, the conspiring unity of their vital thrust). The earth itself is also transformed:

*Tibi suaves daedala tellus summitit flores.*

(“For thee earth, the quaint artificer, puts forth her sweet-scented flowers.”)

This underscores how Lucretius can say: *efficis ut cupide generatim saecula propagent* (“thou dost strike fond love into the hearts of all, and makest them in hot desire to renew the stock of their races, each after his own kind”). *Physis* no doubt seems to be more particularly immanent to the earth. Lucretius is a philosopher who is comparable to the Ionian physiologists; yet, while Thales, Anaximander, and Anaximenes chose water, the indefinite (ἄπειρον), and air as the fundamental element, Lucretius feels and expresses the existence of a telluric *physis*. Borrowing from mythology, the myth of Demeter and the story of the birth of the first man, who emerges from a womb enrooted in the earth, express this conviction. But *physis* penetrates all things and is not merely in the living species. Must the existence of a finality of the whole therefore be accepted? The very notion of finality must be analyzed here. In the Stoic system, the world soul, which is distinct from the passivity of matter insofar as it suffuses and subtends the latter, providentially governs the world; it is *logos* and foresees events in a unique series that excludes chance; it is decision or power of decision that creates εἰμαρμένη [eimarméne]. Conversely, with Lucretius *physis* is not a *logos*; it is a veritable force; there is a difference in Epicurean nature and Stoic nature between an intention and a tendency, between a volition and a desire; the force of nature acts on the ensemble of the universe, but not to determine this or that fact; this power of nature is revealed in the richness of chance; at the limit, the infinity of space and time are characteristics of this *physis*; they expand the domain of chance by conferring positive infinity onto it. It is due to this positive infinite that chance becomes the power of nature or at least allows *physis* to exert itself

through chance instead of determining the future states of a closed and limited world, a *cosmos* wherein everything is in relation with everything else; for the Stoics, the world is an individual, and *physis* can only be providential and necessitating. Conversely, we see Lucretius, in his description of the way the successive encounters of atoms within the void most often engender unviable beings that return to their elements, say when speaking of nature: “*conata est nequiquam*” (“she strove in vain”). Nature strives in this way; but, since she strives through the infinity of chance, she does not create any necessity: her effort has no predetermined end, but it can have a meaning in its results because it is always identical to itself. The individual being makes of the effort of nature what the elementary corpuscle with the *clinamen* makes of the force of falling in the infinite void; there is no rhythm, no definite tension with which the individual must become syntonic: the force of nature, like what we will today call a potential energy, is always available. Ethics harmonizes with this conception of individuality. Unlike the Stoics, the Epicureans do not have an ethics-oriented physics; there is no systematic bond between a physical dogma and an ethical norm with the Epicureans, because for them there is no physical dogmatism; physics is indeed studied for the knowledge that it can provide concerning the nature of being, but it deploys its own organization in a climate of extremely broad intellectual freedom; there is no subordination of physics to ethics; physics is truly a principle, the constitutive element of a doctrine and not just an integral part determined by the ensemble. The fundamental schema of Epicurean thought is conserved even in knowledge: the element is constitutive and remains free. The consequence of physical atomism is that it removes all substantiality from the composite that the living being is; veritable substantiality belongs to the atomic molecules, not to the composite; the composite only subsists until a force superior to the mutual cohesion of the particles that constitute it eventually dissolves it; thus, one could speak of a relative and limited substantiality of the composite individual, which results from the mutual relation of its constituents—the *semina rerum* (“the seeds of things”)—but which, when the composite is generated and exists, indeed belongs to it and does not depend on a broader principle; there is no εἰμαρμένη that externally governs the duration of the composite individual according to a cosmic order; in Epicureanism, there are none of these privileged and crucial moments of time (καιροί [kairoí]) wherein the activity of the singular individual encounters the rhythm of the world with which to become syntonic. The manner of following nature is quite different in the two doctrines: in Stoicism, nature is the rhythm and movement of the whole, whereas in Epicureanism, nature is

at the level of the elementary *semina rerum* that constitute each composite being: the being does not have to seek a coincidence with the unique movement that rationally governs the universe; the being has within itself, not qua singular being but qua composite formed by the *semina rerum*, this fundamental and immutable reality that is nature in each of her seeds; in the swirling pulverulence of dust amidst an oblique ray of sunlight, in the whirlwind of uplifted sediment, the individual sees and bears witness to what it is. The matter that we see and touch, the poppyseed that flows like liquid when broken by hand, dirt, stone, steel are nature just as much as the forests and the teeming waters of the sea. Sensation is contact between the matter that we are and the matter outside us, which is tangible and sensorial because touching and feeling are the actions of atoms and a soul composed of atoms. There is no mediation that exists and must exist between man and things. This very profound, very moving love of things in Lucretius is quite far from being a search for poetic beauty; pure sensation and immediate sensibility are one and the same thing in Epicureanism; to follow nature is to be linked to her in an immediate and elementary way, to be particulate in some manner. All mediations are ruled out, whether they stem from the search for pleasure, from passion, from ambition, or from fear. It is not so much enjoyment but sensation that must be conserved; the appetite for enjoyment prevents sensing because it erects the artificiality of pleasure between man and the natural thing; the austerity of sensation and its profound gravity demonstrate the necessity of a veritable contemplation of thought and a repose of the body so that this contact with natural matter can be established. The man who seeks ephemeral pleasure turns his back on the object; he is isolated from nature, and he is deranged: like the maniac, he does not know how to enjoy further: he hurries from the city to his home in the countryside, yet, having just arrived, he sets out again, overriding his horses as though his house were on fire. The state of ataraxia is precisely what gives legitimacy to veritable sensation, constituting an entire aspect of the sage in the *templa serena philosophiae* ("the serene temples of philosophy"). Science is not opposed to sensation; it adds to the sensible by extending it beyond the limits of our senses toward the degrees of invisible smallness; the characteristics of atomic particles could be sensible if our sense organs were of the same size or rather on the same scale; even in the approximate and conjectural knowledge of physics, realism, which is linked in Epicurean doctrine to the theory of sensation by contact, is perpetually conserved. With a little bit of barley bread and water, the sage can compete with the bliss of Zeus, the same way he can know the reality of things with absolute sensation by contact. The realism of sensation in the

state of ataraxia does not require enjoyment to provide happiness, nor does it require mathematical formalism to yield science. This doctrine thus leads to a research of sensation as contact of the similar with the similar; in the same way, the social relation is an assimilation first and foremost. Epicurean friendship certainly must be interpreted in this way: it is homogeneity of lifestyle with tastes, desires, and ways of thinking. It is hardly possible to conceive a search for the other qua other, and this is undoubtedly why sexuality barely intervenes except as an obstacle, as the danger of alienation, as a loss of ataraxia; it is the source of natural but unnecessary pleasures. Lucretius remains content with acknowledging "*surgit amari aliquid*" ("something bitter rises") without analyzing more deeply why this undetermined bitterness arises and what it is the sign of; sexuality does not suffice unto itself, and Lucretius sees in it above all a sort of unreasonableness without seeking to discover the postulation of a relation that would free the individual from himself and free sensation from the relation of the similar to the similar. Relation, which in the Stoics was invested with the highest power, becomes, qua familial or social relation, a dangerous thing for the Epicureans. Perhaps this is the serious difficulty of Epicurean thought; it is difficult to consider relation as so inessential to the individual; Lucretius himself acknowledges the importance of civic life in the development of civilization, which protects man from natural dangers, like beasts, lightning, and the cold. The method of veritable life according to wisdom in fact resides in the individual's knowledge of the limited nature of his life, both in terms of time and in his capacity to feel and enjoy. Man above all is a limited being, and all his unhappiness stems from his incapacity to know his real limits; man believes to maintain relations with realities that do not exist or will never be in contact with him; affirming the complete inanity of every relation that is not an actual contact, Epicureanism wants to eradicate false ideas, which overwhelm man by uprooting him from himself and which follow from a false belief in relations that do not exist. Man lives in fear of the Gods. According to Lucretius, Epicurus is the first to have lifted his eyes toward the elevated regions where the Gods dwell to understand and make known to men that the Gods, if they exist, do not preoccupy themselves with men, since they are all too happy to be in a state of ataraxia themselves. But what uproots the individual being from himself is the fear of death. This fear depends on the myth of an existence after death, a sad and tenebrous existence full of torments, horror, and desolation, a diminished and lamentable life, without hope and without light, just like what Homer evokes in the νέκυια [nékuia] ("rites by which ghosts are summoned to answer questions about the future") of the *Odyssey*; a celebrated

dead warrior says that he would prefer to be a worker for a poor farmer than the prince of the empire of the dead. Lucretius finds himself facing all these depressing representations of a dark and painful existence where nothing remains of life except misery: misery and existence after death are inextricable for the Ancients; Lucretius claims that men would not seek wealth so much if they weren't afraid of poverty, and that they wouldn't be afraid of poverty if "*acris egestas*" ("severe poverty") were not for them a tangible image of future existence. And at any rate, funeral rites indeed show us this alliance of poverty and death: rags and the ash poured over one's head and clothes express mourning for the Ancients. This belief, which uproots man from this manner of consisting in oneself that is provided by the plenitude of the moment lived for itself in the present of sensation, is rejected by Lucretius for the idea that death is nothing positive, merely a passage from being to nothingness; there is a logical and psychological illusion in the idea that the individual can be dead; after death, there is nothing, the individual has ceased to be; only the atomic molecules that composed him remain. For a state to be felt there must be a soul, and this soul, which is made of the lightest atoms, dissipates and loses its unity when this bodily vessel loses its airtightness at the moment of death. One can but die, one cannot be dead, for the dead being is no longer an individual, he no longer has a soul or unity. The nothingness after life is symmetrical with the nothingness before it. The idea of an afterlife is the result of an illusion: through a sort of splitting, the individual being imagines standing beside his own corpse, weeping for himself. But this splitting never happens; the being will dissipate but will not split; he will be annihilated and not diminished. Thus, the individual lives in conformity with a law of all or nothing, thereby leaving no place for influences, for obscure and hidden relations. Everything that exists exists actually, in the instantaneous present, and events are merely the result of particular molecular actions. Furthermore, unlike with Stoicism, there is no valorization of the fact with the Epicureans; the fact is pure result; science seeks to know the causes of things, not their end; this doctrine is neither anthropocentric nor theocentric. Stoicism is a mystical rationalism wherein reason becomes that which makes it possible to know the end of things. The Epicureans's realist intellectualism is opposed to this rationalism. According to this mode of knowledge, which also supposes a certain conception of being, there is no circular process of reality in the simple or composite being; in this case, sensation (contact without recurrence) and action by immediate contact (exchange of one being with another) are supposed to constitute the whole order of the real. Conversely, in finalist rationalism, every

being tries to rediscover its own cause within itself and attempts without modification to transform—albeit only through the conversion of the state of fact into right—its situation into an aspect of the finality of the *cosmos*; the justification and rationalization of the world ultimately amounts to a self-justification and a discovery of the individual's validity; the opposition between Stoicism and Epicureanism is that of a philosophy which defines the individual as what acts upon itself to a philosophy which defines the individual by its limits, which are known based on their genesis. These two doctrines attempt to know what the order of succession is in the individual being; but they become separate after this shared intention; in short, Epicureanism finds in the independence and perfection of the instant, as well as in the independence of this succession of instants that is life relative to the past as a whole and the future as a whole, the method for grasping the individual in its highest reality. Conversely, Stoicism seeks in the link of each instant to the whole of life and in the link of the whole of life to the world's movement the condition for the conversion of the individual being, which is integrated into the totality. Epicureanism seeks the causes where Stoicism seeks the ends; the knowledge of ends joins together many successive converging instants; the knowledge of causes isolates each instant as a final product of everything that has engendered it. In the instant, the knowledge of causes attaches to contemporary beings; the knowledge of ends straddles the present and unifies duration by leading the being to react upon itself, to will itself, to cause itself. Consequently, the unity of the temporal series can only be gained at the price of an integration into the necessary order of the universe according to a rationalist finalism; conversely, the unity of the self-consistent instant can only be obtained at the price of a discontinuity introduced into the succession of the individual's states by privileging causality and leaving out any relation of finality, which makes each instant overflow itself. Relation sacrifices the independence of the individual in the instant, and its independence sacrifices continuity, the unity of the series. The same back-and-forth swaying as the one that opposed the system of relation in accordance with simultaneity to the doctrine of the fulfillment of the being in itself appears here: each presupposition concerning individuality leads to its contrary.

#### SUMMARY

We are therefore asserting that when it comes to individual reality, philosophical doctrines have an attitude that constitutes a theory of nature in the

old sense of the term; Ionian physiology represents one of the two general aspects of the doctrine of nature: the force that makes things grow, that pushes them to be and individualizes them, insofar as individualization *results* from the production of beings, either because we start with a continuum like the ἄπειρον, or because we start with an infinite void populated by an infinity of atomic corpuscles, which amounts to the same productivity (the element function then being represented by the ensemble of the void and matter). The other aspect of the theory of nature is that of the fact, of the already fully constituted universe that possesses a unity of organization in its totality but not a power of productivity in each of its parts; this second path is that of rationalism. Insofar as the universe is taken as a constituted whole, the only path of intelligibility that remains is that of the comprehension of finality (whether apparent or hidden) and of the unique order that must be discovered. The universe is nothing but nature in its totality; it consists of parts but is not constituted by its elements; in this case, a superior intelligence and a mobile will (which is distinct from the elements even when it suffuses them) are necessary to account for this unity and anteriority of the whole with respect to the parts. In the second case, nature is a realized creative intention; a plan (and therefore a finality) is revealed in it. This path is that of rationalism because reason grasps the ensemble insofar as it corresponds to a unique intention. Conversely, the first conception does not seek to justify everything, to valorize everything based on its rapport to the ensemble; the intellectual operation is required to understand the genesis of beings but not to operate their integration into the overarching plan. These two opposed conceptions do not envision individual reality in the same way: for the first conception, the individual is what is at the end of a genesis and does not become integrated into a whole except through this genesis; its relation to nature is one of immediate contact. On the contrary, in the doctrine that conceives nature as a finalized whole, there is no isolated genesis of the individual being; this individual being is merely a part of the plan, a member of the organism; it is not itself nature; it is in nature, must participate in nature, but is not nature. This consolidation of the individual being, which depends on the order of things by becoming initiated into the plan of the universe, can only take place by way of a detachment of what is immediate in sensation and in the existence of the instant; the being detaches from the immediate on behalf of vaster mediations that attach it back to the order of the universe. Conversely, with the Ionian and Epicurean path, the individual being seeks to detach from all subordinating mediations to create an immediate contact with respect to what surrounds it, in particular to what is not individualized and harbors more creative force; the elements (water, earth, air, fire) indeed contain this

power of *physis* in the primordial and original state; they are the source of this eternal emergence of forms. The individual being is not the only form of being that can exist; it is not first, and it is not last; it has no more dignity and perfection than the non-individual being, like the element; the individualized being remains parallel with this non-individualized being in the world. The individual is merely one aspect of being, and the relation of the individual being to nature is this contact between non-individualized elements. The earth gives birth to man. The plant rises and takes root on the sacred shores of the day. The only true mediation for the individual is the relation to the species, because it is the species that populates the water, the earth, or the air: "*frondiferasque domos avium camposque virentes*" ("the leafy haunts of birds and verdant plains") is the expression Lucretius uses to designate the forest (which is for him a veritable element) and the plains (which are also an element), both of which originate from this fundamental element of the earth. Later on, speaking of an old and happy sage, when Virgil says "*dapibus mensas onerabat inemptis*" ("it loaded his table with unbought supplies"), or when he describes the customs of bees, he is no longer acting just for Augustus; something much stronger and more concrete than an official poetry animates his thought: immediate contact with the natural elements or with things not produced by human society, not mediated by commerce and exchange. This individual wisdom of the bond with things is also found in Rousseau and quite a few individualists; nevertheless, the literary and doctrinal expression of this attitude is rare because the literary expression is in general the search for a mediation; it is therefore almost inevitable that we find more authors who have sought to express the meaning of their life according to the finality of the universe than authors who wanted to proclaim their relation to natural beings: this immediate relation does not seek to be mediated in a city of letters. The Stoic intention on the contrary aims toward expression and to a certain extent constitutes a philosophy of expression; since expression is a gesture and a role to play, the *persona* coincides with a reality that the individual being discovers as destiny in a human *cosmos*.

It is in this sense that we can bring Platonic thought closer to the Ionians, for it seeks to define beings genetically, whether it be a question of the cosmic work of the Demiurge or the formation of elements based on primordial triangles within the  $\chi\acute{\omega}\rho\alpha$ . Aristotelianism, on the other hand, is more like Stoicism, in the sense that it leads to a vision that integrates beings into a universe that tends toward the unmoved mover and form without matter. The distinction between the doctrines that consider the individual as a temporal series and those that consider it as a bundle of rapports in the order of simultaneity is insufficient: within each of these groups of doctrines, we must

still distinguish between the conception that defines the individual for itself and one that first integrates it into a vaster order by defining it by its function within this order, while the other doctrine defines it by its structure.

#### CYNIC HEDONISM

Cynic hedonism extends Epicureanism but attempts to give it a broader basis by connecting it back to certain preoccupations of the Stoics: what results is a sort of slightly simple eclecticism, but it is endowed with an immense power of vulgarization; the literary genre that corresponds to this doctrine is the diatribe. Anniceris gives an absolute value to everything that connects the individual to other men: friendship, bonds of the family and of the fatherland. Nevertheless, this attachment of the individual must occur in a way that is real and not deceptive and artificial: one must not be attached to opinion but instead to the reality of beings. According to Bion of Borysthenes, fortune has allotted men their fates in a way that is overbearing and incomprehensible for them, without any providence; happiness consists in being satisfied with one's fate (αὐτάρκεια [autárkeia]) and plying oneself to every circumstance, just like a navigator obeys the winds.

#### PYRRHO

Pyrrho wants to obtain the state of silence and ataraxia for the individual; he obtains it by declaring that things are equal and without difference, unstable and indiscernible, and that consequently our sensations and opinions are neither true nor false; no thing is rather than is not, each thing is and is not; each thing neither is nor is not. The suspension of judgment (ἐποχή [epoché]) endeavors to stabilize the individual; men shouldn't justify Homer's verse that compares them to the leaves of a tree. Haughty solitude and disdain are better than useless agitation: "a nature of the divine and the good exists eternally, from whence the most equitable life for man derives": these are the words that Pyrrho lends to Timon at the beginning of his poem *Images* (Ἰνδαλμοί [Indalmoí]). This ideal comes close to that of the Hindu Gymnosophists, of whom Pyrrho was aware due to his travels with Alexander the Great.

#### ARISTO OF CHIOS

This same indifference that stabilizes the individual is encountered in Aristo. For him, the highest good is ἀδιαφορία [adiaphoría] or absence of attachment

to things. Furthermore, the individual must be capable of judging morally without the need for a paraenesis that specifies all particular cases, the number of which would consequently always be too restricted. What is refused is the theory of preferables (and with it the whole of paraenesis) that attaches man back to his milieu. The individual in fact possesses a power of absolute initiative that makes it possible to decide and to act even faced with indifferent things; this is ἐπελευστικὴν κίνησιν [epeleustikèn kínēsín], a phrase inherited from one of Chrysippus's texts.

#### CARNEADES

Carneades extends Plato's thought by way of a theory that critiques the Stoics' thought, particularly the notion of comprehensive representation. Carneades critiques the comprehensive nature of representation as the recognition of an individuality of the grasped object; the grasping of this absolute individuality of the object is not what gives knowledge its security, but the subject himself through the comparison he establishes between perceptions and the critique to which he submits his different sensations. The subject with his own activity is someone who can choose between the objects with which existence must be harmonized and those that appear to him deceptively. There is no absolute presence of the individuality of the object that guarantees its existence for us; we can confuse two twins, and we do not know how to distinguish between two eggs presented to us. If the criterion of the absolute individuality of objects were valid, there would be no indiscernibles; yet, there are indiscernibles. Thus, we see that, according to Carneades, the world surrounding the human subject does not consist of beings as rigorously individualized as the Stoics would like, and that this individuality of objects cannot be turned into a certain principle of knowledge, since we can be deceived about the identity of two very similar individuals, like twins. Knowledge, which is only affected by certain degrees of probability, is always approximate but is never perfectly adequate to its object, is not a grasping of individual reality. The veritable individual is the object; but this individual is not inserted by knowledge into a world within which everything would already be arranged and determined, as the Stoics would like. There is around the human individual a certain margin of uncertainty, of indetermination that leaves him with freedom both in knowledge and in action. This freedom depends on the "breadth" of the criterion of the probable, which contrasts with the all-or-nothing criterion of the truth of knowledge and the goodness of actions in the Stoics. The critical examination of representations is substituted

for a supposedly direct grasping of objects: “a representation is never solitary, but representations are suspended by one another like links in a chain.” Correlatively, Stoic theology is thrust back into an impenetrable mystery; indeed, according to Carneades, it is impossible to affirm contradictory attributes for the same being; however, if the God of the Stoics is acknowledged, one will be obligated to say that he is endowed with a voice and deprived of a voice, endowed with generation and deprived of generation; one will have to successively avow and disavow all the attributes of God; this is due to the fact that the Stoics wanted to turn God not only into an individualized being, but into a principle of the individual unity of the *cosmos*. This argumentation is reminiscent of what Kant develops against metaphysical dogmatism by revealing the contradictions and aporias to which this dogmatism leads. What Carneades critiques in the Stoics is in fact this unity of the world conceived as an organized individual; from the fact that nothing happens without cause, it cannot be concluded that all things are linked together in such a way as to form a system that weaves each event into the unique weft of εἰμαρμένη [eimarméne], which makes all events of the world into externally different yet deeply interconnected aspects of universal determinism, a determinism which is, moreover, fully suffused with finality. What Carneades refuses is the unity of a nature that would be a given fact once and for all, fixed for all eternity by destiny; the free will of the individual is indeed real; it is not an illusion that would have to be converted into an acceptance of the order of the universe recognized as sacred and holy. There can be independent causes that are inserted from outside into the weft of things, and the free will of man is one of these causes. In this doctrine, individuality is no longer constituted by a quality proper as in the Stoics, but by the source of an activity of critique and decision, a power of choice. The individuality of the subject detaches from the individuality of the object and stands out in a relief that it will retain throughout the various traditions of philosophical thought. The doctrine of Carneades prepares Descartes’s reflection as well as the critique that Kant addresses to Descartes for having asserted a substantiality of the subject of knowledge.

#### PANAETIUS

Plato’s thought is accommodated quite enthusiastically in Panaetius; the individuality of the Stoic *cosmos* is critiqued severely: Panaetius does not want to accept influence at a distance, which is the agent of this unity: “What appearance, from an almost infinite distance, can the influence of the stars extend as far as the moon, or rather the earth?” The Stoics’ universal sympathy founded

on the notion of resonance (which implies action at a distance) is refused here in the name of a rational evidence intended to destroy this incoercible unity of the *cosmos*. Panaetius also rejects divination founded on universal sympathy; he asserts a certain slack in destiny. Human reason in the development of civilization is more interesting to Panaetius than divine reason immanent to the *cosmos*. The human soul has no destiny outside the body; the soul does not exist before birth because the moral resemblance of children relative to their parents reveals a filiation of the soul and not just of the body; the soul must die because it is born; it is corruptible because it is subject to illness; it decomposes at death, and its ethereal part goes back to the heights of the world from whence it came. Human individuality is therefore a reality in becoming, fully submitted to generation and corruption. Our individual nature is what must be taken as a rule: "For we must so act as not to oppose the universal laws of human nature, but, while safeguarding those, to follow the bent of our own particular nature; and even if other careers should be better and nobler, we may still regulate our own posits by the standard of our own nature (these words are taken from *On Duties*, a treatise proffered by Cicero as inspired by Panaetius's treatise *On Duty*). To live in conformity with nature is to live according to the inclinations it has given us. An individual nature therefore exists according to Panaetius. There is also a "human" nature: it can be summarily defined by "*ratio et oratio*," reason and language, of which the beasts are ignorant; this nature is like an individuality of the species that distinguishes it from other species in this way. This human nature provides norms for action: it is quite contrary to humanity to meditate at a feast to which one is invited, or to sing in the public square. Relation is part of human nature as a social bond. It is what defines a justice between enemies, in the same way that oaths are made to be respected. Nature is what invites us to restraint and this self-respect that *verecundia* ("modesty") constitutes. Human virtues are natural tendencies regulated by reason. There are tendencies in beasts that correspond to all the virtues, a desire to see and to understand and a disinterested tendency for play corresponding to the speculative virtue, a desire of self-preservation corresponding to courage and temperance, innate social tendencies. With Panaetius, nature becomes immanent to individuals and to species, to every living thing; it is not reserved for the universe in its indecomposable organic totality. Nature becomes a certain internal finality and reciprocal conformity of the elements of activity in their mutual rapports.

In this sense, according to Cicero who is inspired by Panaetius, it would be inhumane to use eloquence to the detriment of good men when the natural role of eloquence is to protect them.

## POSIDONIUS

The same transformation is found in Posidonius: the rational character of the universe still exists, but it is force that is rational, not reason, which is a force; the divine fire is no longer a reason initially, it is an organic force, the *vis vitalis* of Seneca or the ζωτική δύναμις [zotikè dúnamis] of Posidonius. There is no longer merely a nature, but natures: the world is a system formed by “the sky, the earth, and the natures within them.” Posidonius’s physics is a dynamism that insists on the expansion of life and the gradual complication of living beings. The unity of the world is no longer that of a single organized body; it is deployed in an immense variety of hierarchically ordered beings. Zeus, nature, and destiny are three hierarchically ordered terms: Zeus is force in its unity, destiny is the same force contemplated from multiple aspects, and nature is the power emanated from Zeus to bind the multiple forces of destiny. This triad still appears in Cicero’s *On Divinity*, which is inspired by five books that Posidonius wrote on the same subject: nature contains the principle of all events. The manner of envisioning individual reality therefore changes throughout the dynamistic doctrines: the individual is not the whole being; there remains some non-individualized being; furthermore, and consequently, there is a nature in the individual because there is not a single nature that would be the world, yet an apportionment of nature makes it possible to give a greater consistency to individuals. The individual can have direct relations with God through mystical enthusiasm. Duration has a lot of importance in the individual soul; opinions and passions do not depend on facts alone; passion is not the same in the various individuals who share the same opinions; however, habit or vice cause the strongest passions for the same opinion about good and evil: the veritable cause of the passions is due to the fact that there are two parts in us: a daimon which is of the same nature as God, and a bad, bestial, irrational, atheistic part: passion consists in submitting the second part to the first; reason has no capacity to combat or assuage the passions; this irrational and unsystematic dynamism can only be transformed by means that are homogeneous with respect to it; for example, certain musical rhythms reduce anger or desire. The human individual is the being who is capable of a multitude of actions and who synthesizes seemingly contradictory activities: Diogenes and Daedalus can be admired at the same time; arts and technics are part of human civilization; man is capable of plurality. Man and nature in the most complex manifestations of their activity must be embraced in a single perspective. Human reason pertaining to the individual being is indivisible; it must be artisanal and theoretical to an

equal degree: Anacharsis invented the potter's wheel; Democritus invented the kiln; these are sages who invented arts that facilitate everyday life, like that of construction; they discovered metals and their uses, the agricultural arts, the grain mill. Art and nature are not opposites: the same man who witnessed a forest fire liquify metal invented metallurgy; the grindstone of the mill operates like human teeth. Endowed with this observational capacity and inventive dynamism, the individual establishes continuity between art and nature. The object of philosophy is to rediscover a dynamic continuity everywhere; Roman civilization is a continuation of the preceding Etruscan and Greek civilizations.

#### EPICETUS

Epictetus discovers in philosophical activity a necessary condition for the individual's possession of all human rights: "philosophical dogma is what keeps one's head up for those who are downtrodden"; due to this activity, the slave and the freeman can look tyrants and the wealthy right in the eye; indeed, in the age of Epictetus, the condition of the naïve person is increasingly rare, and Epictetus himself is a freed slave. Manual labor is not dishonorable; what is honorable is man's activity, not his birth. Here, the distinction between τὰ ἐφ' ἡμῖν and τὰ οὐκ ἐφ' ἡμῖν comes to the fore again: "what does not depend on me are my ancestors, my relatives, my friends, my reputation, my temporary stay." On the other hand, the individual absolutely possesses the use of his representations. This is where his freedom resides. No one can force him to think what he does not think. In this sense, man can turn away from what is a state, a fact, and does not pertain to the individual, in order to go toward what is an act and, proceeding from the individual, belongs to him; representation is a condition of the act; it is therefore a condition of freedom; moreover, it is an act in itself. Instead of being preoccupied with the means that will allow him to integrate into the world, the individual being on the contrary seeks to know how he will always be independent from a situation of fact; he discovers this condition in his own activity.

#### MARCUS AURELIUS

Marcus Aurelius instead seeks to reconnect the individual to the universe; he conceives death as a diffusion into the whole and an emancipation; death allows us to avoid the perils that lie in wait for the individual in his integrity, particularly that of intellectual decline. This reconnection to the universe is

what gives a meaning to individual life, which is so fleeting and unstable. The moral act is like a flowering of universal nature within man; man must produce moral acts just like a tree bears its fruit, without knowing it. Marcus Aurelius declares that there are two fatherlands—Rome, insofar as he is himself, and the world, insofar as he is man; the sole good is what is useful for these two fatherlands. The individual is a being who must insert himself into the world by way of his activity. Such a meditation leads to a valorization of effort, of labor: “*laboremus, ceterum nihil expedit*” (“let us work, or else there is no use to anything”).

#### PLUTARCH

A rebirth of Platonism becomes apparent in Plutarch, who does not define man in the midst of a human world as the center of all preoccupations, but with respect to a nature and a world that do not grant preeminence to man; there is no humanism<sup>70</sup> in Plutarch; the reasonable man is in certain aspects inferior to the plants and animals: “Do not be surprised if animals without reason follow nature better than rational beings; from this point of view, animals are even inferior to plants, to which nature has given no representation or penchant capable of deviating from nature.”<sup>71</sup>

#### PLOTINUS

For Plotinus, a being's degree of unity depends on the degree of union of its parts, from the heap of pebbles consisting in a simple juxtaposition, up to the organized living body (whose parts are maintained by the tension of the soul), by passing through a collective body, like a chorus or an army. Union can be conceived as increasing to the point where the parts fuse together and become exceedingly inseparable. In a living body, the parts have solidarity with one another but are locally separate; in a science, a part is a theorem, and each theorem contains all the others *in potentia*; with a further degree of unification, one passes from the genus of corporeal individuality to spiritual individuality. Yet every reality in which the union of the parts is not perfect supposes a more perfect unity above it, that of the soul that contains them, whether it be a question of the unity of the parts of a living body or the unity of the parts of the world. Nothing is a coherent and consistent individual except through the one. Despite Aristotle's opinion, being and the one are not convertible: the one is the principle of being; all that is real in the living being comes from the one, which governs it; in this sense, everything real in

the body is contained in the form of seminal reasons within the soul of the living being. All reality is comprehended when it is related to a more perfect mode of intelligibility discovered in a superior unity. This unity is not due to the activity proper to an agent that penetrates a matter by way of the total mixture and retains the parts by its tension. For Plotinus, the genus of unity is that of a science; in a science, the mind is one because it contemplates one and the same object; the contemplation of the superior principle is what introduces unity into inferior reality. Like intelligence, nature is the tacit unconscious contemplation of the intelligible model that it strives to imitate; *physis* becomes a thrust that stems not from the element that produces individuals but from the contemplation and imitation of the ideal model reflected in the created individual. The superior principle of unity therefore remains in itself, in its unchangeable perfection and immobility; nothing of itself passes into inferior reality; it only acts by filling things with its light and its reflection to the extent that things are capable of receiving them. The *cosmos* is unique, finite, and eternal, with its own order, which is always identical to itself. There is a unicity and unity of the world, a sympathetic bond between its parts. The first principle is the One or First, insofar as there is not yet any division; it is nothing, because there is nothing distinct in it; and it is everything, because it is the power of all things, like the One of the *Parmenides*. This absolute individual (the One) is therefore that of which the same things can be affirmed and denied. But the One is also the Good, like in the seventh book of the *Republic*; it is "beyond essence." This superessential nothingness is hypostasis, without being essence or substance. Individuality is therefore absolutely first; it is the first hypostasis; this first hypostasis can only be characterized by the role that it will play with respect to the subordinate hypostases. But this absolute individual could remain the unique, thereby conserving all reality contracted in it. It does not remain the unique because everything perfect produces its similar, like the living being reaching adulthood. This production is unconscious and involuntary, it is due to a kind of superabundance, like that of a river source whose overflow spills out, or like that of a light in diffusion. The being is consequently endowed with a sort of expansion that characterizes full individuality. The individual reality of the living being, of the river source, of light, loses nothing by expanding, and they retain all their reality within themselves: procession is the forward march of the individual reality of the being, a forward march that originates with the principle. On the contrary, conversion is the fact of an imperfect individuality: the being that proceeds turns back toward its producer to contemplate it; the second hypostasis is being, intelligence, and intelligible world.

The one becomes distended and multiplied therein; reality is discharged therein in a hierarchized multiplicity of genera and species, which happens to form through a sort of dialectic. The individual exists in the intelligible world; there are ideas of individuals.<sup>72</sup> On this point, this doctrine is quite different from that of Aristotle, for whom the individual, realized in the sensible world, contained all the characteristics of specific form augmented by an indefinite number of other characteristics due to a thousand accidents encountered by the specific form of man in its realization. According to Plotinus, in its realization in the sensible individual, form does not receive new positive characteristics; the intelligible world contains all possible richness. This second hypostasis is both intelligence and the intelligible. The distinction between intelligence and the intelligible corresponds to a degree of relaxation of the absolute and first individuality of the first hypostasis, an individuality which is also an indivision. The reciprocity of intelligence and the intelligible is the maintenance in two associated terms of a functional and somewhat operative indivision that is equivalent with the absolute unity of the first hypostasis without, however, being as perfect as it; the hypostasized intelligence must discover in itself all the richness of the intelligible world. The thought of oneself gives it the certainty of its content; its knowledge is prepared as it begins: intelligence is vision of oneself and of the intelligible world; the intelligible world has the structure of a society of intelligences in which each intelligence thinks all the others by thinking itself. Reflection, return to oneself, is therefore at once unity and plurality returning to unity. Individual souls appear at the level of the third hypostasis: their destiny is part of an overarching plan; the world is a theater in which Providence assigns to each its role. The soul acts by way of contemplation: it organizes because it contemplates by way of an influence that emanates from it without its will, as if the figures of which a geometer thinks were sketched out by themselves. The intelligible world and the sensible world are linked to their own essence from which they cannot escape; on the contrary, the First principle is endowed with an absolute freedom; it is not bound to any essence. The contrary of individuality is matter (of which it is impossible to say "self"), a completely undetermined and even indeterminable thing, something impassive and comparable to absolute poverty in the myth told in the *Symposium*. Individuality is far from being the union of a form and a matter, since form does not make matter more determined. There is no veritable union of form and matter; the sensible is a simple fleeting reflection of form in matter, and it no more affects matter than light affects the air it suffuses. This matter is the last reflection of the One before the complete darkness of nothingness.

Absolute individuality should not be sought in the corrupted, fleeting, undetermined sensible. All singular souls derive from a unique soul in the same way that intelligences derive from Intelligence. The world soul has prepared a home for each singular soul corresponding to its nature, a home that each soul must look after for the time determined by the order of things. In a sense, the singular soul looks after the body; but it only looks after the body because it contemplates the intelligible order. Converted toward this world and thereby being intelligence, the soul remains close to the intelligence; it is a self-reflection that will illuminate and vivify the body. Yet the soul can turn back toward its reflection: this conversion that is an aversion enslaves the soul to the changes of the sensible world; the soul is consequently like Narcissus, attracted by its image, drowning itself so as to embrace its own image. This descent of the soul determines its life in the sensible world. The goal of philosophical effort is to accomplish the inverse movement. But then the soul and the self must be distinguished: the soul as intelligence contemplating intelligence remains eternally converted toward the intelligible world; only the self descends toward the reflection that the soul projects instead of remaining at the level of the intelligence; the self is like an intermediary soul between the soul and its reflection. While the superior part of the soul "remains on high," the self can sometimes go toward the height, sometimes toward the bottom, toward the soul or toward the reflection. Destiny is the change that occurs in the soul when it passes from one level to another, successively absorbing all metaphysical landscapes. At the bottom is the life of pleasure, or the active life provided by the social virtues, whereas the life of pleasure is always passive. Higher up is the reflection of the judging and reasoning self, the intermediary level where the soul is master of itself. Higher still is intuitive or intellectual thought, which is at the level of the essences that suppose nothing before them and are intuitive givens. The soul can go no higher, for the One, insofar as it is undetermined, cannot be known, only grasped in an ineffable contact wherein the duality of subject and object is suppressed, that which is at once knowledge and enjoyment of this state: this is ecstasy, which is superior to intelligence and to thought, a state in which Plotinus raved four times according to Porphyry: the being who experiences ecstasy loses all notion of himself.

#### POPULAR BELIEFS

But philosophical thought is not the only one to contribute a certain theory of the individuality of beings and their mutual relations: starting in the second

century, popular beliefs open up a large space for magic; yet, magical practices suppose a universal sympathy of beings that exerts itself at immense distances, without any mechanical causality and by way of an influence that comes from the unity of beings. The imperial endeavors to create a solar religion take inspiration from the religion of Mithras. However, this religion shows the shining sun continually causing along its rays a certain descent of fire particles into the body, which it summons to life. Then, when death has dissolved the elements of which the individual is composed, the sun raises them up to it (according to Cumont, *Astrology and Religion among the Greeks and Romans*.)<sup>73</sup> Such a possibility of procession and conversion supposes that influences are exerted between beings with a common origin. Apuleius reveals the transformation of beings in the mysteries of the Great Goddess in the eighth book of the *Metamorphoses*. The acts of the cult become magical rites. The world becomes a vast network of magical influences: in his *Alexander, the False Prophet*, Lucian shows how charlatanism took hold of the public. The magical rituals of the East are eagerly sought by the readers of Philostratus's<sup>74</sup> novel *Life of Apollonius of Tyana*. Divination and magic are given free reign, despite the prohibitions decreed by emperors. The *Chaldean Oracles* are utilized by "theurgists," and this results in the creation of an art of making divine influence act where and when one wills. Alchemy also expands during this time.

#### IAMBlichus AND PORPHYRY

A fully practical and anti-speculative thought begins to spread: the treatise *On the Mysteries of the Egyptians* introduces purification as a unique means of knowledge. This treatise is perhaps the work of Iamblichus. In philosophers as well as theurgists and alchemists, the belief in a universal sympathy of beings is omnipresent. Porphyry consecrates a treatise *On Images* to the rules for the construction of statues: statues are in fact analogous to beings, whether men or Gods, and through statues one acts on beings due to this link of analogy, of participation through influence. The statue is not an individual by itself but a sort of double of the being that it represents. Astrology is one of the aspects of this search for participation, as Porphyry's *Introduction to Ptolemy's Tetrabiblos* shows. Iamblichus was both philosopher and mystagogue. Proclus abandons the theory according to which, after Plotinus, the superior part of the soul is us without being us; it is us when we reach the superior, and it stops being us when we descend to an inferior level. Iamblichus separates the daimon and the self. The dynamism of procession and

conversion in Plotinus is replaced with a static conception that indefinitely multiplies the principles and gives a fixed place to the Gods, heroes, and daimons. A hierarchy of ternaries replaces the Plotinian triad. The relation of the One to that which proceeds from it and then converts is replaced by the static arrangement of three distinct terms, the first of which performs the function of remaining (τὸ μένον [tò ménon]), the second of which performs the function of proceeding (τὸ πρόιον [tò próion]), and the last of which performs the function of converting (τὸ ἐπίστρεφον [tò epístrephon]). This distinction stabilizes the movement inherent to Plotinian metaphysics; but it thereby makes it difficult to resolve the problem of individuality, for absolute individuality will be neither in the first term nor in the other terms; with Plotinus, on the contrary, procession was directly a manifestation of the One, thus producing its kind through a superabundance of being. The complementary aspect of procession and of this recurrence of genesis that is conversion closed a cycle of being that made relation into an expression of the absolute individual; being and relation are grasped in a single way in the double movement that connects the first three hypostases; similarly, the distinction within the human being between the soul and the self makes reflection possible, which is the conjunction of the two movements of procession and conversion and the establishment of a sort of reciprocity between these two movements. This recurrence linked to a schema of productive circularity disappears in Iamblichus, and the doctrine of Plotinus is no longer included.

#### PROCLUS

This abandonment becomes definitive by virtue of the same presuppositions in the system of Proclus expressed in his theorem on transcendence in his *Elements of Theology*: “a term equally present in all the terms of a series can only clarify all of them if it is neither in one of them, nor in all of them, but before them all.” Whether or not it is in all and divided among all, there must be a term that unites the parts of the series; or instead it is in one of them alone; but then it will not be present in all of them. Consequently, concerning each series of things that possesses a common characteristic, there will be three terms: the unparticipated term, the participated term, and participating things; relation becomes a term instead of being movement and operation: the recurrent circularity of Plotinian procession and conversion is fully forgotten. The participated term, which in logic plays the role of joining the unparticipated term (comprehension of the concept) and the participating terms (extension of the concept), replaces the recurrent relation of procession

and conversion, the movement from the One to the multiple and from the multiple to the One. With Proclus, the series becomes genus, and the genus is cause: the density and consistency of the individual is lost, along with the circularity of procession and conversion of which it is the beginning and end. Each series is like a διάκοσμος [diákosmos], an oblique world, a transversal structure within which each series contains all possible realities in its own way.<sup>75</sup> There is a law of development or distribution of reality that is shared by all series: beings divide like unities, living beings like beings, intelligences like living beings, souls like intelligences. The One is then endowed with quite various powers relative to singular individualities: it turns them into achieved beings (τελεσιουργει [telesiourgei]); it keeps the parts together with their essence (συνέχει [sunéchei]); it protects their limit from the encroachment of other essences (φρουρει [phrourei]). Each series contains within it from its own perspective the characteristics of all the other series.<sup>76</sup> Each reality remains in its place, in a fixed hierarchy; the metaphysical voyage of the soul is no longer possible; the mobile and spiritual self that is displaced at all levels between matter and the one no longer exists. The absolute individual no longer creates; nothing proceeds from it: Proclus critiques the Christians wholeheartedly; in the same way, he could also critique Plotinus, who asserts procession starting with the One. “In what intention, after a laziness of infinite duration, will God manage to create? Because he thinks that this is best? And yet, either he ignored it, or he knew it; to say that he ignored it is absurd; and if he knew it, why did he not start before?” Saint Augustine responded to this accusation of absurdity<sup>77</sup> by referring to a principle that is not very different from that of the superabundance of being.<sup>78</sup>

#### DAMASCIUS

Damascius on the contrary tries to recover some of the dynamism of the One in Plotinus by supposing the existence of the *Ineffable*; the Ineffable possesses both the characteristics of the individual and those of the non-individualized element; spiritual life traverses the metaphysical world that Proclus described as static reality. The definitive functions of the unification of the real that Proclus imparted onto the One do not suffice as first principle: the absolute principle is beyond unity and plurality: it is necessary to suppose the existence of the Ineffable, which is inaccessible to all, without coordination, separate to the point that it no longer veritably possesses separation. This principle is without order and without hierarchy. What each singular being contains of the ineffable and the impenetrable comes from this Ineffable; the higher we

rise, the more we find the ineffable: “the One is more ineffable than Being, Being more ineffable than Life, Life more ineffable than Intelligence.” Nevertheless, this ineffable reality is not hierarchically superior to what is ineffable in each of the singular beings; in the sense that the relation between the ineffable and singular beings would be hierarchical, it must be said that the ineffable communicates nothing of it to the realities that come from it. The ineffable is absolute initiative but not hierarchical order. The ineffable cannot be defined; it can only be designated by a thought that affirms then denies the propositions that concern it, like what Plato does in the first hypothesis of the *Parmenides*. Procession and conversion, the monad and the dyad, the limit and the unlimited, the Father and *Dunamis* only appear in realities derived from that for which we want to account through the union of two distinct principles. The ternary in Damascius is therefore replaced by three terms whose triplicity does not alter unity: the first is One-All, one by itself and all insofar as it produces the second; the second is All-One, all by itself and one insofar as it is produced by the first; finally, the third is one insofar as it is linked to the first and all insofar as it is linked to the second; each of the terms is like one aspect and one facet of the same reality; there is thus a certain circular relation in the primordial ternary. For Damascius, procession and conversion can only be said of intellectual natures and cannot help to explain all reality: such is the meaning of the critique Damascius brings to bear against Proclus’s *Commentary on Parmenides*.

#### CHRISTIANITY

E. Bréhier posits that there is no Christian philosophy. We will not allow ourselves to contradict the historian of philosophy concerning a point we have followed throughout the whole course of this explication; however, the existence of Christianity was able to play a role in the genesis of philosophical thought; and if there is no Christian philosophy properly speaking, there is a meaning of Christian ethics that imposes a certain conception of the human individual; it is not as ritual or even properly speaking as religion defining a certain conception of the sacred that Christianity was able to contribute something to thought; its cult is not essentially distinguished from the various theurgies that blossomed in this era; its theology is not unrelated to the metaphysical conceptions of Plato, Proclus, Damascius; furthermore, it borrows significantly from the Old Testament. But Christianity is also an ethics, it is even profoundly an ethics; yet, instead of giving positive rules, instead of defining the pure and the impure, good and evil in long lists—

as Hesiod provides, for example, for the Greeks or as the author of Leviticus provides in the written tradition of the Hebrews—this ethics provides nothing but a negative canonical: “do not do unto others what you would not have them do unto you”, or “whosoever among you without sin may cast the first stone,” or “*nolite judicare*” (“judge not”). It is quite remarkable that almost all the commandments of the Church have a positive form, whereas the precepts that constitute the canonical of the Good News are negative, if not in their grammatical turn of phrase, then at least in their veritable signification. Yet the negative form of a canon defines a veritable universality of the action it defines, and it considers the individual as a free subject; a positive rule is never fully transposable; it is circumstantial and consequently supposes that the being to which it is addressed is in a certain milieu, with this or that social relation; conversely, a negative canonical is really universal, always transposable; but it supposes that the individual can be thought and think itself as a reality independent of the circumstances in which it is found; these circumstances, conceived in the relation to a negative canonical, become universal. Due to its negative form, Christianity becomes an ethics of the absolute individual; every rule that seems positive in it are negative rules in the end.

#### SAINT PAUL

Because of this fact, Christianity is cosmopolitanism; consider Saint Paul: “There is no longer Jew or Greek, there is no longer slave or free, there is no longer male and female; for all of you are one in Christ Jesus.” As with Seneca, there is an indifference relative to the social condition in which one lives. The only one who can know the truth is one who is totally free from all circumstances and who has become a spiritual man, a pneumatic, in opposition to one who is merely psychical and remains engaged in matter. Like Epictetus, Saint Paul wants to save man, and what is important to him is this salvation of the individual being. The idea that an individual is the neighbor with respect to another exists in Epictetus and Marcus Aurelius as well as in Saint Paul; the fraternity of men is even more pronounced in Stoicism by way of the belief in the mission of Hercules, son of Zeus, who spreads justice and virtue throughout the world, and by way of the idea of Christ who is the son of God made man, offering himself as a victim for the salvation of men. This ethics is indeed an ethics of universality that considers humanity as a set of individuals who as men all have an identical nature. Yet this canonical persisted in Christianity even when it evolved, even when it invested its forces into this or that social or communitarian temporal cause: here, one

must distinguish between the Church, community among communities, and Christianity, which lived on due to texts and often was taught explicitly in the Church, at the same time as an implicit content was taught that was not always a universal ethics and was quite rarely so in the century; it is of this ethical teaching that one can say that it contains a philosophical thought precisely relative to individuality. It may be that this ethics is not proper to Christianity, but it has been conveyed by Christianity, thereby providing an incitement to think that was given for many centuries to many peoples. After having brought Epictetus and Saint Paul closer together, E. Bréhier declares that there is nevertheless one difference that produces the fundamental feature of Christianity: “absent in Epictetus, who, as Pascal says, did not know the misery of man and who makes man into his own savior; in Saint Paul, the sinner who knows the good cannot do this because of the power of sin, which is counterbalanced only by the grace of Christ. Unlike in Stoicism and even Philonism, it is no longer a question of these semi-abstract powers that assist man (divine logos or interior daimon) but a question of a historical personage whose death has saved humanity through an action of a completely mysterious effectiveness, which is completely different from that of the pagan sage, who simply teaches or offers himself as a model.”<sup>79</sup> This difference in fact is quite important, but it is not the only one and is no more essential than the others in itself: it signifies that the Christian individual is never an abstract being, to such an extent that redemption itself can only be made possible by way of a mediation that is a complete incarnation of God, i.e. an individualization of God in space and time. In Stoicism as well as in Christianity, the individual is citizen of the world; but, since the Stoic world is the world that we see, this universalization can only take place due to a certain abstraction based on the social condition, based on the creation of a *persona*; conversely, the transcendent aspect of the world within which the interindividual relation of grace arises allows the whole concrete character of the individual being to survive; in Christianity, the concrete individual is the object of human effort, not the support of a role: transcendence unmoors the individual from this world but conserves him in the concrete state; immanence connects him to the world, albeit by effectuating the separation of τὰ ἐφ’ ἡμῖν and τὰ οὐκ ἐφ’ ἡμῖν. It is rather that there was a certain mixture of Stoicism or Cynicism and Christianity after the intervention of monasticism and the practices of maceration. This difference is revealed by the continuous nature of individual moral progress, which is opposed to the nature of the “all or nothing” of moral progress in the Stoics; here again, we find in Saint Paul a doctrine that was partially forgotten afterward, that of the individual

who is in constant progress or regression and who is never fixed in his destiny until the moment of his death because he can always progress or regress with respect to God. Another theory followed this doctrine of moral progress, namely that of the distinction between those who have received grace and those who have not, a distinction which will end in the theory of predestination we find in the Jansenists. There is indeed a doctrine of the individual in Christianity, and this doctrine is the seed of a philosophical thought.<sup>80</sup> We are left to wonder what is first and absolutely fundamental in Christianity: the search for transcendence, or the search for the concrete and complete individual, all of whose acts matter and contribute to modifying his distance from God. This individual lives in a world that is not eternal and where knowledge does not suffice to eradicate evil; man's activity is open in time and effectively creates the new; there is an initiative of man; knowledge is not the only initiative of man; Saint Paul, who borrows from the Gnostics their distinction between the hylic, the psychic, and the pneumatic, is on the contrary opposed to their doctrine according to which knowledge of the world is what drives out evil; he is also opposed to their moral dualism. According to Saint Paul, redemption comes from the efficacy of Christ's sacrifice and not from the knowledge he brought, as the Gnostics claimed. Christianity is a monism relative to the theory of Gnosis; it affirms and maintains the unity of the individual being, instead of allowing him to be considered a divine spark stuck in the mud; it is also a monism relative to Manichean dualism, according to which the duality between two sources of powers generates a duality in man, a duality Christianity does not accept; for Christianity, the duality is not actual but virtual: it results from sin and can cease through grace; the state of sin is not a simple juxtaposition;<sup>81</sup> only a redemption can modify this homogeneous state, not a simple splitting: it is therefore impossible to make decidedly two parts of Man. The state that results from the successive acts of creation, then from the sins of the flesh, is a state that conserves the idea of the resurrection of the glorious body.

#### SAINT AUGUSTINE

Saint Augustine boldly expresses the idea that the Mediator is mediator not because he is the Word, but because he is man, is made man: "Christ died but once."<sup>82</sup> Saint Augustine refuses the Stoics' expulsion of all the passions from the human being: desire, fear, sadness can come from the love of the good and from charity and are not vices in themselves. Self-knowledge is the knowledge of a fact and not of an essence, as asserted in the treatise *On the Trinity*,

where Saint Augustine says that we know through an internal science that we are and that we live. Here, unlike in Plotinus, to know oneself is no longer to know the universe of realities, but to feel oneself live and exist. The feature that strikes Saint Augustine is not so much some intrinsic property of intelligible things, but the independence of truths that we conceive with respect to individual minds: the reality of the individual is posited from the start.

The conception of the individual in reflexive thought was able to be conditioned by the *modi vivendi* and social relations of the thinkers themselves; in this sense, what must be studied is the psycho-social unity formed by the thinker and his public; two general types of organization of the dynamics of this relation can be distinguished as the extreme terms between which every mixed type can be interspersed: the closed and therefore homogeneous public, and the open public, which is consequently heterogeneous with respect to the author. However, in ages when intellectual life is emphasized particularly, since intellectual elaboration involves a certain specialization, it is natural that the public is vast, open, and heterogeneous with respect to the author; the relation of the author to the public is consequently didactic and exoteric; this reflection corresponds to a meditation on the world, to a link with the object, and to a more theoretical than practical preoccupation. Conversely, in ages when preoccupation with spiritual life and personal salvation take precedence over intellectual life and knowledge of the world, the communal gathering of subjects who seek to work together toward salvation and purify themselves involves an esoteric position of the problem of the individual.

At the twilight of the ancient world, the universal need for a practical search and for the meditation on personal salvation is indicated by the existence of a multitude of spiritual conventicles, like that of the Therapeutae of Lake Mareotis and that of a countless number of Pythagorean, Hermetic, Platonic communities; the monasteries of Western Christianity have an analogous structure and provide fairly similar conditions for the development of thought. At this time, philosophical problems are posed in accordance with man's destiny such as Christianity conceives it; the intelligence does not assert the autonomy of its methods and problems. The emotive, affective, voluntary aspects of life have as much importance as properly intellectual representation; furthermore, the relation to the world of the public is a relation to the homogeneous and to the limited; there is somewhat of an identity of the world and the public, of the object and society; the unique relation to the world consequently becomes a relation to matter, and this world becomes foreign to the individual enveloped in a limited society that is for him principle and end, subject and object symbolized by a single substance.

## EASTERN HERESIES

One of the first signs of the existence of these communitarian conditions of reflexive thought is the reaction of Christian thought against the Eastern heresies relative either to the question of the trinity or to the Christological question; what they both fundamentally have in common is a change in the paradigm of individuality applied to the conception that divinity can be made man. In Sabellius and the modalists, the Word is not considered the son of God for fear of falling into polytheism. In the same spirit, Arius only accepts the son of God as person on condition of making him a creature of God; these two thoughts highlight a common preoccupation: to safeguard the intellectual purity of the representation of God that has been formulated and therefore to elucidate the mysterious nature of trinitary dogma by thinking divine reality as an individual identitarian unity, not as a reality that can be grasped merely through the categories of participation, thereby rejecting the principle of excluded middle. This refusal of the principle of excluded middle is palpable in the formula that Athanasius and the Council of Nicaea oppose to Arius: the unity of substance in God does not exclude the diversity of persons; this logically supposes that two incompatible structures are simultaneously existent in the divine being. These are the same formulas with which Cyril of Alexandria and the council of Ephesus in AD 431 condemn Nestorius: the duality of human and divine natures in Christ does not prevent Mary from being *Théotokos*, the mother of God. Lastly, these are the same reasons why the school of Antioch was considered heretical even before Nestorius, because it refused to see in Jesus Christ anything other than a man filled with the graces of divinity, and because it avoided the metaphysical god-man combinations that require the category of participation and the refusal of the principle of excluded middle. Here, theocentrism is the mark of an inspiration that conforms with neo-Platonic thought, seeking to determine the intelligible structure of things by remaining faithful to the principle of identity.

## WESTERN HERESIES

The Western heresies (Pelagianism in particular) also manifest this defiance against participation: this doctrine denies the hereditary transmission of original sin, the justification of man by the merits of Christ taken as victim, and the importance of the means of grace and of the sacraments that the Church makes available to the faithful. Saint Augustine opposes the efficacious reality

of the Church to this thought; grace is what establishes this necessary participation; the good can come to the soul only from a special grace; salvation only belongs to those who are predestined by God for all eternity; unbaptized dead infants are damned; the Gentiles who have not been touched by the grace of Christ have never attained virtue. The Church is the necessary institution for the dispensation of divine graces, i.e. for the maintenance of participation between divinity and humanity. Donatism is critiqued in the same spirit; according to Saint Augustine, who also fought against this heresy, the value of a sacrament should not depend on the individual purity or impurity of the priest who bestows it; the formalism of the sacrament is what establishes participation, not the individual reality of the priest. Under these conditions, it is inevitable that man cannot be transparent to himself in his individual reality; the possession of spiritual power does not provide intellectual penetration: in his work *On the Soul and Its Origin*, Saint Augustine protests against those who believe that man “can discuss his own quality or nature as a whole, as if none of himself eluded him.”<sup>83</sup> This is why Saint Augustine, concerning the controversy over the origin of the soul, hesitates without concluding between traducianism, which derives our soul from that of our parents, and creationism, which makes each soul into a creature *ex nihilo*. The doctrine of Saint Augustine therefore aims in particular at establishing the reality of participation through the Church; his thought conforms with the doctrine of participation; the story of his conversion shows that individual unity is not as strong as commencing participation; conversion is like a struggle between individual unity and the force of participation: the “old man” is the singular man according to a thought that conforms with the principle of excluded middle; man at the moment of conversion is a divided being<sup>84</sup> in which a struggle arises between the part that is still purely individual and the part that already participates; after having vanquished the other part and detaching from it, this part that participates becomes the whole again; at that time, the world to which the old man was attached is no longer but “*nugae nugarum*” (“toys of toys”). There is a profound difference in structure between the man before conversion and the converted man: the former subsists, the latter participates.

#### CASSIODORUS

This duality of conceiving the human individual is prominent in Cassiodorus (AD 477–575), who, in his treatise *On the Soul*, opposes the proofs of the immortality of the soul according to “secular letters” and those based on

“veridical authorities”: the first proofs, which are in particular drawn from the *Phaedo* by way of the discussions contained in the works of Saint Augustine and Claudianus Mamertus, define the soul as a simple substance, a natural form, different from the matter of its body; the soul is thus defined here by itself as individually isolated; conversely, according to the proofs derived from the “veridical teachers,” the spirituality of the soul derives from its relation of participation in divine reality: the soul is made in the image of God. Cassiodorus considers these proofs that utilize the relation of participation as specifically Christian and superior to the proofs of the *Phaedo*. In the spiritual city that Saint Augustine wants to establish, the moral life of the individual is participation in the established order. The very relations established between the different sciences and knowledges that form the content of the spiritual city conform with this structure of participation: the *trivium* and *quadrivium* find their justification in their usefulness for the study of the purely divine sciences; these sciences no longer have their individuality or their specialty; they are totalized in an encyclopedic form that is indispensable for liturgy and ecclesiastical computus; they are limited by the relation of participation that integrates them functionally into the corpus of the sciences; they lose their power of self-creative discovery and no longer have the goal of promoting themselves; participation suppresses the internal finality and power of indefinite growth of each individualized reality. Such is the role of the Encyclopedias that were written at that time and that constitute something like cities of the sciences. They subjugate the knowledges inherited from pagan antiquity to the Church; the relation of participation, which deploys itself starting from the active center of revelation, extends up to the ancient doctrines and turns them toward it by depriving them of their autonomy. This conversion is practiced by Isidore, the Archbishop of Seville (AD 570–636) in his *Etymologies* and by Bede the Venerable (AD 673–735) in his *De Natura Rerum*, which was inspired by Isidore and augmented by frequent reminiscences of Pliny the Elder.

Refusing citizens’ rights to individual opinion, the same relation of participation appears on a particularly crucial ground: that of the criteria to be employed for discerning truth in matters of faith: this set of rules is expounded by Vincent de Lérins’s *Commonitorium* in AD 354; the opinion of the majority must be given preferential treatment from the start by distrusting private opinions. In the same way, the opinion of the ancients must be followed; ultimately, if these two methods make room for error, the decision of an ecumenical council must intervene; short of this, the search for the opinion shared by all orthodox masters is fruitful. The tradition grows by way of

development and clarification, i.e. such that the new participates with the old continuously and never by way of addition or innovation, which would disrupt the continuity necessary for participation. The only mediation invoked in these different examples is consequently that of participation, of continuous participation. The mediation proper to philosophical thought, which calls for invention and not participation through continuity, for creation and not simple development, cannot be suitable for this ecclesiastical thought.

#### SAINT ANSELM

It is nevertheless appropriate to note just how much the very method of participation can be taken in different senses; there is no common measure between participation in divine reality through revelation and writings and participation on the basis of Saint Anselm's *esse in intellectu* ("being in the understanding"); in Saint Anselm, the *esse in intellectu* can lead us to God because the understanding is already a mediation between faith and the beatific vision of the chosen ones; we then pass from the *per aliud* ("through something else") to the *per se* ("through itself"). There is still participation, but this participation is a relation that goes in a direction opposite to the habitual sense; in discovery, thought is directed from the part that participates to the being, which is the object of participation; the fool who says there is no God possesses in his understanding the notion of God; and what he comprehends is in his understanding, even if he does not comprehend that this thing exists; when Saint Anselm goes from *esse in intellectu* to *esse per se*, he does not go from the concept to the real thing, but from partial reality to complete reality; there is no change of modality in the judgments that explain this reasoning; thought always moves toward the affirmation of reality: "And assuredly that, than which nothing greater can be conceived, cannot exist in the understanding alone. For, suppose it exists in the understanding alone: then it can be conceived to exist in reality, which is greater. Therefore, if that, than which nothing greater can be conceived, exists in the understanding alone, the very being, than which nothing greater can be conceived, is one, than which a greater can be conceived."<sup>85</sup> This path of participation going from the part to the whole, and not from the whole to the letter of its degraded expression, sometimes appears in Saint Augustine: "For never yet was, nor will be, a soul able to conceive of anything better than You . . . and if You were not incorruptible, I could in my thoughts have reached unto something better than my God."<sup>86</sup> Negative theology proceeds along this path. Lastly, let us note that all the great rules of Christian morality are given as

negative, and it is for this reason that they can claim to attain universality, for an ethics is founded by passing from the reality of a particular negative rule to the reality of the unique basis that positively founds ethics. The foundation of the Platonic dialectic is rediscovered in this path of participation through which one ascends from the conditioned back to the unconditioned that conditions it: "But God, surely, and everything that belongs to God is in every way in the best possible state."<sup>87</sup> In Plato, participation can occur in two senses: it goes from the Good to the ideas and from the ideas to the Good. The possibility of this double movement also exists in Christian thought, since God is creator but also redeemer, alpha and omega, Father and Son; but two very different currents in Christian thought appeared that could be called the movement of procession and the movement of conversion; in the first, participation is established by way of a descending continuity, both through time and through the hierarchy of beings by undergoing an ontological degradation that can only be reduced; the community consequently contributes to each new individual that which ties him to the past and connects him back to a long and solid tradition by making him participate in it. The individual is one who is always new with respect to the time of revelation; the individual is new, and therefore he does not participate in a processive participation by himself. Whence the importance related to the initiatory rituals in the community; the spiritual birth of baptism is the establishment of participation through procession; the individual is therefore no longer something new; he is clothed in a new name, connected by a name to the processive community. He is purified of his novelty, which was isolation and foreign nature. Every man can baptize, for every man who participates can propagate this processive participation. In the other aspect of the Christian tradition, the movement of conversion is primordial; consequently, participation can be established starting with the individual, without the aid of the community, by way of a simultaneously interior and exterior discovery. The community still exists, but it no longer has the same meaning; it is not a closed circle entrusted with processive communication, but the active and creative kernel that is the overseer of the other individuals in the discovery that conversion is; the circle can be both the image of inclusion as well as the image of exclusion, of the whole as well as the part; a community can be constitutive as well as constituted; the Christian can be the Platonic prisoner returned from the cave as well as the adept of the initiatory faith of a community among other closed communities. This double movement created an essential ambiguity in Christian thought, and this ambiguity is reflected in the treatment that the problem of individuality receives. The individual is the being who is

capable of isolation, and this isolation itself can seem like a curse; whether it be on the symbolic level of the stray flock or on the theoretical level of the dereliction of the sinner, isolation seems like a misfortune; in the tradition of participation through procession, the temporal isolation of the individual is a prefiguration of damnation: the excommunicated is in some sense temporally damned. To excommunicate is to deprive of participation; the temporal Church, mediator of communication, isolates from it or receives into it those whom it wants to damn or save. The chosen one is not merely a just and rewarded judged being but also a being definitively integrated into the spiritual community of the chosen ones. Generation is a degeneration to the extent that it creates the individual. The temporal concerns the individual. These two aspects are prominent in Saint Augustine; the preoccupation that animates him against Donatism and Pelagianism connects back to participation through procession; but his spiritual life reveals a search for participation through conversion. Saint Anselm is on the path of this participation through conversion. Gaunilo of Marmoutiers, on the contrary, opposes Saint Anselm in the name of authority and revelation; he defends the point of view of the *insipiens* (“unreasonable”) introduced by Saint Anselm; the *intellectus* for Gaunilo will no longer play this mediating role between faith and the beatific vision that Saint Anselm assigns it; however, faith as well as beatific vision are attitudes of participation that connect the individual back to the community of the temporal Church or the triumphant Church. Conversely, the *intellectus* is the mark and activity proper of the individual, who applies his forces to knowledge and who, passing from the *per aliud* to the *per se*, from the multiple to the one, ascends from the conditioned back to the conditioning; consequently, as we learn in the *Monologium*, the *intellectus* is that which forms the unity of the individual in his search: the *intellectus* in fact starts with the multiplicity of truths, which are not just truths of pronouncements but also of opinions and of the will, of actions (right intention and right actions); the true does not belong to judgment alone: it can also be said of the will, of the senses, and of essence; reflexive thought, which discovers truths, participates in reason, the eminent and unique reality of which truths are like various aspects; in this sense, reflexive activity guided across every ground of human existence is indeed a movement of conversion. In such a doctrine, the individual who thinks is no longer a being disinherited from the search for the mediator as creator of a community, but a limited force who, guided well, is capable of discovering the divine; the *intellectus*, which is reflexivity, is not the opposite of faith; *fides quaerens intellectum* (“faith seeking understanding”) applies for all dogmas, including that of incarnation,

which is consequently no longer belief in an exceptional event founded on revelation, as Saint Anselm wants to establish in his *Cur Deus Homo* (“Why God is man”). In this theory of conversion, everything happens as if the individual had the possibility to introduce the unpredictable initiatives of a free being, whereas the universe would be an eternal and invariable order, all in one piece. Conversely, in participation through procession, the divine drama unfolds within a discontinuous universe in which creation, sin, and redemption are introduced by the unpredictable initiatives of this free being who is God; participation through procession introduces the continuity of the supernatural into a discontinuous nature; continuity alone comes from God. On the contrary, mediation through conversion supposes that the universe is stable and continuous; consequently, the activity of the individual is efficacious; the individual can start with himself, for he is not foreign to the whole of being; he is particular but not isolated; he is already something real, and he can start with the realities that are within him, with the truths that contain his right opinions, his right actions, his true judgments, and his senses. Reflection is endowed with fecundity, for it is what allows passage from the multiple to the one, from the *per aliud* to the *per se*. Thus, two opposed ethical and epistemological attitudes concerning the individual appear in the Christian tradition, and it does not seem at present that they have been able to be deeply reconciled: on the side of participation through procession, we find certain doctrines like that of Bossuet and Joseph de Maistre; on the side of participation through conversion, we find thoughts like those of Malebranche, Laberthonnière, and Maurice Blondel.

#### ROSCELLINUS

This double attitude toward individual reality appears in the debate over universals; for Roscellinus, who speaks against Saint Anselm, the universe seems to be fragmented into individuals: the distinction between individual substances alone is real, while other distinctions are merely an “exhalation of the voice.” Under these conditions, the dialectic has nothing to do with things, only with words insofar as they signify things. Individuality is the principle of real distinction, and it is the only principle of real distinction. Here, nominalism is a consequence of the way individual realities are represented. According to the dialecticians who inspire Roscellinus, individuals are like absolutes; across this tradition of dialecticians, passing through Boethius (*Isagoge*) and Simplicius of Cilicia, what is sought and rediscovered is the logic of Aristotle: all the distinctions brought to bear by the dialectic

between genus and species, substance and quality, are merely verbal distinctions based on human discourse. For the nominalists, the individual is not only an absolute in its rapport to other realities but also in its rapport to itself: the division of the body into corporeal parts seems to Roscellinus completely arbitrary and conventional; every body (e.g. a house) is indivisible: to say that it is in reality composed of foundations, walls, and a roof is to consider one of its parts, the roof for example, both as a part of a whole and as a distinct thing in an enumeration of three things. This amounts to saying that if a thing is sufficiently individualized to be a distinct part in a whole, then it possesses complete individuality. Consequently, the conception of divine individuality becomes difficult in Roscellinus's nominalism: in God there are as many substances as distinct persons; the Father and the Son, the begetter and the begat, are two individually and therefore substantially distinct realities; the three persons are as separate as three angels would be, and, if there is a unity between them, it is only a unity of will and of power. In this radicalism of the conception of the individual, the individual no longer acknowledges division superposed onto its substantial unity; it cannot be one and multiple at the same time. At the basis of this attitude, we find this principle that relation does not have the value of being. The relation that exists between the three divine persons has no value of being and cannot guarantee the substantial unity of these three persons in a single God. This affirmation was considered heretical by the council of Soissons in 1092, and Roscellinus was forced to retract. In conformity with this principle, Roscellinus did not want to distinguish the attributes of God (goodness, power . . .) from his substance, no more than he wanted to distinguish the divine person incarnated in Jesus from his humanity. According to the thought that seeks participation in conversion, the individual is not a radical unity; not only is the individual not isolated from other realities, to the point that every distinction is the sign of a distinct substantial individuality, it also possesses real parts within it that exist according to a structure and are distinct from one another. In the Platonic vision, the individual was able to be considered as a microcosm; relation still had the value of being in that case, and the relation between the microcosm and macrocosm is partly founded on the fact that the individual possesses an internal structure analogous to that of the whole in which it participates; analogy founds participation by establishing a continuity of rapport between the being that participates and the being in which it participates; man as God's image participates in God through this very image. Here, the individual is not an isolated being but is completely defined as a limited reality. In some sense, it may be said

that the individual participates because it is a whole, i.e. because it possesses a structure.

#### CHRISTIAN THOUGHT IN THE TWELFTH CENTURY

However, Christian thought in the twelfth century reveals a need for unity in doctrine; this is the time of the Encyclopedias named *Specula*, *Questions*, or *Sentences*, like those of Ivo of Chartres, Radulfus Ardens, Anslem of Laon, William of Champeaux, Robert Pullen, Robert of Melun, Peter Lombard, and ultimately Abelard's *Sic et Non*, whose method is also found in Pierre Lombard's *Pro et Contra*. Nevertheless, despite the unity of method that appears in the scholastics, the divergence between attitudes relative to the nature of individuality remains: faithful to a Platonic inspiration, the School of Chartres and John Scotus Eriugena situate, between the particular being and the world, the continuity expressed in the eternal necessity of the movement of descent from and return toward God. Conversely, Lombard and Thomas Aquinas assert discontinuity and introduce a completely free and contingent initiative into each act of the drama.

#### THE SCHOOL OF CHARTRES

The thought of the School of Chartres is also found in ancient culture. Constantine the African translates certain medical books of the Jews and Arabs, the *Aphorisms* of Hippocrates with Galen's commentary, and two works of Galen himself; the corpuscular physics of Democritus is known because of these books. Adelard of Bath journeys to Greece and various Arab nations; he translates mathematical works, in particular Euclid's *Elements* and the arithmetic of al-Kwharizmi; he is also familiar with the *Timaeus*. For Adelard, alongside universals, to which a reality proper cannot be granted, there are archetypes; these archetypes are neither genera nor species, which can only be conceived in their rapport to individuals; archetypes exist and are conceived outside sensible things in the divine mind; the goal of dialectics is to contemplate these archetypes. In the treatise *De Eodem et Diverso* ("On the same and the different"), which is written to justify philosophy, the understanding is presented as knowing things and their causes; it is only due to the aftermath of forgetting and because the soul is in the prison of the body that this knowledge is partly lost: at that point, the soul calls upon opinion. The Aristotelian inductive method is only valid in accordance with this degradation. In fact, the individual soul, as Plato asserts in his theory of reminiscence,

is pregnant with the knowledge of the archetypes. The knowledge we have of the archetypes is not a "*flatus vocis*" ("an exhalation of the voice") but a real knowledge; there is a relation of analogy between the archetypes and the notion of these archetypes within us; the soul is sister of the ideas. The individual is therefore not isolated from the reality that he knows; knowledge is a participation through conversion founded on the reality of the analogical relation; there is no discontinuity between the knowing subject and the object known. This relation that is knowledge is founded on being; it has the value of being. If knowledge plays a vast role in this theory in conformity with Platonic thought, this is because it is that through which the individual participates in divine reality, insofar as the Good of Plato becomes the God of the Platonic Christians.

Under these conditions, the individual cannot be a closed and limited reality. Science [*savoir*] is not only capable of fixing the knowledge [*connaissance*] defined by the past, it can also extend it. This is what Bernard of Chartres expresses by providing a remarkable image of continuity in the development of human knowledges: "We are like dwarves on the shoulder of giants." For Bernard of Chartres, universals are identical to Platonic ideas. The notions of Microcosm and Macrocosm are presented in the work of Bernard Sylvestris entitled *De Mundi Universitate sive Megacosmus et Microcosmus*, which conforms with the theory of the *Timaeus*. Lastly, in Bernard Sylvestris's cosmogony, which to a certain extent is the first mystery, the continuity of the universe appears very clearly. The trinity becomes hierarchical and forms the echelons of an order that goes uninterrupted all the way up to the universe as a whole: the Father is identical to the Good (*Tagathon*), the Son is *Nous*, the Spirit is the world soul or *Endelechia* ("continuity") that emanates from *Nous*; lastly, the world soul informs yet another hypostasis inferior to it, *Natura*. We find species, genus, and individuals enclosed in *Nous* (intelligible world): "the whole series of destinies, the arrangement of the centuries, the tears of the poor, and the fortunes of kings". In this vision, "everything that will engender matter, the elements . . ." is found to participate in the reality of the Father in advance without any arbitrary intervention in the order of time. It is thereby understood that the human being can be engendered not by a creative act of the Father but by the simultaneous operation of *Nous* and *Natura*. *Natura* forms the body of man with the four elements. This same inspiration is also found in Alain de Lille, who renews the doctrine of microcosmic man formed by the same parts as nature. Nature herself is like a human being, like a young maiden wearing an ornate crown of stones (which symbolizes the planets) and a robe embroidered with the

complete variety of beings. This doctrine of the real analogy between the individual and the universe was already found in Nemesius's treatise *On the Nature of Man*, which was translated by Alfano I in 1058. But Alain de Lille adds specifications to this vision, and these specifications are reminiscent of the *Timaeus*: reason in man is like the movement of the sphere of the fixed stars, and sensibility with its varieties is like the movement of the oblique spheres of the planets; the soul is even like a divine city, wherein reason in the head corresponds to God and to the heavens, ardor in the heart corresponds to the angels and the air, and the lower regions of the waist correspond to man and the earth. Such is the universal analogy between the microcosm and the macrocosm, between universal life and individual life, which *The Plaint of Nature* reveals as the foundation of the secret affinities due to which there is participation of the individual in the whole. The difference between God and Nature is merely that of unity and multiplicity, which is itself just a developed unity. Nature says: "the operation of God is simple, and mine is multiple" (*Adversus Haereses*). This conception is inspired by Plato through Proclus's *Platonic Theology*. Thus, reflection becomes a power of the individual being. Whereas previously the *trivium* and *quadrivium* were merely subservient to faith, the *quadrivium* is considered by William of Conches as the first part of philosophy, the second part of which is theology. The *trivium*, or eloquence, is more opposed to the scientific and philosophical study of nature than this very study is opposed to theology. Consequently, the formation of individual beings can be explained by an autonomous physics; living individuals are beings composed of particles by the operation of "*natura operans*." A vast naturalism establishes continuity between individual beings and the whole. The inspiration of Plato is combined with that of Lucretius and the Stoics to form the notion of a "*vigorem naturalem*" inserted by God into things and through which certain beings live, others live and feel, and still others live, feel, and reason. Such are the "forces of nature," which are a mediation between God and created individuals, thereby establishing continuity between the individual and God, in whom it participates. Procession itself is conceived here in a form that legitimizes conversion beforehand: such is the role of this notion of nature elaborated in the twelfth century with so much firmness, thereby establishing a reversibility between the two forms of participation, which were in opposition until then.

The mysticism of the Victorins does not disavow this tendency; for Bernard of Clairvaux, the human individual is not isolated from Christ; the Christian has the capacity to be saved by following Christ; a continuous path goes from consideration or research (which is meditation on oneself, on the world, and

on God) to contemplation, which is a certain and indubitable conception of truth, and this path ultimately leads to ecstasy, wherein the soul is deified in the end. The tradition of universalism in knowledges is conserved by the Victorins. The knowledge of God is effectuated according to five increasingly perfect modes, in which the first two modes veritably manifest this continuity between the individual and the reality in which it participates; the contemplation of nature leads to the idea of the creator; the contemplation of the nature of the soul, which is everywhere in the body just as God is everywhere in the universe, gives us an image of divine essence. Such is the doctrine of Hugh of Saint Victor's *On Contemplation and Its Forms*. Like Saint Anselm, Richard of Saint Victor wants to rediscover the necessary reasons for divine dogmas, and he titles his work *The Grace of Contemplation*.

#### ABELARD

This force of individual thought is expressed to the highest extent in Peter Abelard's genius; he has been criticized for wanting to establish a dogma wherein all mystery is suppressed (which negates the need for tradition) and from which a morality would ensue that would rely on man's confidence in himself and nullify the need for grace with the sacraments. According to Bernard of Clairvaux, Abelard exhibited immense pride, which led to making human genius ("*humanum ingenium*") usurp everything for itself, thereby leaving nothing to faith. And *de facto*, Abelard indeed offers the appearance of what could be called an extreme individualism with the *Historia Calamitatum* at the end of his life. The knowledge of God surpasses the dialectic and the whole content of the *trivium*: "in Himself, God violates the rules of the philosophers." Nevertheless, there remains the path of similitudes practiced by Plato and Saint Augustine. Philosophical notions provide an image of divine reality. Correlatively, the morality that *Scito te ipsum* ("know thyself") proposes is individualistic: monastic life, the sacraments, and the merits of faith are useless; marriage between monks and nuns is not forbidden. No trace of respect for the community's authority remains; sin is purely personal, and there is no possibility for any reversibility of mistakes. No man can know the intentions of another; since the mistake is in the intention alone, one cannot judge others. The very merits of Christ are not reversible for us; salvation is purely personal. Penances cannot be remitted by priests, no more than sins can be forgiven by bishops. Abelard therefore goes to the point of refusing all participation (even through conversion) in order to safeguard the individual's force and freedom.

## THE ALBIGENSES

The end of the twelfth century is marked by a number of aspirations to evangelical purity, either in the sense of a historical continuity effectuating the advent of pure spirituality, as with Joachim of Fiore, who proclaims the coming at hand of a kingdom of the spirit, or by a direct aspiration to purity, as with the Albigenses, who want to deliver themselves from sins in order to become Cathars ("pure ones"). What is quite remarkable in this aspiration in conformity with the Gnostics' doctrine is that, in order to rediscover his veritable nature, which is that of the soul before it is enclosed in the body, the human individual must carry out within himself a division between what is of celestial origin, and therefore angelic in nature, and what is of terrestrial origin, i.e. the body, the vital principle, and the desires or tendencies that arise from the latter. The human being is vaster than the veritable individual; the veritable individual is rediscovered and isolated from what is not itself by way of a separation, a reduction. Purity is an isolation of the individual, but the individual is simpler than the human being, who is already a composite. Isolated from the community of the Church and from everything that is the temporal world, abstaining from all participation in the Church taken as the dispensator of the sacraments, the human being is not yet a veritable individual; he remains impure because he is double; he must yet purify himself, and, for the Cathars, to purify oneself is to simplify oneself. The conception of individuality at the basis of the doctrine of the Albigenses is an affirmation of substantial simplicity as constitutive of individual nature. The individual's participation in the divine therefore occurs by way of substantial identity: pure spirituality in man rejoins spirituality in God without passing through any mediation: the thought of the Albigenses is a doctrine of pure conversion. But we should note in particular that this doctrine can only be applicable if veritable individuality is considered to be more limited than the apparent content of human individuality. Pure conversion in some sense requires a preliminary simplification of the being; the individual in the Albigenses's sense is a simpler being than man. Everything happens as if in this conflict between the orthodox doctrines and the doctrine of the Albigenses two paths appear for discovering the individual's participation in the divine that are mutually exclusive while at the same time somewhat equivalent. The Albigenses want to avoid subordinating the individual to the mediation of the community with its sacraments and its authority. But then, in individual isolation, there appears another subjection internal to the individual and another mediation consisting in the necessity to pass through the

operation of the body in order to act and to feel. It's as if this internal mediation were merely another aspect of the mediation that appears externally as a communitarian mediation. The rejection of external mediation reinforces internal mediation. The individual being is not just in himself; the necessity of participation forces him to modify his initial limits, either toward the outside or toward the inside, and these are therefore perhaps two equivalent or merely complementary operations. It could be that each form of participation, the processive form and the form of conversion, are addressed to different realities within the individual being, and that the option in favor of this or that form of participation can only be elaborated after a simplification of the individual being. To conserve the whole being, it would be necessary to discover a mode of compatibility between the two types of participation.

We find a type of participation that inverts the Albigenses's type in Amalric of Bena, at least in a certain sense; indeed, he attempts to discover the source of participation in a pantheistic unity; for him, each man is a member of Christ; the only reality that exists, eternally identical to itself, is God; salvation consists only in the science or knowledge that God is all things. This profound monism leads to the same practical attitude as that of the Cathars: the Spirit must replace the Church. Derived from the Stoics and John Scotus Eriugena, this line of thought elaborates a direct conversion without splitting the human being. But here, conversion is founded on a procession that exists before the human being, and it is because of the simultaneity of procession and conversion that splitting is no longer necessary in this ethics. The same search for unity between procession and conversion is encountered in David of Dinant's work *De Tomis, seu Divisionibus*. This writing was condemned in 1210 at the synod of Paris along with Eriugena's *De divisione naturae*; according to *De Tomis, seu Divisionibus*, the individuality of each being is founded on the existence of an indivisible principle: matter for bodies, Intelligence or spirit for souls, God for separate substances; but this triad merely designates a single substance, for if distinct terms are discerned therein, one must acknowledge above them a simple and indivisible principle that contains in it what they share in common. This reasoning conforms with the thought contained in Avicbron's *Fons Vitae*. Beyond Avicbron, the inspiration of the *Timaeus* is present in David of Dinant.

#### THE THIRTEENTH CENTURY

The thirteenth century introduces into reflexive thought an element of extreme importance for the conception of the individual being: William of Auvergne,

who is inspired both by Aristotle and the postulates of theological thought, defines God as the being whose essence is to be. Conversely, the creature is formed by the union of two things, its essence (*quod est*) and that through which it is (*quo est*), which is necessarily distinct from its essence, because this essence cannot exist by itself. The model of individual unity is therefore God. In man, the understanding is not just the faculty of abstracting; abstraction can only come from our imperfection and the weakness of our spiritual sight. In the individual being that is man, the type of intellectual knowledge is the knowledge of oneself, i.e. of one's opinions, of one's doubts, and therefore of a particular being. A single intellect ("material intellect") exists in the human soul. Just as the adult being develops from sperm, the intelligible forms with which this intellect is pregnant develop from this intellect under the influence of sensations and images. The individual is therefore not the complex of matter and form, as in Aristotle; individuality is defined by a productivity of the being, a sort of power of engendering oneself that does not require the tendency of matter toward form to pass from potency to act; the vocabulary is Aristotelian, but this conception of the individual evokes a Platonic thought. Even in this imperfect individual that man is, procession and conversion are posited as compatible.

#### SAINT BONAVENTURE

Saint Bonaventure does not establish continuity between God and man according to procession, for the act of creation does not follow from any necessity; there is no continuity between God and creatures, because God is not compelled to create the best of possible worlds; every being (changing, active and passive, individual and capable of entering into a species or a genus) contains matter: it therefore contains being in potency or a possibility of being other; souls and angels are veritable individuals. Here, Saint Bonaventure is opposed to Saint Thomas Aquinas, for whom souls are not veritable individuals. For Aristotle, the form of a being is what makes it such that it is effectively what it is; it is due to the presence in it of the humanity form that a man is man; each substance, insofar as it is singular, must therefore have a unique substantial form; this form determines and completely fixes the nature of the substance. However, according to Bonaventure, the individual being, insofar as it is a creature, cannot be perfect and achieved; if the form completed it in such a way that nothing substantial could be added to it, the individual being could not be a creature. If the form gives a perfection to substance, this is to prepare substance to receive another perfection that the

form could not itself give to substance. Consequently, according to Saint Bonaventure, it could be said that the individual is not a limited being but instead a being in progress, in expansion. Is this non-limitation lower than limitation? This is perhaps one of the most important questions of the problem of individuality; for Aristotle, the individual limited by its unique form is more perfect than a being that would not be limited and could therefore receive several forms. For Saint Bonaventure, it is not certain that this condition of the individual as non-limited by the unicity of a form should be considered a mark of inferiority relative to a being that would be perfect in the Aristotelian sense of the terms. Thus, the eduction of forms by a being in act into a being in potency is no longer necessary; the individual, which is a being in potency, already contains within it the seminal reasons that the influence of the being in act merely reveals and develops; the form that will arise in the being in potency is already present there in a certain way; the being in act cannot have the efficacy that Aristotle gives it in the eduction of forms. The physical world is not autonomous and does not possess its own principle of explication within it; one must rediscover in the creature the traces of divine emanation in the form of an analogy, like the equality between two rapports. Consequently, there can be continuity from man to God in participation according to conversion; as Saint Augustine noted, there is an analogy between the Trinity and the soul considered in the rapport of its three faculties. This image of God in the human soul becomes directly aware of its own resemblance to God. Because of supernatural grace, this analogical image will transform in the chosen ones into a veritable similitude, which is the deification of the soul. It may therefore be said that the individual with the plurality of his forms is, if not a microcosm, then at least a *microtheos*. He is already something of God, and there is no discontinuity in the passage from the shadows or vestiges of the human attributes that the observer finds in natural things to the image of God that exists in the structure of the human soul; there is also no discontinuity in the passage from the analogical image of the soul to veritable similitude with respect to God. There is no intermediary between the human individual and God; the active intellect is a faculty of the soul; unlike in Thomas Aquinas, it is not the last of celestial intelligences; the possible intellect is not pure passivity; it is aided by the active intellect, but it makes into itself the operation of abstraction and leaves to the active intellect the types that it contemplates. The human individual possesses a "natural light" that allows it to know principles without the aid of abstracting from the sensible; moral virtues are provided by the inclination we feel in ourselves toward the good and by the immediate

knowledge that this inclination is right; ultimately, God is known through simple reflection on the human individual because he is made in the image of God: this knowledge is direct. Through reflection, the individual can attain being, i.e. see God or, more exactly, apply the idea of being to realities that do not exactly include it, because within us there is the presence and influence of eternal reasons and of divine reality, which we do not possess; God, while not being the object of knowledge, is present in the operation through which we know the humblest realities. In knowledge, the human individual is already beyond his apparent limits. The knowledge of any object whatsoever is participation in God; the knowledge the individual has of an object is not limited to this individual or this object: knowledge is not defined in itself but by virtue of the effaced image of the full and certain knowledge that God has of his own reason. The supernatural destiny of the soul, which is a veritable individual, gives the individual a power of surpassing every finite limit. The individual is not limited by a form; the individual is only fully what he is through conversion, which turns him toward its own principle, the emanations of which he receives.

#### ALBERTUS MAGNUS

Against this doctrine of the individual stands that of Albertus Magnus and Thomas Aquinas. For Albertus Magnus, the soul is merely a form and not an individual; the form is by itself a universal; the principle of individuation is in the accidents arising from the matter added to the form, and the nature of individual man composed of a soul and a body has barely anything in common with the nature of the angel: insofar as they are pure forms, the angels must therefore differ amongst themselves like species, not like individuals; none of the faculties of the same name is the same in the angel and in the human soul, which, linked to the body, only attains the rational through an operation of abstracting from sensible images, whereas the angel has an intuitive knowledge that is exempt from trial and error; the active intellect, which is intuitive in the angel, is in man a simple indistinct clarity that borrows from sensible images all the distinctions of genera and species. The human individual cannot therefore be brought closer to God directly through intellectual knowledge. The active intellect is devoid of forms; it is a part of the human soul; its role is abstraction. There is discontinuity between revelation and actual knowledge, as the *Summa de homine* explains: if a separate or angelic intelligence influences us, the result of this influence is a revelation.

## THOMAS AQUINAS

Aquinas asserts that for all individual beings other than God, essence is merely possible and can be thought without its being; in this way, no other being than God exists by itself; no individual is necessary; its being comes from something else, it proceeds, and this procession is anterior and superior to any conversion. The knowledge that the individual has of an object is not an assimilation but a direct presence of the being. Knowledge cannot give the individual this unlimited power of assimilation that Saint Bonaventure bestowed upon him. According to Aquinas, "the human intellect is not able to reach a comprehension of the divine substance through its natural power. For, according to its manner of knowing in the present life, the intellect depends on the senses for the origin of knowledge; and so those things that do not fall under the senses cannot be grasped by the human intellect except insofar as the knowledge of them is gathered from sensible things. Now, sensible things cannot lead the human intellect to the point of seeing in them the nature of the divine substance; for sensible things are effects that fall short of the power of their cause."<sup>88</sup> Under these conditions, knowledge can start with quiddity to go from essence to its properties, or from the cause to the effect. Human thought can only go from the effect to the cause and can merely determine the cause in its rapport to the effect: the demonstration *quid* ("what") is inaccessible to man; only the demonstration *quis* ("who") can be used. No more so than Aristotle, Aquinas does not discover a rational procedure for attaining the quiddity of beings; Aquinas considers this lacuna of the Peripatetic school as a definitive lacuna of human reason: "even in sensible things, the essential differences are unknown to us; and this is why they are designated by accidental differences which arise from essential difference, in the same way that the cause is signified by its effect; for example, *biped* is posited as the difference of *man*." Knowledge does not start with the individual taken in itself in its interiority and its productive capacity, which would be deployed in effects. The hylomorphic conception of spiritual substances is not valid for Aquinas; the hylomorphic composition can only pertain to the body. The form divides when it is received in a matter; it individualizes by linking up with the accidents; it excludes the presence of the contrary form; it is introduced into the matter as the result of a movement. Intelligences are not individuals but instead pure forms without matter; the intelligible is not received in the intelligence like a form in a matter; as an object of the intellect, the form is simple and indivisible, universal and free of accidents, better known due to the presence of its contrary, all the better

understood to the extent that the intelligence is less mobile. Individuality only belongs to a form engaged in matter. The problem of the individuality of man is resolved according to the general rule that applies to the individuation of beings composed of form and matter. What separates individuals from one another is the matter with which the form is joined; in short, the form is specific, and, for all individuals of the same species, a specifically identical form is in each one; what constitutes the individual is the *materia signata* ("intact matter") joined with the form, i.e. that which is considered under determined dimensions; it gives the form a position that excludes every other form in space and time; moreover, due to its debility, it can only receive the form in a deficient and imperfect way; individuation therefore corresponds to a diminishment, a deterioration, a degradation. Matter, which in Aristotle was a being endowed with tendencies and was animated by a dynamism, above all appears in Aquinas as a negative limit; individuation is deprivation. Whence results the fact that, in the union of the soul and the body that is man, the soul cannot be grasped; it cannot know itself. Such a manner of considering the individual could support the precariousness of this composite of soul and body. But Aquinas, while diminishing individual reality, conserves immortality for it. The soul must have a permanent individuality, even though the individuality of man, which is composed of soul and body, has its principle in *materia signata*. Aquinas is faithful to the principle of the Aristotelian universe, which consists in individuals, each of which in themselves have the principle of its operations: there is unity of form in each individual. However, this doctrine, which seems to reserve first place for the individual because the former makes of the latter the unique reality, in fact leads to diminishing it by limiting it; conversely, the Platonic vision of the universe, which grasps a series of hierarchized forms and seems to diminish the individual because unity is never in the individual but only in the whole, in fact frees it by giving it the infinite dynamism of these forms in which each is longing for what will complete it. Individual unity seems to be linked to a static conception of the individual. There is a profound opposition here, and there is more than a paradox in the chiasmic characteristic of the starting points and endpoints of these two visions. Reflexive thought cannot discover a compatibility between these two antagonistic representations. Therein lies the metaphysical problem of individuality.

Aquinas sought to discover in the intelligence the principle of the permanence of the human soul's individuality. Aristotle tried to establish that the intellectual soul is not linked to the body part by part. Pursuing this search, Aquinas shows that, alongside the operations which require the body's organs,

an intelligence exists that knows its objects without the intermediary or assistance of matter: "The intellective soul . . . must not be wholly encompassed or imbedded in matter, as material forms are."<sup>89</sup> To safeguard both the personal immortality of the soul and its function of substantial form, the soul's individuality must be conceived as distinct from the individuality of man wherein the soul would be nothing but the form of the body. "The human soul is a form not depending in its being on matter. It therefore follows that souls are multiplied in accordance with the multiplication of bodies, yet the latter will not be the cause of the multiplication of souls. And for this reason it does not follow that, with the destruction of bodies, the plurality of souls ceases, as the first argument concluded."<sup>90</sup> But can the intelligence be considered as individual? This point of view would not create any fundamental difficulty in a thought that conforms to Platonism due to the principle of the plurality of forms; the intelligence would be a form superior to the forms that are the other functions of the soul; this superior form would do nothing but add onto the inferior form: "Inferior forms are embraced in the superior forms, to the point at which all are brought back to the first universal form, which unites all forms in it."<sup>91</sup> But for a static conception of individuality, the plurality of forms in a being is incompatible with its unity; a plurality of forms cannot create a true substance. Aquinas at this point discovers a solution in the idea according to which the intelligence is the sole and unique form of the organized body; whether sensitive or vegetative, all the faculties—whose operations are executed by the organs of the body—stem from the intelligence. Consequently, the soul's individuality comes from its relation to the body, and its independence comes from the immaterial nature of its operations of knowledge. We should however note that this independence of the intellective soul is taken from Platonic thought, according to which the soul is sister of the ideas. Aristotle accepted the distinction of the intellective soul, which is not bound to the body part by part, but this is not a requirement of his system and his conception of the individual. At the basis of this notion of distinguishing the intellective soul, there is a Platonic conception of being, according to which knowledge assimilates the knowing subject to the object known. This knowledge is a participation through conversion; it is neither inductive nor abstractive. Conversely, for Aristotle the operation does not have the sense of analogical assimilation that it has in Plato: thus, the intelligence in act is identical to its object, and its object is a universal form. Aristotle's whole theory of knowledge would therefore have to be abandoned, along with his representation of the intellectual operation. Here, Aquinas stops and invokes a supernatural cause for the multiplication of

intellects. This is what Bréhier calls a “theological coup de force.” This coup de force consists in subordinating to a fundamental procession the intellectual operations that give a capacity of conversion to the human individual. Insofar as it is multiplied by God, the intellect is an intellect whose individuality proceeds from the divine act; but insofar as it is distinguished from this matter it informs, the intellect is the principle of operations, for it is through these operations thinking incorporeal notions that it is distinguished from the body and the functions linked to the body (sensation, movement, nutrition). The intellect, which is distinguished from the body, appears as identical in all men and is found to be deprived of individuality by the very characteristics that establish its participation through conversion. Thus, for reflexive thought, there is no way to make these two representations of the intellect compatible; this is why the theological coup de force is needed to introduce by way of procession a multiplicity that would not exist by way of conversion; however, the conception Aquinas presents of individuality requires the multiplicity of individual intellects. In fact, this appeal to faith leaves the problem open. It is essentially by way of this crack in Aquinas’s thought that Cartesian reflection will be introduced, which in a certain sense extends and, in another sense, radically transforms the Thomistic conception of individuality. Descartes will reprise the idea of this intelligence that knows its objects without the intermediary or assistance of matter in order to systematically push this idea to its extreme theoretical consequences by abandoning the notion of the soul as form of the body. But then the question of the relation between the soul and the body will stand as an insurmountable difficulty. In this sense, it could be considered that the development of the reflexive problem of the nature of the individual is contained in the difficulty highlighted in *On the Unity of the Intellect against the Averroists*: “They argue most crudely to show that God cannot bring it about that there should be many intellects, believing this to involve a contradiction. For even granting that it is not of the nature of intellect that it be multiplied, it does not follow from this that the multiplying of intellect involves a contradiction. Nothing prevents a thing’s getting from another something that it is not of its nature to have: it is not of the nature of the heavy to be above, yet for the heavy to be above does not involve a contradiction although for the heavy to be above by its very nature would involve a contradiction. Thus, if the intellect were naturally one for all because it had no natural cause of multiplication, multiplication could nonetheless come about through a supernatural cause without involving any contradiction. We say this not because of the present question but lest this manner of arguing be extended to other cases, for in this way one could

conclude that God cannot bring it about that the dead should rise and the blind have their sight restored to them.”<sup>92</sup> However, this “manner of arguing” is precisely what the Cartesian constructive method will want to extend to all subjects and to that of man’s knowledge in particular.

The first difficulties that can prompt a reflexive critique appear when Siger of Brabant, Master of Arts, shows that Aristotle’s theses concerning the identity of the intellect in all men contradict revealed doctrine; in this sense, the Averroist interpretation of Aristotle is opposed to the Thomistic solution of the problem of individuality. Siger’s *De Anima intellectiva* asserts that according to Aristotle the vegetative and sensitive faculties do not belong to the same subject as the intellectual faculty; the intelligence is certainly united with the body in its operation because it can grasp nothing except in the image, which implies the corporeal organ of the imagination; but it is the intellectual faculty alone that understands, and when one says that man understands, one does not wish to speak of man as composed of soul and body, but of his intellect alone. In 1270, the bishop of Paris Étienne Tempier condemns the propositions of Averroist teaching concerning the identity of human intellects (among other propositions); once again, in 1277, a new condemnation is issued; Siger is forced to leave the University of Paris and is cited before the inquisitor of France; after appealing to the Holy See, he is condemned to life in prison; defending the same propositions, Boetius of Dacia and Bernier of Nivelles are also condemned; the Averroists have been attributed the doctrine of “double truth.” This movement, which is continued by John of Jandun, is pursued up to the Renaissance and leads to a sort of fideism. The condemnations issued by Étienne Tempier in 1277 moreover targeted not just Latin Averroism but also certain innovations of Thomism, concerning, particularly in propositions 42 and 43, individuation through matter alone and the will’s necessity to pursue what is judged as good by the intellect (proposition 163); however, this latter proposition was made necessary by the concern of maintaining the unity of form that is the soul in the human individual. In 1277, the Dominican Robert Kilwardby at Oxford condemned the thesis of the unity of form; this path of his was followed by the Franciscan John Peckham in 1285. This thought was inspired by Augustinism, for which the already informed being aspires to new forms, and in which matter is full of determinations that form generates beforehand. The individual is not complete by himself, but he possesses reason, which is an illumination and allows him to participate in God through conversion. On the contrary, in the peripatetic universe, the individual is complete by himself, matter awaits form passively, and intellectual knowledge cannot be a means of participation

because it is abstractive. Lecturing on theology in Paris and representing this anti-Thomistic Augustinism, Henry of Ghent in 1277 asserts that matter exists by itself and remains in act, even though this act is imperfect and leaves it able to receive the form that completes and fulfills it; essence is not really distinct from being; essence by itself has its own being, and just as many various beings correspond to the essences; each essence therefore has in itself something of the power of God. Consequently, individuation does not occur by way of matter but negation; the individual is the being who, as the inferior term of division, becomes incapable of dividing in turn, and who is equally incapable of identifying with other individuals and to communicate with them. There is continuity in being and knowledge; for the individual being, the goal of spiritual life is not the knowledge of God, as in Saint Thomas, but union with God and love; the intelligence is not that which in the individual imposes—in the single form that it would be—the goal pursued by the will; the will, which is the faculty of desiring or loving, has its own goal that is valid by itself and is superior to the goal of the intelligence; it indicates the sense of this movement of the individual's conversion. The intellectual soul is individual by itself, even without a relation to the body. We find this conclusion clearly formulated in the *Summa philosophiae* of Robert Grosseteste and his school at Oxford University. This *summa* asserts that “in comprehending itself, the soul does not receive its own kind but instead intuits itself.” Knowledge exists according to a continuous relation between subject and object; the thing's essence unites with the intellect without any intermediary; there are no intelligible types required as an intermediary for intellectual knowledge. Such a conception of the individual and of relation requires a physics and a metaphysics of the continuous: the theory of light provides the former and the latter at the Oxford school; light plays the role in the physical universe that emanation plays in the metaphysical universe.

#### JOHN DUNS SCOTUS

This doctrine persists with Roger Bacon by transforming to produce a new conception of the individual beginning with Duns Scotus. Many traces of Augustinism remain in Duns Scotus, but this Augustinism above all appears in the critique Duns Scotus marshals against Aquinas's thought; it is not the Augustinian vision that is conserved in the theory of individuation, and this latter theory is a new mode of thought, thereby revealing to a certain extent that a new age for this problem begins. The sign of this new period

is highlighted by the fact that the great question to be resolved to define the individual is no longer knowing how he participates, but if he is free and how this freedom is defined; during the first period, the paradoxical aspect of the notion of the individual is expressed by the fact that the individual appeared as simultaneously participating according to two incompatible modes; in the period that begins with Duns Scotus, the same paradoxical aspect is expressed by the simultaneous position of un-free will and free will.

Continuity in being as well as continuity in knowledge—the principle of all participation—are abandoned by Duns Scotus; the principle of universal analogy, which in Saint Bonaventure and Thomas Aquinas was the prime mover of continuity, is, as Emile Bréhier notes, abandoned by Duns Scotus; with regard to God and creatures, being has a univocal, not equivocal, sense; hence the removal of all foundation for the rapport of analogy, which permits passage from the derived being to the most noble being. There is no longer a link between matter and form. Insofar as it has a distinct idea, matter is something actual by itself. The individual consequently receives an intelligibility analogous to the one the Peripatetic school gives to the species, i.e. a determination through positive and essential characteristics and no longer through accidental and negative characteristics. The individual's unity is what requires a determined entity, that of haecceity; this identity is included by neither the specific form nor the matter to which the latter is linked. Haecceity must be sought outside form, matter, and consequently outside their composite in an ultimate reality; the haecceity of an individual being is its "singular entity," which remains formally distinct from its specific entity; individuality is added to the species without any link of continuity between the former and the latter; the knowledge of singulars cannot be contained in the knowledge of universals, as Aquinas supposed for angelic knowledge. The individual is therefore a positive reality distinct from the species. Similarly, the possible intellect is the total cause of the act of understanding; the intelligible species does not produce the act of understanding but solely determines this act for a given object. First principles are apprehended with evidence as soon as the terms are apprehended. The individual avails himself of the principles of knowledge and action (which exist absolutely) without resorting to any participation. On the ethical side, the primacy of the will over the understanding gives freedom to the individual: "nothing but the will is total cause of volition in the will"; the will "commands the understanding" by guiding it to the consideration of a given object. This principle is valid for the divine being: "there is not any cause for why His will has willed a certain thing, if not that the will is the will."

## THE FOURTEENTH CENTURY

However, this primacy of the will leads to a consequence in opposition to the starting point; this consequence is developed particularly by Thomas Bradwardine: there is no causality other than divine causality; there is no “necessary reason or law in God prior to His will,” and “the divine will is the efficient cause of everything, whatever it may be, the driving cause of all movement.” The consequence of this manner of envisioning is that the freest act that man can undertake is necessitated by God: “man is God’s serf, a spontaneous and unconstrained serf.” This theory of the un-free will is represented in the fourteenth century by John of Mirecourt, who teaches at the University of Paris. Even when it does not end up explicitly denying the fact that human freedom supposes free will, this theological determinism nevertheless leads to making it considered as “the lowest degree of freedom,” according to the expression Descartes will use.

We should note that from this point on, theological determinism constitutes a doctrine that can be opposed for long periods of time to the doctrine that makes freedom consist in individual free will; individual free will indeed makes choice possible, and choice can be made between preexisting and determined terms; conversely, the freedom of an individual submitted to un-free will is the fact of continuing to act in the path in which it is determined to act or stop acting; stopping is not a choice, no more so than action; it therefore seems paradoxical that man is most profoundly creative not in choice (supposing free will) but in action, through which he acts according to God and in the condition of un-free will. There is a possible transition from theological determinism to determinism through character and destiny; it is therefore possible to grasp in Duns Scotus a manner of conceiving the individual that will lead not just to the conception of John Wycliffe and then of Luther, but also to that of Descartes and perhaps to certain aspects of the thought of Rousseau and Maine de Biran.

Nevertheless, for a new conception of the individual to become possible, there would need to be a reform of all metaphysics, particularly in the case of the theory of knowledge. This reform begins with the Dominican Durandus of Saint-Pourçain, who declares sensible and intelligible species to be fictive; the active intellect is also declared to be fictive. The universal only differs from the individual in the way that the undetermined differs from the determined: the universal only arises from a certain manner of considering the sensible image by not taking account of what is individual in it. The problem of individuation consequently becomes a false problem because it

supposes that the species exists before the individual; if this anteriority of existence is no longer supposed, if nothing but what is individual exists, it is no longer necessary to ask what individualizes the species. Nominalism therefore leads to a new position of the problem of individuality. That which is individual is the first object of our knowledge. This new attitude is still found in the Franciscan Petrus Aureolus, author of the *Commentariorum Sententiarum*: “it is nobler to know an individual and designated reality than to know it in an abstract and universal way.” The soul knows the thing not through a *species*, which is an intermediary, but through an *esse intentionale* or *forma specularis*, which are knowledge’s own object produced in the intellect by things, thereby constituting “impressions.” These impressions are the thing itself present in the mind based on what is currently visible of the former for the latter. Knowledge of species and knowledge of genus are only due to the differences of clarity and distinction in the impression; the genus corresponds to the least degree of perfection. The progress of knowledge goes from the universal to the singular, which means from the confused to the clear and distinct: for knowledge, the individual is the principle of perfection. However, it could be supposed that the hierarchy of the degrees of being follows the hierarchy of the degrees of perfection.

#### WILLIAM OF OCKHAM

William of Ockham systematizes this doctrine by first showing that if the universal existed in itself, it would be an individual, which is contradictory; the universal cannot explain the singular, for it can only duplicate singular beings and not explain them; to put the universal into singular things—whereby the mind would extract it through abstraction—is to render it individual; these arguments recall those we already find in the critique that Aristotle wields against the separate idea in Plato; but the reasoning itself also reaches Aristotle’s doctrine; for William of Ockham, universals are in the significations of a word (*intentio animae, conceptus animae, passio animae*; “will of the soul, conception of the soul, affection of the soul”); universals are signs or significations; they are neither in words nor in things; universals replace the very things that they designate in the proposition; universals are therefore defined by their usage in knowledge. The problem of universals is no longer a problem of nature but a problem of function, of usage. The origin of this doctrine is found in Abelard; it supposes that active relation has the value of being; it is in fact quite different from considering universals as a pure “*flatus vocis*” and from considering them as images that will indifferently

represent any of the singular things contained in their extension and that will be able to replace them, just as the sign replaces the thing signified. Universals are not things, but the relations between signs are veritable relations just as much as the relations between things. One can act with universals as the algebraic mathematician acts with his abstract symbols: "*supponere pro ipsis rebus*" ("standing for the things themselves"). One of the most important consequences of this new theory of knowledge is that the primitive knowledge of singular things (which is veritable knowledge) attains through intuition either sensible things or "certain intelligible things that do not fall under any meaning at all, such as intellections, the act of the will, joy, sadness, and these types of things, which man can experience to be in him." Alongside outer experience, which reveals the sensible to us, inner experience reveals the intelligible to us. This is a whole new domain of reality, i.e. the world internal to the individual insofar as he is aware of it by way of inner intuition, which is revealed here with its process of knowledge and its qualification. The dignity of individual reality not only consists in the fact that the individual is subject to the internal and external experiences that found knowledge; this dignity also consists in the fact that the internal reality of the individual becomes an object of knowledge through intuition, whereas the questions of metaphysics are beyond the reach of our reason; in some sense, metaphysics becomes the knowledge of realities internal to the individual.

#### NICHOLAS OF AUTRE COURT

The critique of Aristotle's physics and metaphysics is pursued in the teaching of Nicholas of Autrecourt through the examination of the notions of causality and substance; the link of causality is no longer the close relative of the link of identity, since causality cannot be conceived as the production of the similar by the similar; becoming is an unconnected succession of moments; the same critique is applicable to the notion of substance: there is no subject of the appearances given by the senses that can be known intuitively or discursively. The conclusion is important for the doctrine of man qua individual: "I am certain with evidence only of the objects of my senses and of my acts." The subject is aware of his existence through acts. Cartesian thought is not opposed to this way of contemplating the knowledge of the subject in his isolation, thereby avoiding any question concerning individuation, because the reality of the subject is initially grasped (strictly via the conditions of knowledge) as individualized; no doubt, this point of view poses the critical problem, but it is important to realize that this reflection on the knowledge

of the subject starts with Siger of Brabant, and that there was already with him a simultaneously logical and ontological aspect characteristic of this set of arguments: "Everything that appears to us is merely dream and simulacrum, such that we are not certain of the existence of anything"; this proposition pertains to the *impossibilia* whose demonstration can be provided through logical play; it is not the senses themselves, which merely give us appearances, but another faculty alone that can judge if these appearances are true. This reasoning has a Cartesian aspect; it is completed by Nicholas of Autrecourt, who goes to the point of attacking the notion of the faculties of the soul, asserting that we do not have the right to conclude from the act of will to the existence of will; this thesis leads to considering the individual subject as a first term that does not require any explication and is the source and foundation of all knowledge and every action. Nevertheless, one principle of Aristotle's philosophy remained to be fought against to guarantee the primacy of the individual as cause: "everything that is moved is moved by something else"; according to this principle, movement, not just in its initial moment but in each of its successive moments, is produced by a mover that contains in act that which, in the moved, is in the process of being realized.

#### JEAN BURIDAN

With Buridan, this principle, with all the metaphysical consequences it entails, is replaced by the first formulation of the principle of inertia; movement is not perpetually sustained and maintained by a celestial intelligence: movement is due to an *impetus* that is communicated by the mover to the thing moved. This *impetus* is a certain power (or, in the vocabulary of modern physics, a certain kinetic energy) that makes the mobile capable of continuing to move by itself in the same direction; this *impetus* is all the more important as the speed with which the moveable is moved increases; and movement would go on indefinitely if it were not impeded by the resistance of air and gravity; if these circumstances did not exist, this impediment would not occur, and movement would go on indefinitely; this is the case for the movement of celestial bodies, which consequently leads to the uselessness of the moving intelligences and any special assistance by God. For Buridan, the movements of the heavens can be assimilated to the movement of projectiles, which, with the principle of inertia, establishes the unity of mechanics and replaces the theory of natural places, including its corollaries, i.e. the finiteness of the world and geocentrism. A study like the one Albert of Saxony conducts on falling bodies along with a hypothesis like the one he formulates relative to

the immobility of the heavens and to the Earth's movement—following in the footsteps of the author of the *Timaeus*, John Scotus Eriugena, and Albertus Magnus—shows that a new spirit brings about in the sciences a veritable decentering of the subject of vital appearances and vulgar knowledge; the reflective individual will no longer be the center of the world, privileged in his dignity, but due to this decentering he will get to become the author of an objective knowledge he will construct. The paradoxical aspect of the notion of the individual is also revealed on this point; the individual loses his geocentric and anthropocentric dignity, but he becomes the being who depends only on himself; the twofold situation of man in the world noted by Pascal is already beginning to blossom in this fourteenth-century critique of Aristotelian physics. The study of the individual's participation in a superior reality halts the moment when the human individual becomes aware of his self-creative power, particularly in the sciences; undoubtedly, certain errors persist that reduce the fruitfulness of the principles of the new physics. For example, in Buridan and Albert of Saxony, the principle of inertia is not accompanied by the principle according to which every body with a certain speed yet exempt from the action of any force continues its movement indefinitely in a straight line at the same speed; these two authors thought that if a body began to undergo the beginnings of circular movement, it would continue this circular movement when the forces stopped; yet the mode of new knowledge with its main hypotheses was defined, and its paradigmatic role began to become more widespread.

These new methods are even more clearly evident in Nicole Oresme's *Commentaire aux livres du Ciel et du Monde*: he invents the coordinate systems that will later be named Cartesian, and he provides with precision the law of falling bodies later verified by Galileo.

#### MEISTER ECKHART

With Eckhart, the mystical movement of the fourteenth century seemingly leads to a very different vision of individual reality; nevertheless, the same paradox remains there as well: in a certain sense, finite and individual creatures endowed with a veritable reality cannot exist outside God in the same sense as divine reality: "individuality is a pure accident, a nothingness; suppress this nothingness, all creatures are one." Individual destiny thus can be consummated only in a unification with God, which, for the individual, is a complete and radical decentering. And yet, this decentering is merely the suppression of a nothingness; it does not remove anything from the individual

already considered from the point of view of what it will become; this decentering only seems to remove something from the individual if it is considered as initially given in its entirety, i.e. when it exists as a separate being and is determined as the member of a species. As the member of a species, the individual is separate from other individuals, because individuality qua separation is all that remains to the individual when the species has already been loaded with meaning. But the problem of individuality is anterior to that of individuation, since it consists in asking which part of reality belongs to the species and which part belongs to the individual; it is only when this problem is answered that one can ask how the reality of the species—if the species is the bearer of a significant part of reality—fragments into individuals due to a principle of individuation. But at the level of the first problem, the metaphysical dilemma—individual or species—may be refused; for one can imagine a primordial existence of the individual outside any species; the individual is then no longer merely individuated species but directly and primarily being. In this sense, the particular being that is the individual is not fundamentally distinguished from the unique and universal being that is divinity; the former is only distinguished from the latter in an inessential and ancillary manner; consequently, the individual may discover its veritable reality by stripping away its particularity and that which constituted its division from other particular beings, and this discovery is not an impoverishment but a deepening and the discovery of a definitive and fully real state. The primordial reality of the individual was not to be distinguished and separate, but to be. The individual is something of being, and it wants to become the being. To abandon limitation and particularity is not to abandon reality but to eliminate the primordial illusion. In that case, this individual, which possesses within it something of being from the moment of the first act of reflection, must not seek the mediation of the species or group to discover within it the absolute reality that will annihilate this nothingness that its particularity is. Does this particularity itself possess a reality? This is difficult to answer; it can only be acknowledged that this initial isolation of the individual is, within it, like the negative sign of the fact that its reality is not to belong to a species or a group; the individual's particularity protects it from the illusion of the individuated species: it is easier to go from the particular being that the individual is to the absolute being than from the individual's relative situation in the specific group to the real position facing the absolute. Passage is possible from the particular absolute to the absolute of divine reality, whereas the relativity of communal existence and collective operations, giving themselves as an absolute, forever encloses the particular

being that the individual is within their relativity. The individual is closer to the absolute in the solitude of its particularity than in the relativity of earthly existence. The negative characteristic of the individual's isolation is therefore that due to which there is something absolute about the individual. At the level of individual reality, this isolation is a condition of the absolute; the limited being can be absolute only in isolation; the nothingness of individual isolation is not at all something of the being; but it preserves the being enclosed in this particularity that the individual is from the relativity of a communal existence taken as a final goal. That is how this paradox of individuality can be partially elucidated: a pure nothingness can have value as a condition of access to the absolute; what the individual abandons when he approaches the divine state is this nothingness that envelops individual particularity. This is the explanation for the functional importance of this nothingness and all the negations associated with individual particularity. Individualities are not endowed with a veritable reality insofar as they are separate, but they contain an eminent reality as the starting point for a movement toward being, which is spiritual advancement; the reality of the individual is a reality in the individual according to the stages of a dynamism that begins with the individual; it is starting from the individual that the soul can become separate and be informed in God, become convinced by the nobility and purity of divine nature. This fundamental attitude constitutes an ethics that becomes an integral part of the movement toward God; the more important rules define a state of the individual with respect to the world and itself, not an action vis-à-vis the community; poverty is the state of someone who knows nothing, who wants nothing, and who has nothing; those who are truly poor are those who are completely separated from themselves and from other creatures; the poor are in a state in which individuality and non-individuality confront one another and coincide: they no longer even have the will to accomplish the will of God; they are in a state of complete passivity wherein they leave God to accomplish His work in them, as ready to suffer the torments of hell as to participate in the joys of beatitude. Virtues are not acquisitions of the soul but the very being of the soul; works qua works are nothing; only the will from which they proceed has a value; the true work, the internal work that alone brings one closer to God, is the will unconcerned with any external success, a will that is consequently superior to any circumstance, to space and time, a will that can never be forestalled. Love is not the son of Poros and Penia, but a plenitude identical to God Himself; the soul ensconced in this way back into its own depths, i.e. on the hither side of the states in which it has a limited and determined activity,

finds complete freedom; it does not need repeated and multiple contacts with the exterior milieu and the social milieu. The inferior activities of the soul are those that end in action: these are the will, reason, the understanding, the external senses; these activities are ordered and guided by the withdrawal of the soul into itself.

Such is the vision according to which the totality of the diverse, the sum of all separate individualities, appears as the manifestation or revelation of a deeper unity; appearing as expression, the diverse is immediately negated as diverse; the individual is known as reality only in its isolation from other individuals, which returns it to God and prevents it from being taken as an ultimate reality; the word does not find its meaning solely through its link with the other words of the phrase, for if a word has no meaning by itself, several words even more so do not have meaning because they are several; each of the words must have a meaning relative to the thought it expresses for all the words to have a meaning; the context is in the meaning and not in the other words; the context is in the thought and not in the addition of words. This method is applied to theology: it indicates that divinity, above the trinity, is "non-natured nature," while below this unparticipated unity that remains in itself, the three persons constitute "natured nature." The creation of the world, or the procession of created things outside God, is still an expression of God; under these conditions, this creation is not strictly different in kind from the generation of the Son by the Father; the Son indeed expresses the thought of the Father, who is Himself the absolute unity in which known and knower are identical. The Spirit unites the Father and the Son; each thing has its eternal being in God included in the Word: creation is this atemporal act through which God has expressed Himself in His Son. Each individual existence of each creature in a determined time and space cannot be conceived as the result of a positive act of God; the finite existence of things outside God, the diversity that separates them, can only be conceived as a nothingness and a deficiency. Just like in the theory of Plotinus and Saint Augustine, evil is a simple deficiency and a defect linked to this diversity.

The function of the individual soul is the knowledge of the primordial unity of creatures; the depths of the soul, the *Funke*, is *synteresis*, the place wherein every creature rediscovers its unity. Knowledge has the value of being; it is a transmutation of things themselves in their return to God. Christ then becomes a model more than a redeemer of Adam's sin; he is the model of the perfect union of God and creature; even without Adam's sin, this incarnation would have taken place; Christ is the guide of souls whereby the universe returns to God; the aspect of Christian doctrine that subordinates

individual life to a historical tradition, to juridical and sacramental institutions, becomes inessential. This doctrine was disseminated by Johannes Tauler, Henry Suso, and John van Ruysbroeck, for whom the “quiddity of God surpasses all creatures.”

Despite the extreme difference between the academic doctrine of the Ockhamists and the mystical doctrine of Eckhart, the conception of the individual implies a common postulate: it is not necessary to pass through the species to know the individual, and this individual is a solid basis for acting and for knowing, outside any natural or institutional group. Reality is to be sought in individual interiority, not in tradition or group institutions. Whatever the ultimate reality or necessary starting point, the individual must be grasped in its isolation; by being particular, it harbors something absolute; there is no natural place for the Ockhamists, just as there is no validity of the tradition and the sacraments for Eckhart; the planet is moved by its *impetus*, just as the soul is carried toward God by itself.

#### FROM THE RENAISSANCE TO THE SEVENTEENTH CENTURY

The problem of individuality appears in a new way in the seventeenth century; the spirit of individualism in the sixteenth century and the Renaissance comes to a close; nevertheless, we do not find in the seventeenth century a return to a doctrine prior to the Renaissance; the individual always remains principle, to the extent that the individual is what is distinguished from any community, tradition, or *de facto* situation. But the individual is principle of universality, the starting point and milieu of a constructive activity. It is no longer the individual qua particular being that is a reality, but the individual grasped as human being. The earthly ideal of the honest man who is not offended by anything takes on significance here; the honest man is not particularly the court gentleman, the townsman, or the countryman; even less is he the professional man; that is because these particular aspects, which make man belong to what we call a social milieu, take away from him something of his universality. The same can be said for inner man and character traits: a given habit, a given character type—instead of accusing an individual nature—are defects that deprive this individual of an access to the universal; to be singularized or specified is to be deprived of universality. This search for universality at the level of the individual and through the individual can also be highlighted more positively by the creation of a veritable *de facto* universality between scientists and the most distinguished minds: the correspondence between philosophers and scientists of the seventeenth century goes

directly from individual to individual, external to these limited groups that constitute universities: as Emile Bréhier notes, the philosophers of the seventeenth century do not belong to any school: Bacon, Descartes, Hobbes, Spinoza, Malebranche, Leibniz, Locke are independent from the university. These men are well-known by themselves and not as members of a group. One of the most remarkable representatives of this individual independence of seventeenth-century philosophers and scientists is Marin Mersenne, who played a galvanizing role for research before the existence of scientific media; Pascal says of him: “he provided the occasion for several wonderful discoveries that perhaps would not have occurred if he had not excited scientists.” Mersenne made it possible for Descartes to preserve his solitude while remaining in communication with the best minds of the time. Difficulties were often proposed in the form of a problem—for example, the difficulties of geometry—and the responses were circulated by particular correspondences. Later this function was fulfilled by scientific journals, like the *Journal des Savants* and the *Nouvelles de la République des Lettres* as well as the *Mémoires de Trévoux* and then the *Acta eruditorum*. In the same way, the academies—like the *Académie des Sciences*, the *Accademia dei Lincei*, the *Cimento*, the Royal Society of London, the Berlin-Brandenburg Academy of Sciences and Humanities—constitute societies that are essentially groupings of individuals who think and communicate their works and discoveries qua individuals, without there being a group opinion constituting a dogma;<sup>93</sup> the goal of these societies is to realize a universality of information, not to decide on what is true and false. The statutes of the Royal Society of London are quite remarkable in this regard: “the society will not make its own any hypothesis, any doctrine on the principles of natural philosophy proposed or mentioned by any philosopher whatsoever, whether ancient or modern,” and this is so as “not to give as general certain thoughts which are particular to them.” This thought defines a universal condition of individuality; the individual is capable of universality not in the empirical conditions of his existence, but in the exercise of his activity; the individual is universalized by his activity. The thinkers of the seventeenth century abandon the dynamism of the sixteenth century and the Renaissance, but it seems that everything removed from the world is given to the thinking subject; this constructive order of universality indeed starts with the individual to such an extent that all objects of the world and their relations are posited as re-constructible by thought; if the dynamism of the sixteenth century is abandoned, this is because in the original connection between man and the world, a barrier and a link still remain; the apprehension of the object here is even more immediate than in

the dynamism of the preceding age: the object is grasped as compenetrable to a technics, which is the rational reconstruction of the real and the extension of the creative work through self-aware human power; there is no longer a distinction between reason and intelligence: what can be thought is that which could be constructed or that which constructs. To construct is to arrange, and to arrange is to construct. Operation has the value of being; it not only modifies being, it constitutes being. The individual is the being who can construct or reconstruct himself. Action upon oneself is no longer conceived as a purification or a sacrifice, but as a construction that takes stock of and takes back up reality initially given as a whole in order to rearrange it and complete it. The activity of constructive discovery that the Renaissance had mainly dedicated to the world turns back toward the self in the seventeenth century, but the self is not conceived as something to be explored; it is grasped as a reality to be constructed or reconstructed according to norms elaborated in the most fruitful rational technics: that of mathematics applied to mechanics. What the seventeenth century discovers in the sciences is that which is constructible according to technical schemas; the type of intelligibility is that of a mechanical functioning in which there is no anteriority of the whole with respect to the parts; the order of the parts is what gives to the whole the functioning that characterizes it; the functioning is a relation or ensemble of relations. Structures are mechanical structures, not hierarchies, hidden forces, desires, or even analogies, a relation between sign and signified thing. The individual is a being without subjectivity, or at least without profound intimacy. Essence becomes activity; relation is a bundle of operations, and structure is a bundle of relations. Certain difficulties undoubtedly persist in this endeavor; the human individual is not simple, and not everything within him is constructible to the same degree; one of the fundamental relations that is revealed in him is imposed as a given reality that does not allow him to be penetrated directly by any schematism; the intelligibility of the human individual has been obtained only by supposing the distinction between soul and body; the whole irrationality of the given has been repressed in this obscure relation that is not a bundle of operations. Therein lies the paradox of individuality in the particular form that it takes in the seventeenth century: the individual becomes something constructible and consequently rational, on condition that one supposes realized a certain discontinuity that has broken individual unity and is not constructible in any way, since it supposes a theory of being that is different from a theory that makes rational construction possible: it in fact supposes that there can be relation across an ontological discontinuity, a bi-substantial heterogeneity, whereas every

rationalism of the constructive order depends on the hypothesis of the continuity and homogeneity of being. Nowhere is this paradox more visible than in Descartes; but the difficulty he presents is so massive that none of the great systematic thinkers of the century escape his domination.

In this age, the schema of participation is abandoned so as to think the individual; the schema of construction replaces it and comes up against the same fundamental problem.

#### FRANCIS BACON

With Bacon, the constructive intention stands out in the *Temporis partus masculus sive de interpretatione naturae*: the fifth and sixth parts of the treatise reveal how one can descend back from the laws of the sciences to the actions that these knowledges allow to exert over nature. The study of “*phaenomena universi*” makes it possible to found “*scientia activa*.” Between the first study, which is the *Historia naturalis sive experimentalis ad condendam philosophiam*, and the *Philosophia secunda sive scientia activa*, is inserted the *scala intellectus sive filum labyrinthi* and the *prodromi sive anticipationes philosophiae secundae*. This plan is already that of the Cartesian reform, albeit without the Cogito. Bacon wants to transform human life by ensuring the mastery of man over nature; Descartes will add the mastery of man over himself by establishing continuity between the techniques that guarantee mastery over nature and those that make it possible to arrive at self-mastery in the unity that wisdom is. In this sense, technical objects are not conceived as different from natural beings. Natural history is divided into three parts: *historia generationum, praetergenerationum, artium*; the study of monsters and techniques was already part of the encyclopedia elaborated by Pliny, but, unlike Bacon, Pliny does not assert that monsters and techniques reveal the same forces as those hidden in natural generations: “*natura omnia regit*” (“nature rules all things”). Man does not create any force that is not in nature; he only creates new conditions. Human operation has the value of being; it is natural and enters into the universality of natural actions; there is no longer a fundamental distinction between the theoretical order and the practical order: practical operations are not merely part of the operations of nature; they are capable of being considered as objects of theoretical study; it is thereby understood why there is continuous passage from first philosophy to second philosophy. It is thereby understood why it is possible, without doing harm to first philosophy, to “call back the natural philosophy from the thousand forms of speculation to the importance of operative practices.” Bacon turns

away from the sciences of argumentation because these sciences are enclosed in the specialty of a method or a vocabulary; the scholastics “enclose their soul in Aristotle, just as they lock their bodies in their cells”; these specialists take refuge in their discipline and are under the illusion that their favorite science contains all things. The sterility of dogmatic specializations is explained by this enclosure; sterility is a sign of the unreality of thought: scholastic logic is sterile, like a virgin consecrated to God; it produces nothing. In its isolation, the mind can only produce distinction upon distinction. In this way, isolated man possesses nothing but *intellectus sibi permissus* (“the intellect left to itself”). What Bacon seeks is operative fruitfulness, and he thinks that he can find it only in experiment. He remains quite different from Descartes by not discovering a condition of fruitfulness for the *intellectus sibi permissus*, or rather, by not distinguishing inventive and synthetic deductive labor from simple logical analysis. But the intention is the same: to refuse the fruitlessness of pure formalism. It is up to the individual being to not let himself become locked into the illusion of a completed dogma (like the scholastics) and to go (for Bacon) toward experiment and (for Descartes) toward constructive deduction. Nevertheless, Bacon is still much closer to the Renaissance than Descartes; for Bacon, the dynamism in the world is found deposited in the human being; but it still partially remains deposited in the world, such that, in experiment, a certain relation always remains maintained between the individual and the world. Bacon ignores the inventive capacity of deduction; in this sense, he is the pioneer of this confidence in the capacity of the individual being that will be found in Descartes; he does not yet have the methods that will fertilize and validate the confidence in this capacity; but he has faith in this force, and his intention will be pursued by Descartes with new means. Bacon has not sufficiently discovered the methods of universality to be able to fully justify the confidence in the individual who invents: in the domain of seventeenth-century thought, the absolute individuality of thought can only be discovered with the universality of method. The paradox of individuality seeking itself through the awareness of its means of action upon nature is revealed in Bacon through the twofold appearance of man’s relation to the world: “*natura non vincitur nisi parendo*” (“nature to be commanded must be obeyed”). Furthermore, this omnipotence of creative man is not expressed by an individualist ethics but by a theory that subordinates the good of the individual to the good of society of which he is part; the sovereign good must not be sought in the tranquility of the individual’s soul but in the active good radiating out from his works; the science of man ends with a politics distinct from morality, a politics which is above all a doctrine of the State and power

founded on facts according to the spirit of Machiavelli. Ultimately, this quest for universality is expressed in physics by mechanism, which Bacon uses at the end of induction to discover the explanation of the properties of a thing and the nature of a phenomenon; it is the *latent schematism* that explains the properties of a body; everything qualitative and connected to the particularity of a given body in a determined circumstance is thereby eliminated; the essence of each thing is in a permanent geometrical and mechanical structure that is common to several beings and to all beings or phenomena with the same properties; it is the community of actions that allows us to consider phenomena as identical; there is no participation but solely identity in reality, i.e. in structures that produce a given function, a given operation. Universality is in the operation and the structure that conditions it, not in particularity; even the study of final causes is much too external to the physical being and remains the sterile virgin that Bacon indicates; the physical being is itself only by having a structure in which everything that could designate it as a particular being disappears. The same simultaneous presence of the extreme aspects of individual reality is exhibited in Bacon's mechanism. This quest for universality is still exhibited in the manner in which Boyle, continuing Bacon's thought, critiques Descartes's mechanism as overly particular: "the mechanical explanation that Descartes gives to qualities depends so much on his particular notions of a subtle matter, of globules of the second element, and other similar things, and he has interwoven these notions so much with the rest of his hypothesis that one can hardly make use of it unless one adopts his philosophy in full." Boyle on the contrary finds a more perfect universality in uniquely experimental considerations, i.e. in the mathematical science of machines, which allows us "to apply pure mathematics to the production or modification of movements in bodies."

#### DESCARTES

We also find in Descartes the "project of a universal science that can elevate our nature to its highest degree of perfection." But a new source of universality is found in the deductive method that does not require the individual to resort to experiment and does not force his thought to obey nature to dominate it. Descartes realizes an absolute independence of the individual being so as to be able to attain the condition of universality in this independence. The individual gesture attains the universal when the conditions under which it is accomplished are conditions of universality; these conditions are the conditions of certain knowledge through the universality of the negative proofs

of the validity of knowledge. The universal is that which—of the individual being—has resisted the progressive ordeal of doubt; if we study how doubt is organized, we see that it proceeds from what is particular, personal, to the generality of concepts and ultimately to the universal and necessary knowledge of mathematical notions and of demonstrations or operations; doubt is possible on all these levels, but, in order for it to manage to become established, arguments of increasingly painstaking elaboration must be put forth. Doubt is even applicable to the necessary deductions and operations of mathematics. But it is singularly and paradoxically held in check when thought finally grasps as ultimate reality that of the being who thinks. The individual being is rediscovered at the end of the progress in methodical doubt, but under conditions that are totally different from those of the first grasping of the individual being by himself; the first grasping was one in which, at the end of the First Meditation, Descartes wondered if we could believe in the existence of the body proper. The illusions, dreams, proprioceptive hallucinations of madmen prohibited trusting in this feeling of the existence of the body at this stage; in the Second Meditation, it is the individual being insofar as he thinks that is grasped as object of reflexive thought. However, like Kant in particular, it could be said that the *Cogito* indeed makes it possible to grasp the existence of a thinking activity, but not to individualize it by giving it a personal subject; the I of the *Cogito* would be merely the form of all judgment and not the reality of an individualized personal being. Can this operation that the *Cogito* is be considered to reveal an impersonal activity? Descartes in fact envisions the problem of the permanence of thought: “I am, I exist, that is certain, but how long?” Yet he does not seem to envision the personal character of thought as a question distinct from existence. It is as if the thought discovered in the *Cogito* didn’t need any individuation because it is already an individualized being. From the outset, this thought is an individual being due to the negative character of the ordeal. The *Cogito* remains valid faced with the Evil Genius, who guarantees that we are wrong every time we judge “I am”: for this judgment to be false when it is grasped as certain, there must be a being who is distinct from the one bearing judgment and who is more powerful than him, who makes him be wrong every time he judges; but then the subject who judges concerning his own existence—and who feels the evidence of this judgment every time he thinks—must be substantially distinct from the Evil Genius (if not, he would know that he were deceived, if he were to himself his own deceiver). If, by contrast, the Evil Genius does not exist, the judgment is true. Thus, the *Cogito* is valid either, if it is false in itself, because it must exist to be able to be rendered false

by the action of a substantially distinct being or, if it is true, due to its direct content. In the first case, it is the *sum* of *Cogito ergo sum* that harbors personal existence; in the second case, it is the *Cogito*. We should note that the subject of the *Cogito* is not just the logical subject of the proposition but also the real object of the Evil Genius's action. If the subject were merely the subject of judgment, it could not resist the falseness of judgment; however, the validity of the *Cogito* resists error in the judgment that constitutes it because this judgment is not grasped only as proposition but also as act; and the act conserves its reality, whether the proposition be true or false. Here, the *Cogito* provides the privileged case of a proposition whose object is the act that formulates it; this proposition therefore takes its validity from the act that posits it because it states nothing but this act; it is true absolutely; this proposition is to itself its own object and its own signification. We could say that it is automatically true, true by its own functioning, for it suffices unto itself. Its particularity is consequently constituted by a pure universality that is not logical but is itself a universality of being. The *Cogito* is an absolute generation of signification and being, of essence and existence. There is coincidence of essence and existence in the *Cogito*, just as there is coincidence of the subject who thinks and the object he thinks, i.e. himself at the instant in which he thinks himself. The *Cogito* realizes the identity of a truth and a reality: the *Cogito* as proposition is a real truth, just as the act that thinks the *Cogito* is a true reality. The *Cogito* establishes a reciprocity of truth and reality, which construct one another according to a schema of recurrent causality. This reaction nevertheless must be introduced under conditions such that it can be maintained: these conditions are conditions of the absolute independence of the subject who thinks; the absence of agitation and preoccupations and then the exercise of methodical doubt create the conditions of recurrent causality. Under these conditions, which are necessary for reactivity, the *Cogito* is defined in advance as that which can be achieved only for a totally independent individual being. It is therefore natural that Descartes does not seek to establish the personal character of the subject of the *Cogito*, since the conditions under which the *Cogito* is achieved are the conditions of the absolute personal independence of the being who thinks.

Such as he appears in the *Cogito*, the individual is therefore the being who expresses himself in a conscious operation—here, the logical operation of methodical doubt. The individual exists before the *Cogito* because the condition of individuality is necessary for the entire progress of doubt. And it could be said that if doubt is not logically necessary for the proposition of the *Cogito*, it is in some way energetically necessary for it. Individuality preexists

as engine and subject of doubt, as requirement of certainty. Pre-reflexive reality is not the *Cogito* properly speaking, but the individual qua center of an activity that seeks certainty. The *Cogito* could neither be discovered in the contemplation of the world's order, nor obtained through a revelation; it cannot be discovered without being achieved, and its universality is expressed by the fact that every subject who will want to comprehend it will have to re-achieve it in himself as if he discovered it. In Descartes, the construction of truth is no longer a logical or pedagogical procedure meant to allow a non-initiated individual to penetrate into the domain of the true: there is no domain of the true; the true is coextensive with the real, and the real is something constructed; he who performs this operation of the *Cogito* again comprehends it as profoundly as Descartes was able to; there is no property of truth or of a doctrine; Descartes found claims of anteriority to be inept; truth is not transmitted; it is reproduced; such is the veritable meaning of individuality according to Descartes: the individual is the being who has reached the universality of operation, i.e. who is delivered from everything that halts and relativizes by shackling creative and constructive movement (prejudices, precipitation, and prevention). The individual is not the particular being submitted to the *here and now*, but the being who has acquired the capacity to act as any other being could act if it had managed to rid itself of its particularity. The particularities of race, birth, education, revelation are not conceived by Descartes as guarantees of certainty and means of assurance, but as restraints, limits, and ultimately causes of error; these means, which are suited to weakness (as Plato said of opinion), must be eliminated by whosoever seeks truth; the principle of authority is bad for this reason: it gives rise to a false security. There is consequently no individualism in Descartes because the individual, such as he discovers himself given to himself, must never be the principle of seeking or of action; this individual is still too much the result of the random exercise of desires and a certain education; it cannot be taken as a solid basis. What distinguishes one individuality from another based on contingent aspects must not be conserved; that has nothing to do with veritable individuality; for Descartes, veritable individuality is in the form of the recurrence of activity and thought upon themselves; the medicine of the passions will be practiced in no other way, and wisdom, providing "contentment," will have no other goal.

According to this principle, the relation of the individual to the species can only be thought in an ancillary way; the classification of beings cannot provide a method for thinking; the difference between the species therefore becomes a difference in kind and of internal structure; in this sense, the animals are

completely different from man, since they have no soul and are purely corporeal; it is remarkable that according to Descartes's principle, the individuality of animals resides in the automatism of the machine in which they completely consist; but human individuality already sufficiently depended on the automatism of thought revealed in the *Cogito*; another automatism must be joined with it, namely that of this corporeal machine that our senses reveal to us. The link is not clear. Certainly, we can say, like Descartes says in a letter to Elisabeth, that one "would have to have corrupted sense" to deny that there is a relation between the soul and the body; but this is not an absolutely valid reason. The veritable difficulty is knowing how two beings, which could already be individuals apart from one another, in fact form a single individuality. Having left aside the model of biological individuality, wherein individual unity is revealed through the convergence of functions, and having taken as the model of individuality the extreme particular case wherein causality and finality coincide in the automatism of an activity, Descartes could not interpret the individuality of the soul and body composite through the same method as the one he used for animals-machines or the soul qua *res cogitans*.

Furthermore, a postulate is needed in order to pass from the *Cogito* to the other operations of the *res cogitans* while continuing to guarantee that there is one and the same thinking substance: the homogeneous continuity of the operations of thought. This continuity is ensured by the reflexive nature of every thought; when it was pointed out to Descartes that it was enough to say, "I walk, therefore I am," Descartes responded that one could in fact say: "I think that I walk, therefore I am." The same goes for sensations: sensations are part of the *res cogitans* not insofar as they are what lead us to consider the outside world, but instead as the awareness of a certain act of thought. Nevertheless, here again the unity and identity of the individual are threatened by apparent or real interruptions, like fainting and sleep; Descartes supposes that thought never stops; but then is it necessary to assert a non-conscious reflexivity? Moreover, are consciousness and reflexivity truly the most important aspect of activities like desire or passion? Part of the goal of the medicine of the Passions is to forge the Cartesian individual in line with the Cartesian conception, like the Cornelian hero in whom generosity is the source of a perpetual overabundance of being ensuring individual unity and identity. But there can be individuals who do not live in a Cartesian way and who are individuals nonetheless. Are the structure of the body and the activity of the *res cogitans* enough to constitute individuality? This is the unanswered question to which Cartesian theory leads, insofar as it remains an optative rather than a definitive analysis.

However, despite these paradoxical aspects of the notion of individuality, Cartesian doctrine defines and proposes a lifestyle and an ethical attitude that give a coherent dynamic aspect to the individual being; the human soul has within it the principle of its movement; it possesses the primordial seeds of truth. Concerning mathematics, Descartes writes: "I am convinced that this method was foreseen by superior minds through the guidance of nature alone. For the human soul has something divine, I know not what, in which are founded the first seeds of useful cogitations in a way that often produces spontaneous fruit, however neglected and suffocated it may have been by studies that are at cross-purposes; we see it in the easiest sciences, arithmetic and geometry." The doctrine of generosity is not fundamentally different from that of the "admirable science," i.e. of method founded on the inventive capacity of order; and yet, order is inherent in the nature of terms and allows for them to be discovered. The norms of action are inherent within action itself and do not consist in an arbitrary code. In a mathematical problem, the unknown quantities are always linked to the known quantities through relations implicitly defined in the given of the problem; once the natural order of these givens is known, the value of the unknown will be extracted by the solution of the equation. Similarly, the necessity of acting does not leave time to determine one's choice in accordance with indubitable motives: the problem of action would consequently be a pure theoretical problem; in fact, one must act before knowing; one must decide. And yet, decision consists in starting to act and in continuing to act according to the path inherent in the first gesture of action; this gesture would have no meaning if it were not followed by realization; but it takes on a value through its fruitfulness by becoming the first term of a series of actions that are arranged toward a completion; here again, it is the order that provides a series of terms with consistency, and this consistency is not a pure form; it is revealed by its fruitfulness: it is inventive power. The human individual is the engine of order, he is the one who operates the ordered relation, who knows how to order the known terms to discover the reason of the progression and then to draw it out of the other terms. Thanks to order, the subject elicits a certain automatism from the relation due to which new terms appear. Veritable Cartesian morality is indeed a provisional morality, for it corresponds to a problem to be resolved that is different in each case; and this problem can only be resolved by supposing a term that is not given in the statement but, combined with the terms of the statement, defines a fruitful order. The individual being intervenes here as one who creates this term that must be added to the situation and without which it cannot be ordered; the subject therefore has a power of initiative; without

him, the problem would remain undetermined; he closes the axiomatic—to speak in modern terms—and this closure not only makes action possible but is conflated with the action as it is being completed; this is what the automatism consists in. The action undergoing completion corresponds to a series in development and the positing of its successive terms according to the necessity of its argument and the given of the first term. Like thought or the functioning of a simple machine, action is a lossless transfer carried out from the first term to the last. A lever, compound pulleys, gears transfer without loss the quantity of movement applied from the mobile side to the resistant side; a chain transfers without loss the action exerted on one of its extremities to the other extremity, just as a building transfers the forces exerted by the roof on the uppermost floor to all the lower floors, all the way down to the bedrock, which is the ultimate foundation. The order of the action of levers, the order of concatenation, the order of superposition bring about a lossless transfer of the quantity of movement. In the same way, reasoning brings about a lossless transfer of sense from the first propositions to the last. This lossless transfer is not enough for invention; simple machines only provide cases of equilibria and only correspond to theory if they diverge infinitesimally from conditions of equilibrium. Simple machines provide in their functioning neither the image of the series in which new terms are deduced, nor the image of the action that discovers its own norms based on an initial indetermination; but lossless transfer is necessary for the automatism of fruitfulness to be possible: the mathematical series is not pure identity, yet the identity and equivalence of two quantities must have a meaning for the rapports of rapports to have a meaning. Simple machines are not automatons, but automatons are made of simple machines organized together, each of which is compelled to bring about a transfer of quantity of movement; each simple machine in turn is nothing but a combination of chains, levers, gears (which are successively interacting levers).<sup>94</sup> Just as mathematics would remain fruitless if it only resorted to pure identity, which would lead it to be an immense tautology, action would be nothing if it were merely the affirmation of an identical principle in multiple cases. In mathematics, order is what makes it possible to pursue an equality across the terms or rapports of terms, which are not identical; order is also what allows us to confer a unity on an operation, which posits new terms that are not contained within the situation into which action inserts them. This is why mathematical invention and moral action are possible. The theoretical spirit is one who gives consequences to the principles that did not have any yet, like Descartes, who rediscovers the ontological argument in Saint Anselm; the man who acts

is one who gives a result to a situation that would remain an inextricable problem without it and would bind man to the fruitless indetermination of choice. The Cornelian hero does not choose; he continues beyond the necessity of choice and surpasses choice by overcoming it: what is Cartesian in *Le Cid* is not the long monologue of stanzas in which the alternative arrests the action, but the battle with and victory over the Moors, which provides a solution by positing a new term with respect to the alternative. Out of this superabundance of being, which prolongs but does not repeat the action already begun, a renewal of the situation appears in which the characters find themselves; in its progress, action has the power to modify the terms beginning with which it acts. Here again, the paradoxical<sup>95</sup> aspect of the individual becomes apparent: the ordered action is not one that is locked into the choice of what is predictable and already given; such an action would be fruitless; to be ordered and singular, action must surpass itself and always be new; action is a gesture based on a situation that transforms this situation so as to justify itself in this transformed situation; the gesture unfolds according to the situation that it creates, and it can only insert itself in the situation that it creates; the individual can realize its unity only by seeming to detach from its identity; there is identity only at the end of action. The conditions of generous action require a superabundance of being; the individual is the source of this superabundance of being in the situation through which it universalizes itself by resolving the problem that held it captive in the particularity of a singular situation. The Cid has rediscovered universality; this is the meaning of the words proclaimed by the king at the end of the tragedy: it is no longer merely a matter of knowing if the Cid will be able to marry Chimène but of learning that this exceptional situation has come to an end; that is the true resolution of the work: two incompatible obligations have been compatibilized through generous action. For Descartes, the incompatibilities become indeterminations: there isn't one term too many but not enough given; it's the individual who determines the givens by completing them through his action. The individual is creator of universality. This is how the foremost character of Descartes's method is explained: what founds method is the knowledge that the intelligence grasps of its own nature and, consequently, of the conditions of its exercise; "universal science" resides in this knowledge of the intelligence; for Descartes, this *intellectus* is a starting point and a fulcrum; the certainty of intuitive knowledge can gradually extend to the truths that depend on it; intuition, this "natural light," this "intellectual instinct," allows us to perceive not only truths but also the link between a truth and that which immediately depends on it; deduction, which is a connection

between truth and is always exerted on certain propositions but never on probable propositions, supposes that the mind can have a full and complete certainty of a particular object without having a total certainty concerning the real as a whole. The human individual's limitation does not prevent intellectual knowledge of the real; it merely forces us to employ a method that ensures the transfer of certainty; for this method to be fruitful, it must be constructive; measurement guarantees certainty; order guarantees fruitfulness. Descartes's great methodological discovery is that of the connection between measurement and order. Before him, order indeed existed as a philosophical principle, particularly in Neoplatonism; but this order was a hierarchical arrangement of heterogeneous realities that did not permit the exercise of measurement; that is because there is measurement only of the homogeneous. For Descartes on the contrary, order is a progress of the homogeneous; it therefore permits measurement. Descartes accomplished in the sciences an effort that consisted in creating the homogeneity of the object where it didn't visibly exist; in Mathematics, for example, Descartes showed that all geometrical realities could be put into equations through the intermediary of a coordinate system; and so, reduced to their projections over the axes and to the measurement of these projections, the geometrical rapports become homogeneous, for they are all expressible as the lengths of straight segments, which is translatable into algebraic numbers; the point of this reduction is not just to permit measurement but to realize homogeneity. This homogeneity of the object is what allows for progress through transfer of certainty or, as Descartes says, the "transport of evidence." Descartes knew how to make homogeneity appear in domains where it wasn't visible yet. This homogeneity is the fundamental condition of knowledge and of the individual's universality; indeed, when the real is homogeneous, knowledge of the particular object is possible and can provide a full and complete certainty. If the real were heterogeneous, each object would first require choosing the suitable type of knowledge, and this determination of the type of knowledge could only occur based on a higher principle that wouldn't reside in the knowledge of each thing because it would be the condition of such knowledge. The realism of knowledge is another expression of this homogeneity of the object; each particular proposition can be true, for the notion is not concept but idea; it does not suppose a plurality of experiences, the necessary basis for abstractive induction in conceptual knowledge. Knowledge starts with true and immutable natures provided by intellectual intuition; here, we come back to the reality of the individual: the individual has within him the intuition of true and immutable natures; in its principle, knowledge is direct relation of the

mind to its object; no mediation, no preliminary induction is necessary. The individual being is not disinherited. He finds the conditions of true knowledge in isolation, at least at the start. Realism, homogeneity, and continuity of the real: these are the postulates of Cartesian thought.

Now, this system would be perfectly coherent if these conditions led to consequences that were in perfect harmony with the starting point. But the human individual also possesses a knowledge through the senses, which is abstractive; in addition to innate ideas, there are adventitious ideas and factitious ideas; and, in addition to the intelligence, there is also the body, which introduces a qualitative knowledge, the passions and tendencies, which are heterogeneous to one another. The discontinuity and heterogeneity between the mind and the body are an inconvenience for the system, insofar as there is no deductive relation that can be articulated to characterize this relation. It could be said that this unity and this continuity are to be realized, and that morality, with the help of medicine, aims to realize it; but homogeneity is hard to conceive, and Descartes has made the distinction between substances an important principle of his metaphysics; nevertheless, practical unity and continuity are precarious enough in an individual being made of two substances. This duality, however, is necessary to establish Physics, which depends on the homogeneity of *res extensa*. If, as in Aristotle's physics, *res extensa* remained fully penetrated by soul, the real would be qualitative and heterogeneous; deductive and constructive knowledge would then be impossible. To ensure the homogeneity of extended substance, the heterogeneity of the individual must be accepted. Thanks to this homogeneity, the understanding can know insofar as it is determined only from within by its internal demand for clarity and distinction; the senses and the imagination cannot know, they can only introduce sensible qualities that are heterogeneous to one another or an infinity of figures without continuity. However, the body cannot live without perpetually introducing the use of the sensations and the imagination.

Nevertheless, the unique and ultimate principle is not the inherence of innate ideas to the individual; this principle is first according to the order of reasons, but it supposes that ideas are comparable, and this comparison supposes the idea of the absolutely perfect being. The whole activity of the intellect supposes this idea, which is the first and the clearest of all, relative to which finite and limited beings are conceived. The individual is not the author of its being. The principle of lossless transfer is valid in this case, as in every other case: "there is at least as much formal reality in the cause of an idea as there is objective reality in the idea itself." This principle is not different from that of the construction of realities; it is when we analyze the type of causality

by which things can be produced and by which ideas can be formed that we understand that there must be a cause of the notions within us; these ideas are something real; if they weren't something real, they would not require a cause that has a formal reality. For Descartes, the reality of a thing is known when we know how it can be constructed. The idea's objective reality consists of reality; it is not a simple image without consistency. Realism is necessary for the demonstration of the existence of God in the Third Meditation to be valid. Here, Descartes employs a mode of thought that not only separates it completely from every non-realist theory but also elevates it to the veritable status of being what we now call information, and which in Descartes is called the objective reality of an idea. This information is implicitly quantified and not just qualified by Descartes, since the reason why the idea of the infinite and the perfect cannot be recognized as factitious or adventitious is because it possess an objective reality superior to that of any other reality of our thoughts; it thus cannot have been fabricated by the mind, which would have arbitrarily augmented and brought together in a fictive being the perfections of which it has the idea based on the experience of the senses. The human individual, who is imperfect, does not have enough formal reality to be the author of the infinite and perfect idea, whose objective reality is so great that it requires as its author a being that is itself infinite and perfect, i.e. in possession of an infinite and perfect formal reality. The objective reality of an idea is a reality that can be one of the terms of the relation of causality, the other term of which is a formal reality; it is therefore unnecessary to prove existence before essence, for there is a link of reality between essence and existence. This is certainly the most profound and also the newest aspect of Descartes's thought; by making information into a reality, Descartes gives the individual the role of an operator of information; this worker has limited forces, and he recognizes a being which is anterior and superior to him when he discovers a work of information that he cannot have made himself.<sup>96</sup> The idea of the infinite and of the perfect is more than the mark of the worker stamped on his product: it is a work that remains operating as an active principle of information because this idea is the principle of judgments; without it, methodical doubt would not be possible; it is "given firstly." Knowledge is not a participation, because the essences that are the object of human understanding are creatures of God. God is the guarantor of our knowledge, not through an attribute that relates to His understanding, but through attributes that relate to His creative power, omnipotence, and goodness; the human understanding takes this clear and distinct knowledge as a starting point and seeks out its combinations and effects. The calling of the individual being is

to be the agent of this knowledge in its development; man extends the creative activity of God; he is not just the foreman of creation, he also elaborates knowledge based on principles created by God.

And yet, a difficulty always remains concerning the heterogeneity of the soul and the body. The individual appears to be created by God, but for thought alone; isn't it necessary to begin again with a new study for the body? The body also appreciates through pleasure and pain that a thing is useful or harmful to it; pleasure is the mark of an augmentation of being. According to what principle is this qualitative appreciation possible? Following the same reasoning as the one Descartes applies to ideas, could we not thereby manage to discover the existence of a formal reality distinct from the body and more powerful than it? For it could be that a number of these qualitative appreciations carried by way of the body surpass the reactions arising from the adventitious data or factitious acquisitions due to some corporeal elaboration. As tendency or instinct, this would therefore be in the individual the mark of a reality superior to the individual, a formal reality great enough to cause the objective reality of the instinct or tendency. This reality could certainly be found to be identical to the one to which the idea of the infinite and the perfect refers; but then the non-homogeneity between the mind and the body would persist: the body is not just an operator of information. It assimilates, generates, dissimilates, develops, ages, mates: these operations are not operations of pure production; they imply types of organization that are not merely the transfer of a quantity of movement or of an information; the body integrates and differentiates. Descartes privileged the operative aspect of constructive thought in the individual and more generally everything that is operative. He supposes given structures in the body, like that of the heart, and shows that life is just a functioning of these structures. Founded on homogeneity and continuity, his system finds coherence at the price of a discontinuity and a heterogeneity for which the system cannot account: that of the soul and the body. Beyond this discontinuity, it must be seen that Descartes, for the being, privileged in individuality the fact of being adult and active, productive and free. But individuality also involves other complementary aspects that are just as important and cannot be separated from the first; the individual is not just a created being; he is also an engendered being who dies; timelessness does not exist for the individual, although he is aware of timelessness. This vital aspect of the individual—through which he belongs to communities, through which he originates in groups and has traditions, through which he is determined in advance to act in ways that are all plotted out—has not been contemplated by Descartes. His search for universality is

precisely what allows the individual to not merely be the being who behaves and who is determined, integrated. It nonetheless remains that the Cartesian conception of the individual is still an optative more so than an elucidation of the real as a whole.

The special mode of intelligibility of the rapports of the soul and the body is finality, which, excluded from physics, reigns sovereignly over the union of the soul and the body, a union which, however, is merely an interaction that remains unknown in its causality. This union of the soul and the body is willed by nature for the conservation of our being; in this sense, the proximate causes of the passions are ignored, but they can be comprehended by recognizing their utility, which consists in the fact that they “strengthen and prolong thoughts in the soul which it is good for the soul to preserve and which otherwise might be easily erased from it.” In the same way, reflex actions, like the pupillary reflex, are finalized and depend on the will; this also applies to the movements of the lips and tongue, which serve to pronounce words, and “which are called voluntary because they follow from the wish to speak, even though we often ignore which ones must be used in the pronunciation of each letter.” The notions of force, of substantial forms, of finality are not illusory in themselves; they are true relative to the union of the soul and the body, according to which a spiritual being acts within an extended being. The medicine of the passions consists in relating the passions to their proper finality; physical therapeutics and intellectual therapeutics give to the power of the will a sovereign authority over the passions. The soul does not add any force to the body; it is not a driving force and does not increase the quantity of movement.<sup>97</sup> The soul acts like a horseman on his mount, changing the animal’s direction without modifying its momentum. In the description that he gives, Descartes seems to find an example in the automatons that he came to admire in the king’s gardens; these automatons generally utilized pressurized water as a driving force; multiport valves, moved by unspecified physical effects, like the action of a stroller on a flagstone, distributed this water into various motorized devices, thereby executing movements in articulated statues; these commands could also be left to the hydraulic engineer’s discretion, who could act with the slightest energy on the valves and distribute the water to his liking, thus executing considerable movements surpassing the energy that a man can deploy; in this fashion, with the slightest movement of the hand, one can work a hydraulic press connected to a source of pressurized water. Constructed as a multitude of hydraulic pistons, these automatic statues could be endowed by the hydraulic engineer with a certain automatism, for the accomplishment of a first movement could trigger another

movement, which itself would control a third, in such a way as to bring about a recurrent series. Descartes entrusts the pineal gland in the human body with the role played in the automatic statues by the multiport valves; pressurized water is represented by sanguinary vapor, which is the most volatile part of the blood vaporized by the heat of the heart and which constitutes animal spirits. Descartes consequently supposes that the soul can direct the movement of animal spirits by exposing a certain orifice of the efferent nervous frenulums of the pineal gland; this pressurized vapor will then inflate a certain muscle and, by expanding it, will shorten it like an inextensible balloon that becomes inflated and takes on a spherical form (the nervous frenulums are conceived as tiny tubules whose diameter is nonetheless sufficient due to the extreme "subtility" of the gas called "animal spirits"). Today, we call a device like the one Descartes imagines in the pineal gland a relay; and it is indeed correct that a relay can, with as little energy as one desires, command a quite considerable amount of energy without adding to or taking away from it. But still, the control energy must exist and be able to exert an action on the control device of the effector energy. It is difficult to conceive how the soul, without being *res extensa*, could control the animal spirits in the pineal gland. The inverse action is just as possible and is effective in passion; the passions are "feelings or emotions of the soul which we relate specifically to it, and which are caused, maintained, and fortified by some movement of the animal spirits."<sup>98</sup> Now, even if it is simply difficult to conceive how the soul can control the animal spirits, it is impossible to conceive how the animal spirits can act on the soul based on the pineal gland itself; if this gland is structured in such a way as to behave as a relay, it specifically prevents the reflexive action of the controlled energy on the control energy; a relay transmits causality in a rigorously irreversible way; without this condition, it couldn't do its job. Conceived as a possible action in two directions, communication is not possible according to the Cartesian schema of the link between the soul and the body. The profound reason for this impossibility is that Descartes only acknowledges instantaneous actions without duration. So, a reciprocal action upholding the energetic distinction of the terms of the relation is only possible if the energetic action of one of the terms on the other is deferred and persists as potential energy for a certain amount of time. There is nothing more opposed to the Cartesian conception of being than potential. Everything is actual for Descartes, and his critique of Aristotle's physics is primarily a critique of potential realities. This refusal of potentials goes all the way to rejecting action at a distance, to such an extent that the notion of a field of forces is deprived of meaning for Descartes, and to such an extent that he

wanted to interpret Gilbert's experiments on magnetic fields in terms of action by contact, at the price of quite incoherent hypotheses.<sup>99</sup> Only the action of shock mechanics is real for Descartes. And yet, it can be wondered if the individual may be conceived as a totally actual being, fully given in the instant. This postulate of Descartes's is also a limit.

Thus, it becomes clear that the ultimate aspect of morality is not in the union of the soul and the body but in the reasoned exercise of the will: the soul has its own separate pleasures, and, more generally, it has passions that do not depend on the body; sovereign beatitude depends on these passions. The passions that constitute our beatitude must arise from the clear and distinct idea of human nature. Here is where the final aspect of the paradox of individuality intervenes for Descartes: we know ourselves clearly, not just as a being endowed with a free will and a soul united with a body, but as part of a whole without which we could not survive. "Each of us is really one of the many parts of the universe, and more particularly a part of the earth, the state, the society, and the family to which he belongs by pledge and by birth; and the interests of the whole, of which each of us is a part, must be always preferred to those of our particular person." This is the way in which an "intellectual love" toward this whole to which we owe our perfections is defined; this reasoned love can estimate our relative value with respect to the whole; it increases to the extent that this value diminishes. Descartes declares that we should sacrifice ourselves only for what has more value than us: if a man through his death can keep all the inhabitants of a village from being executed, and if he estimates that together they all have more value than him, he must sacrifice himself; if not, he shouldn't. In literature, the notion of esteem is the degradation of this reasoned love defined by Descartes. The estimation of our value is the fruit of generosity, passion representative of the search for truth when this passion concerns ourselves; human value resides in the will and in the steadiness with which it always decides on what appears to the intelligence as the best; humility or contempt have no meaning at that point, because in everyone free will is infinite and capable of an equal virtue. This dependence is highlighted with regard to God in particular: "before he sent us into the world he knew exactly what all the inclinations of our will would be; (...) he knew that our free will would determine us to such or such an action; and he so willed it". Consequently, "abandoning oneself completely to his will, one rids oneself of one's particular interest and has no other passion save to do what one believes to be agreeable to him." This conclusion is not absolutely in agreement with the starting point; a gap remains between Descartes's provisional morality and his definitive morality; through the rule of

decision, provisional morality contributes an extremely new conception of action that turns the individual into an absolute principle of action. On the contrary, wisdom involves a number of precepts that would only be justified absolutely in a pantheistic cosmology and metaphysics that herald the thought of Spinoza. This duality comes from the duality that persists in the reality of the individual. The God to which the notion of the infinite and the perfect refers is not in the same relation with respect to us as the God that has destined us to a certain body, to belong to a certain society, and to be born at a certain moment. The existence of the individual as principle of action and of certain knowledge does not fully coincide with his existence as part of a community and ultimately as a part of the world, with a given body and engaged in a given circumstance. In the first sense, the individual is like a principle; in the second sense, he is part of the whole, and he does not have within himself his entire reason for existing. God, creator of true and immutable natures or of the idea of the infinite and the perfect, is not necessarily at the same time creator of relation in the *here and now*; for this latter relation is not known through intellectual intuition; it is not a structure; this relation can only be lived and not thought. It is difficult to readmit at the level of wisdom that whose elimination has been practiced at the time of methodical doubt as a condition of the position of the first judgment of existence, which is at the same time the paradigm of every valid affirmation: the *Cogito*.

#### PASCAL

For Pascal, a problem's principle of intelligibility is no longer a reality given among the terms of the position of the problem; man brings to the problem to be resolved the invention of a notion that is not intelligible by itself but confers intelligibility on the problem. This new notion contributed by the individual being does not emerge from a position of the problem alone; here, the homogeneity and continuity supposed by Descartes are replaced with a discontinuity, a plurality, a heterogeneity that require for each problem an action of invention on the part of the human individual. This human individual is the being who can comprehend the position of a problem and contribute this singular notion that creates intelligibility. Dependent on an invention, intelligibility is not contained in the elements of reality constituting the problem. The individual therefore plays a role that does not make him tend toward universality; on the contrary, there is something unique and irreplaceable in every invention, and the individual who invents is in some fashion the man of this problem. The act of invention appears in the

extreme particularity of the individual who has posed the problem to himself by knowing all the circumstances without omitting any of them; there is, so to speak, a particular world for each problem, and there is something infinite about each problem; method is particular and cannot be applicable to all problems, for every problem has this aspect of a universe that excludes all other universes actually. Consequently, the individual contributes more than an activity of clarification: he contributes something original and particular that isolates him from other individuals, at least at the instant in which he contributes a solution to a problem. There no longer exists a unity of method depending on the unity of the intellect; in order for a mind to be fruitful within its domain, it must be exclusive: "it is rare that geometers are acute men, or acute men geometers". Each direction of the mind requires different gifts, and each problem calls for a particular direction of the mind in which it must be engaged. Thus, for each problem there appears through invention a particular notion that is an elaboration of the individual strictly relative to the problem: the problem of conic sections is resolved by the invention of the "mystic hexagram," which is a hexagon that allows for the deduction of all the properties of conic sections. Similarly, the consideration of triangular numbers makes it possible to find the center of gravity of the cycloid and of the surfaces or volumes that depend on this curve. What constitutes the method proper to each problem is this perception of the rapport between the triangular numbers and the question of the cycloid's center of gravity, or between the mystic hexagram and the properties of conic sections; and yet, this method is proper to the individual being who has made an effort to discover the notion whose rapport to the terms of the problem contributes the solution; to perceive this relation, the notion must have been invented or be capable of being invented again. Unlike in Descartes, here there is no longer a construction due to a transfer of evidence. This constructive addition of the known to the known to go toward the unknown is no longer possible; relative to the terms of the problem, invention is a leap, an absolute initiative that requires individual singularity. The advent of invention is opposed to Cartesian progress. Only the method of decision in Descartes's provisional morality has something in common with this act of invention in Pascal. For Pascal, there are several orders, while for Descartes the real is continuous. Between Descartes's method and Pascal's methods, there is a difference that opposes construction and invention. Construction is continued by a progressive and uninterrupted operation, while invention supposes the existence of a potential that abruptly actualizes into structure. The conception of individual time is opposed in Descartes and in Pascal; for Descartes,

there is no potential; each instant is fully contained within its own limits; for Pascal, alongside the apparent actuality of each instant, there is a potential that operates a straddling of instants upon one another and bursts into invention. The individual is this being who is capable of invention. The elements of a problem are nothing but a rapport between actual terms; it is through the intervention of this potential that an individual can resolve a problem. When Pascal applies his thought and his life to the problem of man, this is to pass from man considered as an actual being (and who is consequently a monster, a chimera) to man as a being who harbors potentials, and who does not have within himself (i.e. in his actuality) the entirety of his explanation. The reality of Christ does not intervene from outside as one fact among others, no more than it intervenes from inside, like the idea of the infinite and the perfect that refers to its author. Christ's reality corresponds to the existence of these human potentials that are not in harmony with the actual reality of man. This is why neither sacred history, nor philosophical proofs, nor the teachings of the Church are sufficient or useful to contemplate at the start. Only the ignorance of these potentials impedes the position of the problem; only the brute stupidity or sheer blindness that conceal these potentials must be eradicated; what must be defeated is distraction, for it saps these potentials that form and guarantees that they never reach a sufficient level to produce invention. Distraction is what leads man to live in the most actual and instantaneous way possible to avoid the formation of these potentials. Reasoning is powerless to show the value of the Catholic religion: "metaphysical proofs are so far removed from men's reasoning, and so complicated, that they have little force; and when they do help some people, it is only at the moment when they see this demonstration; but an hour later, they are afraid of having made a mistake."<sup>100</sup> This is because reasoning is merely actual; it can neither express nor elicit these potentials, which are the essence of real individuality: only a certain mode of intuition is adequate for these potentials. Traditional proofs are not deprived of value, but their effectiveness to a certain extent is contingent on a first invention or purely individual discovery that can only exist through the actualization of one of these potentials. The most concrete and simplest way to lead man to become aware of these potentials is to make him desire the truth of the Christian religion. Instead of discovering man according to a chain of reasons that are all actual and equal in the modality of the propositions that formulate them, Pascal seeks to concentrate everything that man knows about himself within a unique experience wherein he will simultaneously know himself in all his aspects. This is how potential forms. Everything that prematurely discharges this

potential must be removed, and most particularly the expression to others, description.

If Montaigne's project to depict himself is a "foolish project," that is because this self-expression is falsely equivalent to a justification of the whole desire of searching and of discovery that there is in an individual being; it then seems like we exist to be able to depict ourselves. Montaigne leads to "a nonchalance about salvation, without fear and without repentance" through complacency in oneself. In the same way, Pascal refused the everyday satisfactions of existence, such as a mother embracing her children, and all ordinary pleasures in general, even besides those without any hazardous effects, because, without restlessness, they lead to being a "heathen Frank." It takes a total experience all in one piece. Stoics and Epicureans hinder more than serve the knowledge of man because they simplify the vision and consequently destroy its whole character of tension; to see the greatness of man without seeing his weakness, to see his weakness without seeing his greatness, is much more than to be led astray: it is to conceal to oneself and to conceal to others the fact that man cannot be considered without recognizing his enigmatic and incomprehensible nature; it is not to conserve the tension that results from his incoherence. There is never a truth about man, merely problems, i.e. couples of opposite and incompatible truths. This incoherence concerns us with respect to what is most profound about us; it removes from our moral life every firm point, every assurance—both the confidence of the Stoic and the nonchalance of the Skeptic—leaving us terrified and without a center, or rather, without an actuality upon which we could establish knowledge and action. "What a chimera, then, is man! What a novelty! What a monster, what a chaos, what a contradiction, what a prodigy! Judge of all things, imbecile worm of the earth; depositary of truth, a sink of uncertainty and error; the pride and refuse of the universe." This contradiction could be removed by a metaphysics of mediation, like the one which founds Orphism, if actual participation in the world could be a solution. But the very terms of the problem exclude every solution that would only address the actual nature of man; however, the vision of the universe elaborated by the Renaissance permits nothing but an actual rapport and excludes the conception of a world that would be a reservoir of potentials. Man is consequently reduced to himself. It is at this point that these potentials seem to Pascal to be arranged in the supernatural destiny of man revealed by Christianity. Greatness, wretchedness, hope of salvation come from a divine origin, from Christ's misery and redemption: the station-procession-conversion rhythm takes on a meaning for man and explains him. The wager would have no value without this

existence of potentials in man; for a man who would have no desire and no lack of satisfaction, the wager would not be endowed with any force; the wager must lead us to desire and to become aware of the fact that we desire.

#### SPINOZA

With Spinoza, the soul is a “spiritual automaton,” if we consider the capacity of the understanding. In fact, there is a methodical sequence of truths that begins with clear and distinct ideas and reveals the boundless fruitfulness of the understanding through the creation of mathematics and physics. All knowledges unsuitable for this fruitfulness (i.e. all those that end in themselves and are placed side by side, inert) are rejected; they cannot in fact serve to increase the forces of the understanding: these include knowledge through hearsay and knowledge through vague experience. Conversely, the knowledge through which an effect is deduced from its cause and intuitive and certain knowledge are fruitful knowledges. This fruitfulness is expressed in the knowledge of knowledge, which is method; method is the idea of the idea, i.e. reflection on the true idea, insofar as this idea is an instrument or a rule for acquiring other knowledges (*ad datae verae ideae normam*, “according to the standard of a given true idea”). The true idea has certainty in itself; certainty is the objective essence of the thing, i.e. the thing such as it is represented in the understanding. The fictive idea is recognized by its indetermination; it permits alternative; the true idea does not permit indetermination, for it contains the reason of everything that can be affirmed or denied concerning its object; this intrinsic characteristic that guarantees the form of the true is, for example, that of a well-adjusted mechanism which, in the mind of its inventor, is a true idea when this mind distinctly conceives the connection of its parts, even if this mechanism is not realized. Similarly, in the mathematical sciences, the understanding has the capacity to form true ideas by starting with simple (and therefore fully determined) ideas, like extension, quantity, movement. The true idea is therefore that which allows the soul to be a spiritual automaton. Nevertheless, can this power of the intellect be applicable to the individual itself? For that, nature would have to be deducible in its totality; and yet, the nature that the understanding deduces from the objective essence of the principle cannot be “the series of singular things submitted to change, but only the series of fixed and eternal things” (*seriem rerum fixarum aeternarumque*); these fixed and eternal things are the set of laws that form—as the permanent structure of nature—the fixed essences and eternal truths, such as extension, the conservation of movement, the laws of

mechanical shock in Descartes, and, in Spinoza, the laws according to which all singular things happen and are arranged; they are particular essences, well-defined and determined truths. However, even the set of "*res fixae*" cannot be deduced: "to conceive everything at once would far surpass the forces of the human understanding." Each of the "*res fixae*" is nothing but the link in a chain or the moment of a progress, not the part of a whole. One cannot therefore merely determine in the *res fixae et aeternae* the place of human nature and of this singular essence that we ourselves are. The distinction between individual bodies is not a real distinction but a modal distinction; only imagined extension is composed of parts, the finite sum of which it is. For the understanding, extension is infinite and indivisible; bodies are not component parts but merely limitations. Extension is a principle of intelligibility; bodies are modes of extension, through which they are conceived. Substance is unique; it is *Deus sive natura*; all the attributes of this substance have the capability to account for the modes that are in them; the intelligibility of the attributes of unique substance is the order according to which, in each of these attributes, the modes follow one after the other. Substance consequently becomes the root of the unique order deployed in each attribute: "the order and connection of ideas is the same as the order and connection of things." The rapport of substance to its attributes is therefore not a rapport of subject to predicate. God, or nature, is efficient cause, cause of essences as well as existences, self-cause or absolutely first cause, cause acting according to the laws of nature, cause that is only effective through itself, (and ultimately) immanent cause. What results from this conception is that what could be called the complete automaton is merely the attribute and not a finite mode of extension; nothing in a finite mode is related to the eternal essence of the attribute; the existence of this finite mode that an individual body finds its reason in other finite modes, in other bodies that have communicated movement to it and, through their causality, actually make it what it is; in turn, these other finite modes have their reason in other finite modes, and so on *ad infinitum*. An individual body is nothing but a mass of extension, the parts of which are animated by movements that are in a certain rapport and are communicated from one part to the other in a proportion such that the body persists for a certain duration. Existence in duration is therefore existence as distinct from essence, and it belongs solely to the finite being, which has the causality of its being outside it. For what is true of the modes of extension is also true of the modes of thought or ideas; according to the correspondence of the attributes, the order of the objects in thought reproduces the order of realities in extension. The finite mode does not possess eternity

or the infinite enjoyment of being (*infinita essendi fruitio*) in which essence fuses with existence. The finite mode that is the individual is characterized solely by a deficiency, and, as such, it cannot be deduced immediately from the nature of the attribute of God, whose consequences are as eternal as Himself. God is nothing but the remote cause of the individual. The individuality of a body is that of a machine whose different parts are arranged by exterior causes in such a way that they communicate movement according to a permanent order; an individual itself consists of other individuals, and the human body in this sense is a very complex machine made up of other machines. The soul, which begins and ends with the body, is the idea that in the attribute thought has no object other than the corporeal individual in act. This idea has its cause outside it in other finite modes of thought, corresponding to the modes of extension that are the causes of the body. It is the position and affirmation of the existence of the body. This idea is as composite as the body itself, and the individuality of the soul, with the variety of perceptions that it comprehends, does not have a different nature from that of the body. Insofar as it is a finite mode, the soul can have nothing but inadequate ideas of the body and of itself, i.e. ideas that do not make known the cause or reason of the idea at the same time as the object of the idea. The individual being is unintelligible to itself due to its very nature. The soul is a detached and isolated fragment incapable of relating to the ensemble. It is in fact possible to pass from *natura naturans* to *natura naturata* (which consists in the modes) without leaving the eternal and the infinite. The constant quantity of movement is an eternal mode of the extended attribute—eternal like the attribute itself—and an infinite mode, because it indicates what is immutable in the “*facies totius universi*.” There is necessarily a mode in the attribute Thought that objectively contains the entire and immutable order of nature. The infinite modes therefore have God as absolutely proximal cause, but they do not make us leave the eternal and the infinite. The individual therefore cannot be a microcosm.

In this conception, there is a consequence to the Cartesian manner of contemplating extension: bodies can only be distinguished from one another based on movement, for bodies are only distinct insofar as they are extended. However, the quantity of this movement is constant, and the laws of its communication or distribution are eternal truths. To the extent that what distinguishes bodies does not belong specifically to each body, the individuality of bodies cannot appear as a positive property. Here, we find again this aspect of Cartesian Physics that excludes all potential energy and conserves only actual energy in the form of quantity of movement. So, the conservation of

the quantity of movement, due to the exchanges that occur between the different places of extension, can only be affirmed for totality. In this physics, wherein what individualizes extension is the unique form of actual energy, no limited physical system can receive a veritable individuality. The same applies for Spinoza. But, with Spinoza, since the soul is the idea of the body, this weak consistency of corporeal individuality is also true for the individuality of the soul. With Descartes, on the contrary, all the aspects refused to extension were conserved in the soul thanks to the substantiality of the *res cogitans*. With Spinoza, man becomes *spiritual automaton*. This automaton that is the individual is an expression of divine capacity; this being, which tends to persevere in its being according to the *conatus*, has an immediate attachment to itself; in the body, this attachment is appetite, and, in the soul, it is desire (*cupiditas*), the tendency to affirm oneself that exists in every idea, since the idea is self-position and not a silent painting on a canvas. Joy, sadness, love, hate, the passions originate in the encounter of exterior causes acting on our body and in the being's effort to persevere in being. Certain aspects of the functioning of an automaton that have been studied recently are noted with a great amount of precision by Spinoza to explain the states of *fluctuation* that make us love and hate one and the same thing due to the sequence of the play of associations. Even the rapports between individuals can be explained according to a schema of automatism; such is the case concerning the multiplication of hate. The whole course of nature determines the affections of the automaton that the human individual is.

Nevertheless, this spiritual automaton can also seek freedom by escaping from the slavery of the passions. There are absolute ideas in the soul. We necessarily have an adequate idea of what is found both in the whole and the part; since we have an idea of a mode of extension or a mode of thought, as mutilated and confused as it may be, we will necessarily have adequate ideas of the attribute Thought and the attribute Extension. We have an adequate idea of God, whose nature is fully present in each of His modes. These adequate ideas are common notions because they are equally implicated in every individual, and their ensemble constitutes reason.

Now, insofar as he has adequate ideas, the human individual acts instead of being determined by the course of nature. The importance of the expression "insofar as" is paramount here. It signifies that man can pass from servitude to freedom if he is the adequate cause of his affections. Without ceasing to be an automaton, the spiritual automaton can persevere in its being without the aid of external causes; there can be a part of ourselves of which we are the adequate cause. The affection of desire then remains without passion.

Only sadness, with all the affections that depend on it, can be nothing but passive, since a being of itself would not be able to tend toward its own destruction, and since by necessity it has an exterior cause. The virtuous action, that which most increases our own capacity, is one that is determined by adequate ideas or follows reason; for we are its adequate cause, and the action of which we are the cause is the most perfect of all.

The Cartesian individual was composed of two substances: what is passion for one is action for the other, and vice versa. Conversely, according to Spinoza, the individual, who possesses a correspondence<sup>101</sup> instead of an interaction between the body and the soul, has no need of Cartesian free will: every passive affection can become virtue when inadequate knowledge is replaced with adequate knowledge; this is how ambition can become piety. To defeat a passion is not to struggle against it but to know it, i.e. to grasp an adequate idea of the affection that it envelops. However, the affections born of adequate ideas have some singular chances of survival and constancy: if an affection is so strong that it is awakened by a greater number of causes, no affection will be stronger than one that is linked to adequate ideas, i.e. to ideas whose objects are constant and eternal. The idea that we have of our finite individuality as such is an inadequate idea; the idea that we have of God and of the principles of nature is an adequate idea; this idea transforms the one that we make of ourselves; we know ourselves as determined by the laws of the universe; in this sense, we lose nothing of what was positive in our own individuality; far from suppressing the *conatus* through which we tend to persevere in our being, in some sense we rely on the *conatus* of the universe; consequently, we connect to the universe our individual qua part of the universe based on what it has in common with all the other parts. But it is not our individual as such that we connect to the universe.

On the knowledge of the second type is superposed a knowledge of the third type that intuitively grasps the necessary dependence connecting our individuality as such to the nature of God and His attributes. We then see our individual in what is singular about it ensue from the nature of God. This knowledge is eternal life independent of all duration, while the knowledge of the first type made of man a finite and singular being; in the knowledge of the third type, man on the contrary is revealed as a singular but eternal being. Between the knowledge of the first type and that of the third is inserted the moment when man sees himself assimilated into universal necessity in the knowledge of the second type. It is in this sense that man has within himself a certain potential, which through knowledge is likely to change level, point of application, and ultimately effect; man's structure is not absolutely

fixed. This solution to the problem of individuality is not without a certain analogy with that of Descartes representing the rapports of the soul and the body through this relay that is the pineal gland. The soul changes the course of the animal spirits without adding to or taking away from their quantity of movement. Similarly, due to the fact that every idea contains an affirmation and isn't just a silent painting on a canvas, knowledge can modify the manner in which the *conatus* acts in the human individual; this *conatus* is always the same at the level of knowledge of the first, second, and third type; but its orientation is modified; and it can be said in a certain sense that the *conatus* orients itself, because the *conatus* is not different from the idea's power of self-affirmation. It therefore must be said that the individual is an automaton in the highest sense of the term, since, instead of being completely actual, the *conatus* can remain in reserve in a somewhat potential manner so as to be applied to itself. This return—in action returning to itself—is one of the distinctive signs of individuality. But it requires an addition to pure Cartesian mechanism of a certain potential dynamism incorporated in the *conatus*.

This action of the individual being upon himself through knowledge doesn't just begin at the level of the third type of knowledge, but instead at the moment when the individual begins to make use of the second type of knowledge and the common notions: to make use of reason is already to grasp things under a certain form of eternity (*sub quadam aeterni specie*). Eternal life is a knowledge of ourselves *sub specie aeternitatis*. There is no passage from time to eternity; "The *conatus*, or desire, to know things by the third kind of knowledge cannot arise from the first kind of knowledge, but from the second" (*Ethics*, V.28). Due to the second type of knowledge, the corporeal individual, both for Spinoza and for Descartes, is like a whole web of intelligible relations. Rational knowledge is a starting point wherein the soul must be immediately established, otherwise it will never happen. Spiritual life is not conceived as a return toward a lost primordial state, but as a methodical progress, passing from a perfect knowledge to another knowledge that is deduced from it; the common notions of reason are the source of deduction; reason consists of this progress that advances toward singular things; the finite modes existing in duration are not deduced from the absolute nature of the attributes of God; however, in the fifth part of the *Ethics*, deduction leads to these singular beings themselves, albeit endowed with a quite different type of existence and known *sub specie aeternitatis*. The individual can be grasped in its eternal essence as a necessary consequence of this infinite mode of extension that the laws of movement are. If the soul is the idea of the body, it is therefore necessary—even if the actually existing body perishes—that something

of it remains, something eternal, namely its essence, which follows eternally from the infinite intellect or the intellect of God, the infinite mode of thought, just as its body follows the laws of movement in extension: “*senti-mus experimurque nos aeternos esse*” (“we feel and we experience ourselves as eternal,” through these eyes of the soul that the demonstrations are). Such is the conception of the *essentia particularis affirmativa* in the fifth part of the *Ethics*; the singular thing is affirmative when it has understood itself by seeing in its very singularity its dependence on the universe. Determination, which is negation, is on the contrary the boundary of the being that does not have its reason within itself. The *conatus*, which constitutes the being’s essence, is pure affirmation that posits the being without any limit in duration; by passing from passive affections to active affections, originating with the infinite intellectual love that God has for Himself, the *conatus* loses nothing but its limitations. At that point, the love that the soul experiences for God and that joins with His essence has God for its cause. This joy and this love no longer have anything passive about them, since the soul by nature is their adequate cause. There is consequently no longer opposition between the particular being and God or Nature: the eternal life of the soul is like the internal development of this essence based on its principle; to know this essence is to better know this principle, just as we know a geometrical being all the better as more consequences are deduced from its definition. “The more we understand particular things, the more we understand God.”<sup>102</sup> The individual’s salvation therefore consists in the affection of joy and beatitude, which are linked to knowledge. But, according to the *Theological-Political Treatise*, other paths are possible, particularly the path of religious life. Faced with this diversity of human paths, the State should only protect the freedom of thinking without taking sides behind a given belief and without suppressing the individual’s natural right; the role of the State is to prevent what is negative and destructive in the conflict of the passions; it cannot produce the affections that unite men; it can only facilitate their development by protecting them from the passive passions that would destroy them. Consequently, individuals have the right to judge this State and to revolt if it uses violence or stirs up hate between subjects.

#### MALEBRANCHE

In Malebranche’s philosophy, a certain return to Platonism seems to demote the aspect of automatism that the conception of the individual presents in the authors inspired by Descartes. Nevertheless, by considering the transposition Malebranche imposes on the Cartesian system, we again find the fundamental

and characteristic schema of Cartesianism in his doctrine of man's freedom. Man is God's creature; he possesses a movement that carries him toward the universal good, and he always has some force to go beyond the particular goods presented by his understanding; but, without adding to or taking away from this force, man can control it as he sees fit; he can stop his will to a particular good, which constitutes sin; man diverts toward a particular good the force that was given to him for the universal good. This explanation conforms with Cartesian physics, according to which the deviation of a movement requires no supplementary force; this principle is merely transposed from the physical to the mental. And yet, the existence of such a capacity would in fact require a particular structure, that of an automaton involving a relay and possessing an energy within it that plays the role of control energy, which is as small as desired but not null. In his conception of the human individual, Malebranche was only able to make the doctrine of Descartes and the doctrine of Plato coincide due to an error of Cartesian physics, i.e. this principle according to which the deviation of a movement does not require any supplementary force. Indeed, due to this principle, Malebranche was able to consider that self-love is completely constituted by the impulse toward the universal good, toward the good in general; the love of God is rooted in self-love because this self-love is in fact already fully constituted by the love of God; "God wills that we will the perfection of our being, but with the invincible love He has for the immutable order." "The desire for formal beatitude or pleasure in general is the ground or essence of the will insofar as it is capable of loving the good." This impulse contains self-love within itself. Malebranche conserves from Descartes's system only this schema of freedom in the control energy of movement, and, on the contrary, he refuses the self-constitutive nature of self-knowledge: the soul does not know its own essence; if the soul knew itself, it would be absorbed in the contemplation of itself. This second aspect of automatism—which is that through which the being affirms itself and discovers a normative power in its own activity—does not exist for Malebranche; order, which for Descartes was the condition of coherence for the individual's activity, is no longer a constructive method but the plan of creation, which we can contemplate. The individual can contemplate order, no doubt, but the individual does not posit the order through which he is universalized. Order is already given. Order is consequently discovered as a principle of nature and of grace; the architect, the constructor, is God, not man. What was a constructive norm of human action for Descartes becomes the principle of the simplicity of paths. Here, we find this parameter which, according to modern terminology, we have called information. God could have made the world infinitely more perfect in each of its parts provided that

he intervene every moment throughout the world's existence: but a machine that requires the perpetual surveillance of its constructor to regulate and control each of its parts through continual interventions in its functioning is less perfect than a machine that is less elaborate in each of its parts but contains within itself the whole sequence of its functioning and does not require the presence of its constructor to repair it and regulate it throughout its functioning. In this sense, God shouldn't have to intervene in a particular way (i.e. through miracles) throughout the existence of creation. Certainly, he sustains the world in being, but according to general laws and never through particular actions. For Malebranche, the true automaton is creation, not man; man, on the contrary, submits to these general laws, for God made the world according to the simplest (i.e. also most general) paths. For Cartesianism, the difficulty of conceiving individuality in a stable and coherent way therefore stems from two very distinct and independent aspects involved in automatism; the first is that of the control of an effector energy by a control energy. The second is that of the circular causality through which the being acts upon itself. The connection between these two aspects was difficult without the intervention of a potential, which all Cartesian thought refuses. It was nonetheless intellectually possible thanks to the Cartesian principle concerning control energy: no energy is required to direct a movement. However, if we truly reflect on this notion—which is applied by Descartes to the problem of the interaction of substances in the human composite and by Malebranche to the problem of sin<sup>103</sup>—we see that there is an impasse in this attempt at a passage to the limit; an energy as small as we could desire is not a null energy. This suppression of any potential aspect of the individual to fully save his actual character leads to a result opposite the one that was sought: the disappearance of the individual being's consistency. For Spinoza, the passage from the level of the first type of knowledge to the level of the second or third type is impossible by the individual himself; true individuality, that of *essentia particularis affirmativa*, can be constituted only as separate from determinations, which are negations; Descartes's dualism, Malebranche's occasionalism, Spinoza's opposition between knowledge of the first type and that of the other two are three manifestations of the same difficulty: to conceive the individual according to a system of pure actuality.

#### LEIBNIZ

Leibniz, on the contrary, presents another way to conceive individuality by attempting to realize a vast synthesis of all the conceptions relative to

individuality and of all the aspects of this notion. He in fact reintroduces the notion of a potential reality in the individual, but he attempts to make it compatible with the notion of an automatism based on the mathematical paradigm of the series, which *ad infinitum* determines terms that are always new but not contingent with respect to the reason of the series and to the first term; the concrete individual notion contains all the successive states of development for the individual that the monad is. Are the terms of the mathematical series in fact actual or non-actual with respect to the series itself? Does a non-developed series contain actuality and potentiality at the same time? Leibniz founds his system of individuality on this aspect of the ambivalence of the series, which is determined and yet capable of infinite development. The notion of the individual is universalized because everything in the world is an individual: there are nothing but individuals, and these individuals are substantial. The monadology is a vigorous attempt to rationalize and systematize the paradox of individuality<sup>104</sup> we find in various ways in all developments of Cartesian thought. However, the problem of individual freedom remains difficult to pose in this system. Leibniz does not in fact want to accept Descartes's postulate according to which it is possible to modify the direction of a movement without any force.

Leibniz's intellectual method is based on a rapport that is generative of an infinity of terms. The mathematical infinitely small is an example of this; the infinitely small is indeed homogeneous with finite parameters; the infinitely small of the line is an infinitesimal line; consequently, the rapport between two straight lines is independent of the absolute dimension of straight lines and can remain the same when these straight lines become infinitely small. However, the direction of a curve in one of its points solely depends on the determination of this rapport when these lines are infinitely small; this rapport therefore permits the analysis of the infinite because through it we can find the direction of the curve at any point whatsoever. Whence in every question the paramount importance of the discovery of an algorithm that plays the role of the infinitesimal algorithm in the calculus of the infinite. The notion of individual substance is nothing but the series of its changes; in the same way, there is a law of the connection of individual substances. Problems related to individuality arise from an intelligibility of the infinite, which contributes a notion whose fruitfulness is inexhaustible.

The three fundamental principles of Leibniz are the principle of identity, the principle of sufficient reason, and the principle of continuity: "what is remarkable must consist of parts which are not; nothing arises all in one piece, whether it be thought or movement." Reality is therefore an inexhaustible

continuum; we cannot exhaust its parts. From the start in Leibniz's physics, there is a new vision of the properties of bodies; in addition to figure and movement, elasticity and certain internal forces must be attributed to bodies; this elasticity and these internal forces suppose the *ad infinitum* divisibility of bodies, which, consequently, would not have any exact and determinate figure; one body differs from another not due to figure or magnitude but due to the internal force that it manifests. Descartes didn't respect this principle in his laws of the shock of bodies; he neglected the true constant intervening in the exchanges of movements, which is the product  $mv^2$  (mass times speed squared). Living force is therefore particular more so to the body than to movement, such as Descartes defined it; living force belongs to the body more concretely: here, there is a more perfect interiority of what we today call the energy relative to each body. For Leibniz, in a body force is the permanent cause of all the actions it can perform and all the passions it can undergo; it is the "first entelechy, which corresponds to the soul or substantial form." This law of the constancy of force (what we today call kinetic energy) in a body is a veritable reality for Leibniz. The corollary to this law is the law of the conservation of the quantity of progress (constancy of the algebraic sum of the projection of speeds on an axis). Force, inherent in the body, accounts for all mechanical changes; Leibniz is opposed to Newton as though to a physicist who needs a *Deus ex machina* to prevent a system like the solar system from ultimately destroying itself based on the action of gravitation: only a bad artisan repairs the wheels of the machine he has created. Leibniz wants to make physics and metaphysics coincide, and, toward that end, he wants the world to be a perfect automaton; the physical individual endowed with force is a simultaneously physical and metaphysical being; the set of all these beings does not require external intervention to function. But a universal definition of kinetic energy that would be valid in all cases remains to be provided.

Extension is not divided into finite and infinite bodies; each of the bodies is itself actually subdivided *ad infinitum*. Among real substances, each contains within itself the infinity of the universe in its own way. No reality is divided up in the world without being infinite in its own way. And yet, if it were a matter of a single instant, this participation would be sufficient to ensure perfect automatism of the real as a whole; but the infinity of the world is a syncategorematic infinity consisting in the impossibility of ever arriving at the last term of a progression. The necessary complement to these syncategorematic infinities is a categorematic infinite, which is the law of the series and which is necessarily found outside it.<sup>105</sup> Insofar as they are series

of changes, individual substances are the complement of infinity in the sensible universe. All the laws of the series that individuals are constitute an indefinite multiplicity; a hypercategorematic infinite is the law of this infinity. Consequently, each individual substance contains the traces of its entire past, the seeds of its entire future. "Every substance is like an entire world and like a mirror of God or of the whole universe." The individual being is therefore a microcosm in a certain sense. But it can be wondered if the identification of living force with the "first entelechy" of an individual substance is compatible with this conception of substance; living force is part of the system of actuality; it defines an actual energy, not a potential energy. And yet, potential energies are precisely the ones that are always energies relative to the state of a system but not to an individual taken absolutely; they are energies of relation; there must be systems of individuals for potential energies to exist. They give relation a reality. However, to account for individuality, a certain potential must also be supposed; the individual is not explained fully in the system of actuality. Leibniz wants to compose the world with individuals: such is the difficulty of his system, which is expressed by the characteristics—difficult to reconcile together—of substance, which he defines by making it the center of his system. According to Leibniz, Cartesianism, which contains the seeds of Spinozism, downplays the individuality of substances, with the soul as well as the body ceasing to be substances to become modes of thought or extension. For Leibniz, substance is inseparable from the predicates or accidents of which it is the subject, and it is inseparable from other substances. The only veritable realities reside in individuals or monads. Proclus designated by the term monads the unities of order inferior to the supreme One which, in various aspects, contained the whole multiplicity of the universe. Leibniz wants to make individual substance intelligible;<sup>106</sup> all changes in the individual are deduced from its notion in accordance with the principle of sufficient reason: "Now it is obvious that predication has some foundation in the nature of things, and when a proposition is not identical, that is to say when the predicate is not expressly included in the subject, it must be virtually included in it, and this is what philosophers call *inesse*. So, the notion of the subject term must always include that of the predicate, so that anyone who understood the subject notion perfectly would also judge that the predicate belongs to it. We can therefore say that the nature of an individual substance or of a complete being is to have a notion so complete that it is sufficient to include, and to allow the deduction of, all the predicates of the subject to which the notion is attributed." Thus, the contingent truths relative to the individual are necessary *ex hypothesi*. Is this necessity a metaphysical

necessity? The objections made to Leibniz assert the incompatibility of this necessity and human individuality: the geometer De Volder says: "Everything that follows from the nature of a thing is in this thing invariably as long as this nature persists; it would therefore follow from the notion of individual substance that nothing is active by nature; for action is always the variation of the creature." Arnauld made critiques oriented in the same way: is not saying that all the changes in an individual are deduced from its notion, like the properties of a sphere are deduced from its definition, to suppress, along with contingency and freedom, every kind of veritable individuality? God alone can envision the categorematic infinite, which is reason making intelligible all the terms that constitute the syncategorematic infinite. And yet, it is the distinction between the understanding and the will in God that makes the solution possible: the categorematic infinite is not only what has been thought by God as possible but also what is willed by Him; for God to be able to think what He created, He had to make a choice among compossible systems for the one that presented the maximum essence. Each created individual substance contains within it something of this world, which possesses the maximum essence: this is why it is necessary *a priori*. However, this necessity is a characteristic that is connected to the individual as the member of a totality, not the individual posited in its isolation. Here, we again find this parameter that we call information today, which always appears when the problem of the individual is posed; information is what formed the *essentia particularis affirmativa* for Spinoza; it is information here that makes of the individual a necessary being and confers on it its microcosmic nature through which it is an image of totality and point of view on the universe. This parameter establishes the possibility of participation without ruining the distinction between particular beings. Nevertheless, it is worth noting that this principle of maximum essence is an optative more than a certainty; and yet it may be said that Leibniz's thought highlights one of the most important aspects of individuality, namely the fact that it participates in the universe based on the information it contains.

Leibniz's optimism is therefore a very important aspect of his system, which is not necessarily connected to creationism; in fact, beneath the idea of creation and the system of compossibles, there is the idea of the distinction between the quantitative material existence of a being and the maximum essence presented by a system of reality that does not possess any additional quantitative material existence; here, order becomes a characteristic of the systems of individuals, while in Descartes it was that through which the individual manifested and exerted its inventive force. But the order constituting

the individual's substance or being its instrument of creation is always this parameter that is distinct from the quantity of matter. This parameter is essential to the individual, either as a condition of its existence, or as means of its action, or as an aspect of its existence in the form of affirmative particular essence. The discovery of this notion constitutes the new character of seventeenth-century thought and allows it to free itself from the old impasses of this question of individuality. This discovery undergirds all the images of automatism and mechanism that we come across in various forms throughout all the authors of the seventeenth century who deal with individuality, even when they are preoccupied with other problems corresponding more so to what the customary discussions proposed for reflexive thought.

#### THE EIGHTEENTH CENTURY

Returning to what is original about man, the thought of the eighteenth century valorizes the particular qua negation of the universal, as though the universal were something artificial, something non-real. The individual consequently becomes the concretely singular and original being; but then it is the notion of order as creative force of universality that disappears. The being is no longer defined as that which possesses within it a capacity for constructive order or which contains within its complete individual notion something of the order that the divine will has rendered a contingent real, whereas the divine understanding would grasp the necessity of this order the best, or as affirmative particular essence, albeit as interiority. Nevertheless, the paradox of individuality is revealed in yet another way: this individual originality cannot be absolutely terminated in existence alone; it not only needs to exist but needs to express itself in order to be; individuality seeks its complement in another form of information than order: the information of communication; instead of constructing or being constructed, or uniting the will with nature, the individual expresses itself. But the paradox of individuality is expressed in the fact that this expression becomes essentially ambiguous, for the individual is destined to express itself, and this act of expression reacts on the individual structure; subjective judgments are consequently submitted to a necessary ambivalence; the individual's interior and exterior communicate through consciousness, and the problem of individual unity is no longer that of the soul and the body, but that of the relation between the expressed being and the unexpressed being. For the fundamental difficulty persists: to make information coextensive with the being is merely an optative and cannot serve to explain the initial reality of the individual being.

The logical paradox of the seventeenth century here becomes a moral paradox; expression in itself is profanation and consecration all at the same time, and it shows in each act the best and the worst of human activities; whence the essential ambivalence of expression as information of the individual. In the search for unity through unicity, the individual splits in two.

#### ROUSSEAU

This is the approach we find in Rousseau. From the start, Rousseau notes that each individual knows only himself: "I have often noticed that, even among those who most pride themselves in knowing men, each hardly knows anyone but himself, if it is even true that someone can know himself."<sup>107</sup> Self-knowledge does not arrive without the expression of this knowledge, because the rapport to others is loaded with information here and is the equivalent of Cartesian order; it is not to refute others' judgments that Rousseau wants to make himself known; what is essential is the expression, not some practical result in opinion; beneath worldly opinion, there is the relation between subjects, and this relation is what has the power to arrange and give value to subjective realities. Such an act of expression is precisely above any apologetic intention, for it is superior in its constitutive power to any reality that it could defend. This expressive potential is manifested by the experience of the moral wound that we feel when we see ourselves disfigured and misunderstood in the judgment that others bear upon us; the fact that judgment is inadequate is more serious than its depreciative aspect; in this case, the injury is less offensive than the error, which renders us unrecognizable, foreign to ourselves, disordered and disorganized in the judgment that others bear upon us. What is foremost is not praise or blame, but the coherence and truth of the image of the subject in others' judgment. "I made these observations above all in relation to myself, not in the judgments I have made of others, having soon felt like a separate type of being, but in those that others have made of me." The analysis of the preamble to the Neuchâtel manuscript shows that for Rousseau the fact of making oneself known not only has the value of a truth, but also the value of an act of affirmation in being. This expression of self-knowledge is a veritable method with a universal meaning: "Concerning these remarks, I resolved to take an additional step for my readers in the knowledge of men by drawing from them, if possible, this unique and erroneous rule of always judging the heart of others by my own, while, on the contrary, it would be necessary most often to know one's own heart oneself based on reading into the hearts of others." Rousseau wants to

attain more than a “comparison” of oneself with another, because comparison remains at the level of the terms: order is a reality of relation that requires the non-confusion of terms: it is by becoming aware of the differences that oppose us to another person that we can attain this stable and non-relative knowledge of our being. Expression is the act within which the differences of individuals acquire stability. This is why one must “know oneself and another.” Afterwards, the wound of the soul, the regret of having been judged badly by others, misunderstood, is a profound experience because it gives rise to the feeling of “essential differences” and introduces them into existence by expressing them so as to publish them in a way in which they are participable for everyone. By publishing his essential differences, the individual escapes from solitude. In the relation with others, there is a reactive causality between essential differences and the communication between individuals; the fact that essential differences are invested in the relation confers an infinite reality and an infinite fruitfulness onto this relation. In this endeavor of expression, gravity and emphasis are explicable more nobly than by Rousseau’s pride: pride instead encourages isolation; only vanity urges on the will to make oneself known and well-judged; and yet, Rousseau is not a vain person.

Solitude is the condition for this self-expression; the tranquility of the soul is in fact necessary for self-knowledge. The relation to oneself that self-knowledge provides is not profoundly different from the knowledge of others and the relation to others: congratulating one of his correspondents for withdrawing into solitude, Rousseau writes in 1739: “When the lantern reveals nothing, it is indeed a necessity to deal with oneself and to take oneself, lacking anyone else, as a friend and confidant. But we must be somewhat acquainted with this confidant and this friend and know how and how much we can trust him.” The perpetual nostalgia for the Friend is to some extent satisfied by self-knowledge, which in the relation that it establishes consequently has the value of being. Furthermore, having experienced the world after the controversy of *L’Ermitage*, when Rousseau feels the need for solitude like a passion, the search for self-knowledge becomes a method but still retains an important aspect of spontaneous taste: “Readers, I think willingly about myself, and I speak as I think.” The act of expression possesses its value within itself, independent of precision: “In the end, I am persuaded,” writes Rousseau to Dom Deschamps, “that one is always very well painted when one is painting oneself, even when the portrait bears no resemblance.”<sup>108</sup> These words may remind us of Spinoza’s when he said that the idea is not like a silent image painted on a canvas. Self-knowledge is not a self-portrait. It is a work that has a constructive value: “I will make something unique and I

dare to say something truly beautiful.”<sup>109</sup> Self-knowledge immediately has the power to stabilize individual life by arresting the state of oscillation between the physical consternation provoking the slumber of the soul and the excessive feeling of misfortune, which provides the force to fight for truth. This stability of the reflexive state is expressed in the letter to Coindet on 29 March 1766: “With what will we be content in life, if we are not content with the only man we cannot escape?”<sup>110</sup> This is how the *Confessions* are a creation and a construction. The *Reveries* reveal the same preoccupation: “But myself, detached from them and from everyone, what am I myself? This is what remains for me to seek out.” “I should not and do not want to occupy myself any longer except with myself. It is in this state that I reprise the succession of the severe and sincere examination that I once called my confessions” (*First Reverie*). At the beginning of the fourth promenade, then in a preface meant for the *Reveries* but abandoned, Rousseau renovates the *know thyself* of the Delphic temple. This formula was ultimately written by Rousseau on the back of a playing card in 1776.

Nevertheless, the paradox of individuality still manifests in Rousseau from the beginning of the endeavor through a splitting. This splitting is from the start a splitting in time: Rousseau attempts to write his life at the age of fifty; it is not the man of today that he expresses, but the man of yesteryear: “I write the life of a man who is no longer but whom I have known well, whose living soul has known only myself and who deserves to be known. This man is myself.”<sup>111</sup> And yet, this splitting is what permits recurrence in expression: memory becomes the instrument of self-knowledge. However, memory is not a simple communication between the real self and the past self: I am my past; I cannot become conscious of this lived and living past, for it is the condition of all consciousness, but I can express it through the act of my present self, which is realized and realizes it in this expression; the present of the act of expression makes the present self react upon the past self and consequently makes the self react upon itself, because the present self retains the potentials of the past self. Because the past engages the present, it continues to be in potential form in this present that takes it up again; consequently, the past animates the present, which orders the past. This schema of the recurrence of causality characteristic of individuality manifests throughout all the aspects of the unfolding of this longer endeavor. The evocation of past happiness is in the retreat to Wootton, in the peacefulness of the present; the memory really actualizes in enjoyment: “all the memories which I had to recall were for me so many fresh enjoyments.”<sup>112</sup> On the contrary, when the conflict with Hume and the “brothers” of the continent disrupt Rousseau in

July 1766, the narrative Rousseau takes up again becomes an act of pleading, full of judgments and moral reflections, like, for example, the episode of the stolen ribbon. The universe of conspiracy begins to organize in the present: consequently, the evocation of the past is a defense, just as the present is a defense; this is the time at which Rousseau writes books VII–XI of the *Confessions*. The self appears to him as a third person then: “I have here,” he writes to Madame de Boufflers on the 5th of April 1766, “a man who is of my acquaintance, and whom I long to know better. The company that I am going to connect to him will prevent me from desiring any other. I esteem him enough not to fear the intimacy to which he invites me.”<sup>113</sup> This man that he is appears to him like an “immense chaos” and a “dark and filthy labyrinth.”<sup>114</sup> Having ordered this chaos, self-knowledge primarily aims at a “what am I?” and not a “who am I?” This demand for order and totality is so great, so essential, that it prevails against the objections arising from the classical conception of the meaning of the moral work: edification. “If I silence anything, I will not know anything about it, as far as everything stands, as far as everything is one in my character, and as far as this strange and singular assemblage needs all the circumstances of my life to be revealed.”<sup>115</sup>

The conception of the individual that emerges from this reflexive labor involves an initial aspect that is worthy of interest: we are full of prior impressions that “we carry without us noticing.” Rousseau notes this: “While probing in myself and looking in others for what these various manners of being are attached to, I found that they depended largely on the previous impression of external objects.” So, we are not completely ourselves, and things make us partly what we are. Here, Rousseau finds an inexhaustible foundation for individual originality. Under these conditions, the body has a power over the soul: “Everything acts on our machine and consequently on our soul.” This lesson will be taken up by Maine de Biran, who will propose to study the rapports of the physical and the mental. The observations that Rousseau makes in book IX of the *Confessions* were to lead to a book that would have had the title *Sensitive Morality, or the Materialism of the Sage* and was never completed. The difficulty in thinking individuality is expressed here by the obscurity of the reciprocal action of the physical and the moral, an action through which a perpetual possibility of splitting is perceived. Reduction to unity seems impossible and dishonest to Rousseau; he forcefully attacks the recently published English book *Research on the Soul*, where, “by virtue of I don’t know how many fine and entirely conclusive anatomical details, it is proven that there is no soul, since the author hasn’t seen one at the origin of the nerves.” And it’s this reason that leads Rousseau in the *Second Dialogue*

to criticize the claims of the “philosopher-surgeons.” He prefers, in the rapports of the physical to the moral, to accept without comprehending the “many contradictions” by declaring that he does not seek to “elevate them like a physician.” Refusing the materialist simplification, Rousseau nevertheless notes the influence not of the body but of objects and the external world (what we today call the milieu) on the soul and on the passions in particular. In letter XXIII of the *New Heloise*, Saint-Preux expresses himself in the following way: “I admired the influence of the most insensible beings on our liveliest passions, and I despised philosophy for having no more effect on the soul than a succession of inanimate objects.” This succession of inanimate objects is in fact constituted by the whole world in which Saint-Preux lives and perceives. The purity of the air is correlated with inner peace: “It was there that I substantially disentangled in the purity of the air where I was the real cause of the change of my mood, and the return of that inner peace I had lost for so long.”<sup>116</sup> Inversely, the imagination can act on the body: “The source of my agitation resides in an overactive imagination, ready to take fright at everything and magnify it to the furthest extreme.”<sup>117</sup> The imagination consequently predetermines the occurrence of real states: “A sad penchant to foresee all the misfortunes that I fear and a cruel exactitude of fate to justify all my fears ensures my own”; the soul prepares the body for a future that it organizes. This effect is just as intense for the past: “The description of my past pains would make me feel them all again, and my imagination, revived by the depiction of so many evils, would make them so painful to me that the best doctor in the world could not cure them.”<sup>118</sup> It is therefore necessary to discover an order for this reciprocal action and the movements of the body: “From how many errors would reason be saved, how many vices would be kept from being born, if we knew how to force the animal economy to favor the moral order it so often troubles” (*Confessions*, II, p. 69).<sup>119</sup> It is therefore possible to order the reciprocal action of the soul and the body; this is one of the ways in which psychological analysis, responding to the question “what am I?” makes it possible to inform the original chaos.

But this order is not an ultimate victory; the term of the body, until then considered as simple, reveals itself to be double and charged with a rapport of incompatibility, to the point that the first effort to introduce order into the relation of the physical and the moral does nothing but move the problem of individual unity backward; its completion unmasks a deeper and incoercible duality of the vital dynamism: that of temperament, which Rousseau still calls “physical constitution”: “Of all the men I have known,” says Rousseau judge of Jean-Jacques, “the one whose character derives most completely

from his temperament alone is Jean-Jacques" (*Second Dialogue*). In the *Confessions*, he expressed the duality of forces that come from the head, from the heart, from the entrails, and from the disturbances of the blood: "Two things, almost incompatible, are united in me in a manner which I am unable to understand: a very ardent temperament, lively and tumultuous passions, and, at the same time, slowly developed and confused ideas, which never present themselves until it is too late."<sup>120</sup> The second *Dialogue* still expresses this internal contradiction of temperament: Rousseau discovers in himself "a mixed temperament, formed of apparently contradictory elements: a sensitive, passionate, or easily inflamed heart and a dense and sluggish brain whose solid and massive parts can only be put in motion by a prolonged and lively agitation of the blood." The contradictory aspects of his temperament are thus opposites, like liveliness and slowness. These two movements are movements of life, and their contradiction cannot be resolved into unity within reflection. In this sense, it is at the moment when, at Wootton in 1766, Rousseau begins to sometimes feel life fade in him and the fear of death rise that he reveals the most remarkable analyses of the ardor of living, of this ardor that possessed him since adolescence. At the time when Rousseau writes to Malesherbes in May 1766: "My nights are cruel; my body suffers even more than my heart; total loss of sleep reveals the saddest ideas to me; the air of the country combines a somber influence with all this, and I begin to frequently feel that I have lived too much," he describes in the following way the strength of adhering to nature: "All this throws me into the immensity of beings, to combine them, to choose them, to appropriate them as I see fit, without shame and without fear." Rousseau then finds in a middle state between health and sickness a sort of equilibrium between pure existence without consciousness—which he calls "strength"—and life accompanied by consciousness, which requires a sickly state: in the strongest sickness, the soul is alienated from itself: "My soul, alienated from itself, is all in my body," writes Rousseau to Malesherbes.<sup>121</sup> But full health is also a harmful state: "I hate this robust health, those people who have so much strength and so little life; it seems to me that I have lived only since I felt half-dead."<sup>122</sup> Life conscious of itself is therefore a state of equilibrium between strength and sickness: vital activity and the exercise of the soul's faculties can then coexist, and it seems that temperament itself becomes unified in a stable *modus vivendi*.

This contradiction in reciprocal action doesn't just manifest in the temperament taken in its totality as an opposition between liveliness and slowness; it also manifests within each of the tendencies and behaviors, for example the sexual tendency and amorous behavior: Rousseau's masochism, linking

enjoyment with pain, victory with humiliation, triumph with the experience of punishment, deploys itself starting with the corporal corrections inflicted by Mademoiselle Lambercier all the way up to the amorous states of the mature man. Ardor and inhibition become associated and linked together in the complex development of a reciprocal action; feeling arises, radiates outward, is transmitted to the body, is expressed in heat, words, and silent gestures, then abruptly restrains itself and reverberates within the soul under the blow of a painful inhibition. And yet, this reciprocal action integrates the play of external circumstances, which makes the development unpredictable. This is why sensuality is never the only force that creates an emotion; Rousseau declares in the *Second Dialogue*, “sensual more than it should be, but not enough to be just that.” There exists a “moral sensitivity” that “is nothing but the faculty of attaching our affections to beings which are foreign to us.” He depends much more on his senses, and he would depend on them even more so if moral sensitivity didn’t often provide diversion: “Beautiful sounds, a beautiful sky, a beautiful landscape, a beautiful lake, flowers, aromas, beautiful eyes, a pleasing look, all of which reacts on one’s senses only after having pierced somehow into one’s heart.” Consequently, individual duality persists even in the liveliest outpouring of love. In the same way, Rousseau manifests the duality in the motivation and external appearance of sexual behaviors: “Do I not therefore have strict morals only because I have depraved tastes?”<sup>123</sup> wonders Rousseau, who evokes the memory by thinking about the manifestations that psychoanalysis and psychopathology call masochism, auto-erotism, exhibitionism, fetishism. This fundamental ambiguity survives under the apparent unity of adult behavior. “When I became a man, that childish taste, instead of vanishing, only associated with the other that I never could remove from my sensual desires.”<sup>124</sup> The transition from simple masochism to the behaviors of the adult is continuous: “I enjoyed acts of submission, I thus found a way to approach the object of my lust from some vantage, conflating the attitude of a suppliant lover with that of a penitent schoolboy.”<sup>125</sup> It is the same sexual pleasure that is coveted, from Mademoiselle Lambercier’s punishment to the terrors experienced at the feet of Madame Basile: “to fall at the feet of an imperious mistress, obey her mandates, or implore pardon” procures for Rousseau an enjoyment of the body and soul. Masochism therefore reaches the elevated style of courtly love. We understand why Rousseau demands a complete expression of his reality: “What is seen is not the least part of what is; we see the apparent effect, the internal cause of which is hidden and quite often complicated” (*Preamble; Annales*, IV, p. 3). The habit to express each feeling with antagonistic terms is explained

in this way: "even though sometimes next to the ones I loved I was carried away by the furies of a passion that deprived me of the faculty of seeing and of hearing, out of my senses, and seized with a convulsive trembling in my whole body."<sup>126</sup>

Moral conscience reflects the same basic duality: "I felt that I, who have always believed myself and still believe myself to take the best from men, that there is no human interior, pure as it may be, that does not conceal some hideous vice."<sup>127</sup> Theft has its beautiful side: it is a form of desire, an access to inaccessible places, to a garden of the Hesperides. Consequently, there is an ambivalence in theft, which is, on one side, a wrong, the possibility of debasement, and, on the other, an act that provides the feeling of freedom. The degrading automatism of instinctual theft and the freedom of the gratuitous act coincide in the ambivalence of individual motivation.

In itself, the act of expressing is capable of organizing the individual being, but at the price of a duality lived at the very instant of expression: "By giving myself both to the memory of the impression and to the present feeling, I will doubly depict the state of my soul, namely, the moment when the event happened to me and the moment when I described it."<sup>128</sup> The state of self-enjoyment that characterizes expression is comparable to the states of self-enjoyment that are the very feeling of existence in its immediacy and irreducibility. This feeling involves plenitude and desire at the same time. The plenitude is that of sensation, whether direct or rekindled by memory, when the being is fully engaged in pleasure or passion; possession is enjoyment, which can have external objects but is nonetheless a happiness separate from its source, withdrawing so to speak from things and beings, while continuing to draw its strength, its duration, and its renewal from things and beings: "How to say what was not said, done, or even thought, but tasted, felt, without uttering some other object of my happiness than this very feeling? (. . .) Happiness followed me everywhere: it was not in any assignable thing, it was all in myself, it could not leave me for a single moment."<sup>129</sup> This ambivalence of interiority and exteriority, of the dependence on "occasional causes" and autonomy, is clearly marked in reverie, and quite particularly in the first form of reverie for Rousseau, wherein the being transforms the sensations it receives from nature around him and reconstitutes an inner landscape within himself. One feast day, Jean-Jacques goes out for a walk around town in a solitude haunted by the image of Madame de Warens. The context first announced reemerges in impressions, and what alone is described is that which remains in memory to have touched his heart. The external circumstances, the ringing of bells, the beauty of the day, the pleasantness of the

landscape, the scattered pastoral houses are so to speak seen again, refracted by the sensations. This reverie directed toward the future is a precise reverie, not diffuse like those reveries of the *Dialogues* and the *Promenades* will be later. If there is a part of receptivity in it, there is also a part of creation, and in this rapport between receptivity and creation, or better yet between the passive state and the active state, it is the first state that will increasingly prevail as Jean-Jacques grows older. Here, sensation feeds on the emotion provoked by absence. Absence involves a richness that is proper to it: restlessness develops in absence a feeling of exaltation, due to which Jean-Jacques becomes aware of being fully alive and possessed by an inner strength that wants to burst forth. Absence doubled by memory is like a half-presence stronger than material presence, just as "life" is not full health, but an intermediary state between strength and sickness that allows for reciprocity between the physical and the moral. The absence of the beloved object takes on an almost metaphysical signification in Rousseau at the time of his passion for Madame d'Houdetot: this absence becomes solitude. "I begin a correspondence that has no example and will hardly be imitated," writes Rousseau to Sophie.<sup>130</sup> This correspondence is in fact a monologue whose only true interlocutor is Rousseau. "I prefer to pay the costs of a trade alone. I do not even hope that you read all the letters I write to you; but at least I will have the pleasure of writing them."<sup>131</sup> Later, he asks Madame d'Houdetot to receive his letters in thanks: "Do not be surprised by this strange prayer: it has been so long since I learned to love without return that my heart is accustomed to it!"<sup>132</sup> This manner of loving the image of others that one has within oneself supposes a splitting of the individual, fairly similar to the splitting that provides reverie with a density and power of active permanence. Solitude is the condition of splitting, and, in this search for the reality of the self, solitude intervenes as a means with the greatest richness, as a condition of reciprocity between the different parts of the self that the splitting due to solitude unleashes and exalts. The fruitfulness of the self, its power to arrange its own states in reverie, requires solitude as a condition for establishing this recurrent causality. The paradox of individuality is still revealed in the depth of solitude; the unity of self-consciousness can only be attained through an organizing activity, but this organizing activity itself requires a solitude that provokes splitting. Internal richness, which makes it such that the unhappy and lone being possesses within it the means to love for two, is not the development of a unity but the conflict of a nascent duality. Consequently, the internal contradiction of states appears as a source of the instability of behavior; veritable presence can only be felt through solitude, in the heart of solitude, in the

same way as enjoyment in humiliation at the level of the senses; and in the fullness of presence is prepared the emptiness of absence already felt in the heart of presence: "If ever I felt the full force of my attachment, it was when I did not see her. When in her presence, I was only content; when absent, my uneasiness reached almost to melancholy, and a wish to live with her gave me emotions of tenderness even to tears."<sup>133</sup> By contrast, within the happy plenitude appears a perpetual dissatisfaction and a nostalgia that is reminiscent of Lucretius's "*surgit amari aliquid*"; this is what is revealed in the *Mémoire présenté à Monsieur de Sainte-Marie*, which is communicated to Madame Dupin in April 1743: "Desire is opposed to pleasure: this is an uncontested fact; so we lose over time what we gain from feeling."<sup>134</sup> Desire is the "only feeling that time does not weaken."<sup>135</sup> Pleasure and desire can in some way be measured as the product of intensity by time. For pleasure, the product remains constant, since the two quantities that are its factors vary in inverse proportion. But desire does not submit to this law: it is like a fire that incessantly devours new objects and is consequently the cause of itself;<sup>136</sup> due to this schema of conditional reactive causality, desire has the facility to always be born again and not to exhaust itself, since it is nourished by the play of its own exercise. Is it therefore an absolute plenitude? No, for desire is still nothing but being in potency, an undefined postulation of the friend or the lover. This desire that maintains itself does not satisfy itself. The more intense it is, the more it creates the anxious search for the encounter with the other person, which is presaged in each real or imaginary contingent existence: "This house perhaps contains a man made to be my friend. A person worthy of my homage perhaps walks every day in this park."<sup>137</sup> What conditions itself within the individual is precisely the quest for the contingent encounter of a presence coming from outside; this interiority of the individual is not the cause of itself except to the extent that it calls on exteriority; this aseity seeks a contingency. If this desire manages to abate, the whole individual becomes annihilated: "My soul focuses and collapses on itself." But this contingency conceals itself: "I demand as much as I give, and, finding no one who provides, I enter back into myself with the pain of finding no heart that responds to mine."<sup>138</sup> "Whoever should love me as I know how to love is still to be born, and I am almost done for." And Rousseau concludes by way of an extremely profound and expressive formula: "I needed two souls in the same body; without that, I always felt empty."

This duality of souls is impossible in the instant; but the schema of succession realizes that which the incoercible unity of the subject does not allow in simultaneity. Apparent instability and self-denial are the means by which

this necessary duality of the individual finds a way to exist. Rousseau's life seems like that of two different individuals; the death of the first coincides with the birth of the second. It is at the very least Rousseau's intention to show a profound break in his life: "You must admit that this man's destiny has some striking peculiarities. His life is divided into two parts that seem to belong to two different individuals, with the period that separates them—meaning the time when he published books—marking the death of one and the birth of the other." This is the way Rousseau speaks of himself in the *First Dialogue* (p. 18). Furthermore, in a letter to Coindet dated 29 March 1766, Rousseau writes: "I find myself regenerated by a new baptism . . . I have taken off the old self." These two eras are opposed from the start as that of happiness to that of misfortune: "What a different picture I will soon have to develop! Fate, which favored my inclinations for thirty years, contradicted them for another thirty, and from this continuous opposition between my situation and my inclinations, one will see born enormous faults, unparalleled misfortunes, and all the virtues, except strength, which can honor adversity."<sup>139</sup> The affective state that envelops expression is itself different: "I wrote the first with pleasure, willingly, at my ease, at Wootton (. . .). Today (. . .) I would give anything in the world to be able to shroud in the night of time what I have to say."<sup>140</sup> In this second period, Rousseau orients his most fervent aspirations toward a reality of the eternal return of transitory states. "I am far away from that dear time of 1762, but I shall come back to it, at least I hope so. I shall go over again, in my mind at least, those pilgrimages to Colombier, which were the purest days of my life. Might they only begin over again, and again! I should ask for no other eternity."<sup>141</sup> Rousseau wants to stabilize himself in everyday existence, to always conserve the same principles, the same convictions: this is the explicit meaning of the reform of 1752. "I am now at the maturity of age, and the supreme strength of the understanding. I have already reached the decline . . . Let us fix, once for all, my opinions, my principles, and remain the rest of my life what I shall find I ought to have been, after having well reflected. Sunk in weariness and increasing heaviness of mind, I have forgotten even the arguments on which I based my belief and my maxims, but I shall never forget the conclusions I have drawn from them with the approval of my conscience and my reason, and I shall henceforth hold fast to them."<sup>142</sup> This fixation in becoming seems even to Rousseau to be filled with a supernatural meaning: "Do not these deliberations and the conclusion that I drew from them seem to have been inspired by Heaven itself to prepare me for the destiny awaiting me and to enable me to bear it?"<sup>143</sup> Bernardin de Saint-Pierre relates that at the end of his life, Rousseau often said that he

wanted to “be oneself.” This stability, which permits one to be oneself, risks being destroyed by everything that unmoors the being from himself. “My head, screwed up to the pitch of an instrument it did not naturally accord with, had lost its diapason; in time it returned to it again, when I discontinued my follies, or at least gave in to those more consonant to my disposition.”<sup>144</sup> “I think I have already remarked that there are times in which I am so unlike myself that I might be taken for a man of direct opposite disposition.”<sup>145</sup> This will to be oneself corresponds to a need to define a firm attitude with respect to society: “I consoled myself for my want of aptitude in conducting myself skillfully in this world, on feeling it is a science we should not endeavor to attain.”<sup>146</sup> The attempts to adapt loosely if not cleverly to a society for which Rousseau is not made end in failure; this civilization of Venice, Lyon, Paris is foreign to his soul; all the efforts to make him no longer a “cursed beast” become exhausted in fairly ineffective “expedients.” Rousseau’s nostalgia amidst “pretentious people” is revealed to him when he sees “a poor, simple bush of thorns, a hedge, a barn, a meadow”;<sup>147</sup> he would have then readily “struck the face of Monsieur leader and Monsieur master.” This liberation regarding social rules is symbolized by the sale of the watch. But there is also the need for a positive aspect to this reform: “Thrown into the world in spite of myself, without having the manners of it, or being in a situation to adopt and conform myself to them, I took it into my head to adopt others of my own, to enable me to dispense with those of society.”<sup>148</sup> On 26 January 1771, Rousseau writes to the Marquise de Saint-Chamond: “For eight years, I sought a soul among men; now I no longer search for anything, and my lantern has faded”. Nevertheless, even in this moment, Rousseau writes: “Our most pleasant existence is relative and collective, and our self is not completely within us.”

For Rousseau, the idea of the conspiracy is not just an expression of a mental derangement; Rousseau does not want the conspiracy to use a completely false portrait of the character and life of the author as its principal means; there is a conspiracy of lies about the individual: the conspirators want to bury him alive; the league is this barrier between the individual and the world; its goal is apparently to “organize the inconsequentiality” of Rousseau’s behavior. Through this reasoning of the imagination, Rousseau forces outside himself the aspects of incoherence that he feels in order to unify himself; he also forces outside himself the existence of what modern psychiatrists call the “anxiety threshold,” which prevents the subject from achieving even the simplest acts of life without feeling himself dangerously isolated and shut off in himself in some way. All the images Rousseau employs are characteristic of

the mental states in which he finds himself at that moment; but the point that is most interesting here in particular for the study of individuality is the following: Rousseau wants to somehow render his individuality coherent by simply forcing outside himself those aspects of inhibition that are revealed within himself; since inhibition in its effects is completely similar to an external object, this transformation is easy; furthermore, this inhibition is combined with the disorder of contradictory impulses, which impede one another: Rousseau also accuses the league for this disorder so as to ward it off and force it outside himself in order to purify his individuality: "Their project, as I have told you, is to do a general recasting of all the anecdotes collected or made up by their satellites, and to arrange them in a historical body disposed so artfully and worked out so carefully that everything absurd and contradictory, far from appearing to be a tissue of crude fables, will appear to be the result of the inconsistency of man."<sup>149</sup> There is in this mythical idea of the conspiracy a refusal to accept the knowledge and awareness of certain aspects of individuality. Should it be said that Rousseau's personality was richer in psychoses than a normal personality? That could be, but this procedure of the expulsion of inhibition and disorder is only livelier and more striking in Rousseau than in a less diverse man; in fact, this refusal to know oneself in one's entire multiplicity, which includes the totality of the coherent and the incoherent with a certain connection between the coherent and the incoherent, is a testimony of human individuality. It is difficult to fully account for one's own incoherence and inhibitions without resorting to myth. Before resorting to myth, Rousseau tried to unify the different stages of his life in the form of destiny; but destiny, which substantializes the individual, cannot account for inhibition and disorder; the notion of destiny must be expanded to the point of making history as a whole intervene; the conflict between Rousseau and the conspiracy takes on the dimension of an epic; between religious intolerance and the philosophy of Enlightenment, which is the religion of counter-religion, Rousseau appears as the champion of truth. And this truth is no longer a truth for a group, like the Jesuits or the "philosophes," but a truth which—precisely because it is presented by an individual who is not a member of any community—presents within itself a guarantee of universality. Once again, myth is imbued with value and reconnects with the world by reaching the level of the epic of the mind. It is at this point that the whole individual being is conceived not just as unique, but as exceptional in every respect: "I dare to believe that I am not like anyone who exists (. . .) My situation is unique, my case is unique since the world has existed."<sup>150</sup> This exceptional aspect of the being accounts for the "long chain of his misfortunes" that

no long chain of reasons could arrange but that takes on a meaning according to fatality.

However, this latter explanation, which safeguards both the personal unity and infinite diversity of acts and aspirations, is not completely satisfying; individuality always reappears as a paradox: it appears under fatal necessity, and, correlatively, it deploys the feeling of the unique and determinant character of an instant; what creates necessity is the instant, and not perhaps a supernatural destiny sketched out for all eternity. Blind necessity emerges in the course of events: "and from that moment I was ruined. All the rest of my misfortunes during my life were the inevitable effect of this moment of error."<sup>151</sup> Even the happy time of his life at l'Ermitage, which lends itself to the sweetness of remembrance, is called "the terrible and fatal era, of a fate unparalleled among mortals."<sup>152</sup> In contrast, alongside this determinism that has emerged from a contingent moment, a determinism of personality manifests that is so strong and so clear that it permits reconstructing the unfolding of life rationally based on the hypothesis of this personality, in the same way that Condillac forged the constructive synthesis of sensations and ideas in the statue: "Judge whether he could have escaped from the convergence of these different causes that make him what he is today. To get a better sense of this necessity, let's set aside all the facts for a moment, let's suppose that the only thing known is the temperament I described to you; and let's see what would naturally result from that in a fictional being about whom we would have no other idea."<sup>153</sup> Here, the ambivalence still remains: natural determinism is also a moral force that has all the characteristics of Providence: "The man of nature learns to bear in everything the yoke of necessity and to submit to it, never to murmur against Providence, which began by filling him with precious gifts, which promises to his heart gifts more precious still, but which, in order to repair the injustices of fortune and men, chooses its time and not our own."<sup>154</sup>

The same aspect of paradoxical contradiction, the solution of which posits again a new problem from within itself, is revealed in Rousseau's art of living: to flee from men and to be seeking them out, to have written deep within one's heart the need for a friend and to be unable to keep any, these are ethical contradictions. All these contradictions are summed up in the reciprocity of life and death: "I can indeed say that I only began to live when I regarded myself as a dead man."<sup>155</sup> At this point, Rousseau would like to destroy a part of himself: "Reason kills me; I would like to be mad so as to be healthy."<sup>156</sup> Exile is anticipated as a means of accessing the existence of Robinson Crusoe. "It has come to me a hundred times to propose travelling

to America, hoping that I would be left in peace . . . I would like to find some way to end my life in the islands of the Archipelago, in Cyprus, or in some other part of Greece, provided that I find an agreeable climate<sup>157</sup> fertile in plants.”<sup>158</sup> Failing exile, the passionate preoccupations of life become the fundamental methods for the art of living, particularly botany and music; Rousseau gives an incredible amount of attention to botany; he asks for a microscope and goes on excursions that are sometimes painful, like the excursion to Mount Pilat<sup>159</sup> from Monquin; his letters to Madame de Lessert show the extent and depth of Rousseau’s knowledge, as well as the painstaking nature of his methods of observation. Through this effort, Rousseau is convinced that he can escape from madness and disorder: “This preoccupation is well suited to a walking machine which is prohibited from thinking. Unable to leave my head empty, I want to stuff it; it must be full of hay to be free and true without fear of being decreed.”<sup>160</sup> Similarly, the taste for music is active in Rousseau, who plays the zither and tries to rediscover the romances of Geneva, which he sings, so he says, “with a broken voice.” These tastes, particularly that of botany, are consequently an “affair of reason.”<sup>161</sup>

At the same time, Rousseau attempts to discover a doctrinal truth that does not aim at universality but can be perfectly suitable for the individual: “I adopted in each question the feeling which seemed to me the most directly established, the most credible in itself ( . . . ). It is important to have a sense of self, and to choose it with all the maturity of judgment that one can manage.” Rousseau wants a doctrine that conforms to inner assent: “so solid, so appropriate to my reason, to my heart, to my whole being, and reinforced with the inner assent that I feel lacking in all others.” Consequently, it is no longer intellectual life that is a deployment of the individual and that affirms him as a worker of universality but, on the contrary, the individual who seeks a philosophy that is well-adapted to him; it is this point in particular that marks the opposition between the conception of individuality in the seventeenth century and Rousseau’s conception of his own individuality. Furthermore, according to Rousseau, reason can acknowledge the existence of an order superior to it: “I cannot prevent myself from henceforth considering as one of those secrets of Heaven impenetrable to human reason the same work that until now I looked upon as only a fruit of the wickedness of men.”<sup>162</sup> This supernatural force is sometimes envisioned according to the modalities of an Eastern fatalism, sometimes according to the forms of Christian Providence. This is because in the belief in destiny and Providence, there is acceptance of oneself: “Reduced to myself alone, I nourish myself, it is true, on my own substance, but it does not run out; I am sufficient unto

myself” Here, the distinction between amour-propre and self-love intervenes, just as, within the reverie, the distinction intervenes between the self we leave behind and the true self we enjoy and relative to which nothing is external, that which A. Béguin in *L'âme romantique et le Rêve* characterizes by saying: “Absolute self-consciousness here is conflated with what we call the unconscious.”

*The search for individual reality in the eighteenth century* occurs by way of a deepening of the being's concrete singularity; but this deepening of singularity leads to a splitting as pronounced as the bi-substantialist dualism of the seventeenth century; the individual is found to be inhibited by himself, and his search for freedom collides with the barrier that he himself is, just as his desire for plenitude collides with this interior emptiness of the being who feeds on his own substance; the interior duality and the presence of the other resurge from within, posing problems different from those that appeared in the seventeenth century, but with an analogous internal dynamic, as if the problem of individuality were always the same in its source, throughout various intellectual and social circumstances, changing from age to age.

In the eighteenth century, deism appears as an aspect of a general tendency that consists in the individual's search for all the elements of his moral and intellectual life in his experience and his reasoning. Deism is therefore opposed to this “true religion” to which François de la Chambre consecrates his Treatise of 1737: “There is nothing more desirable either for princes, or for societies, or for the particulars that compose them,” for princes as the “motive of keeping people in duty,” for societies who find in God avenging crimes a stimulant to virtue, for the particulars who find in God a consoler. Deism and atheism are associated based on all the protests in favor of tolerance, all the reformational tendencies, while the deists' adversaries assert the value of social police and the means of government. Deism is associated with empiricism and individualism: “inner feeling” is in fact a strength of the individual.

The morality of feeling that develops in the eighteenth century also affirms the value of individual consciousness. Thus, Shaftesbury believes in natural social inclinations, which are, for each individual being, directed toward the good of the species; these inclinations are the work of a providence that maintains through them the perfect harmony of universal order. Man possesses a “moral sense” that makes him aware of good and evil. In 1725, Hutcheson systematizes these ideas in his *Inquiry into the Original of Our Ideas of Beauty and Virtue*. For Hutcheson, there is a “moral sense” that truly deserves the name sense, since it does not presuppose any innate idea.

Diderot brings these ideas relative to the moral sense into France by translating Shaftesbury's *An Inquiry Concerning Virtue or Merit*. In England in 1723, *The Fable of the Bees: or, Private Vices, Publick Benefits* expands the vision that Mandeville developed in 1705 on the topic of the rapport between individual morality and collective life: even private vices can contribute to the smooth functioning of society, which in this sense so often depends on non-virtuous foundations. This work exerted significant influence throughout the eighteenth century, not via the rigorism that drives Mandeville, but due to the schematism that it contains and that opposes it to Hobbes's thesis on authority.

Individualist ethics is particularly prominent in Wolff's thought; his essential rule is reminiscent of Kant's: "do what makes you and your neighbor more perfect and abstain from the opposite." This individualist and naturalist ethics does not acknowledge any authority other than the reasoned knowledge of what we are. The correlative of this ethical conception is a geometrical vision of the universe in which the whole is composed of collaborating individuals. The representation of society leads to the political theory of enlightened despotism: a liberal individualism is completed by a State which, to maintain unity, regulates the life of individuals down to its finest details; this providential sovereign compels its subjects to work and to save, and it takes measures against deism and atheism.

However, Vico and Montesquieu did not completely reduce human reality to the activity of individuals; furthermore, the authors of natural series have understood specific realities; but, perhaps save Vico, these authors elaborated a social static equilibrium and a biological static equilibrium rather than corresponding dynamic equilibria; however, a static equilibrium seems to be able to be superposed onto a dynamic theory of individual reality without modifying it: these thoughts have remained somewhat independent from the conception of the individual and have not become the universal systems that they could have been if they were dynamic equilibria: it is only later that these social and biological dynamic equilibria will have considerable importance for the theory of individual reality.

#### MONTESQUIEU

In the time of Montesquieu, the representation of the individual that coincides with this social static equilibrium is quite similar to the representation Descartes elaborated: man is free due to intelligence, not because of his alleged independence relative to the order of creatures submitted to fixed laws: "as an intelligent being, he incessantly violates the laws that God established

and incessantly changes those that he himself establishes.” The laws God has made are themselves this way “because they have some relationship with his wisdom and his power”; the necessity that guides man is a sort of necessity of convenience; this necessity is discovered based on the man who searches through calculation and reflection for the laws that are the best in a given historical situation. Legislation is therefore like mechanical combinations, which an inventor knows how to discover and institute. These combinations are regulated by the eternal laws of movement, and yet they wait for the inventor to realize them: such is the role of the individual, the being who is capable of invention, the being in whom human freedom is revealed essentially. The problem to be resolved is the same for a legislation as for a mechanical combination: it is that of maximum effect. As with Descartes, Malebranche, and Leibniz, here we come upon the search for this parameter that is information and that can characterize a political system as a mechanical system. The individual as inventor is an operator of information. Montesquieu compares the various political systems according to this larger or smaller quantity of information, which is also a greater or lesser degree of freedom: there is a minimum of freedom when public powers act in a completely arbitrary and unregulated way: each of these powers must therefore be limited and controlled by a force that balances them out; the force that is opposed to the arbitrariness of a public power must be homogeneous with it; it must be another public power; consequently, there will be political freedom when the homogeneous powers will balance each other mutually. This search for the condition of the highest degree of information for a social static equilibrium leads to the discovery of principles like those that define monarchy: “in monarchies, policy effects great things with as little virtue as possible. Thus, in the nicest machines, art has reduced the number of movements, springs, and wheels.” The general principle is the following: “To form a moderate government, it is necessary to combine the several powers; to regulate, temper, and set them in motion; to give, as it were, ballast to one, in order to enable it to counterpoise the other. This is a masterpiece of legislation, rarely produced by chance.” Montesquieu even foresaw the existence of a principle of degradation in opposition to the realization of a very high degree of perfection in the informed system. “Mechanics indeed has its frictions, which often change or arrest the effects of the theory; politics also has its own frictions.” The individual’s essential role in politics is therefore to comprehend so as to be able to invent.

In a general way, above all in *the second half of the eighteenth century*, the conditions of philosophical thought define a certain manner of envisioning

the problem of the individual that will not be encountered afterward; the rise of the third estate permits the individual to feel his forces otherwise than in the heroism of a battle, in the mysterious drive that leads to the countries of the infidel, or in the discovery of a vast system of thought that incorporates everything a human being can think. In the seventeenth century, the necessity of the system was for a philosopher the obligation for each individual thought to attain the universality of representation and action. In the eighteenth century, on the contrary, universality is divided, distributed amongst the numerous members of a team; this is no longer the era of the founders who discover a method but that of the realizers who, having divided up the task, cooperate eagerly with the realization and advent of an order; we should also note that this synergy of efforts is infinitely easier to realize for an enterprise of destruction than for a construction, which always requires a plan for the whole; the effort of critique is cumulative by itself; result adds onto result, like the progression of dilapidation in an established order; there is no need for a system in order to attack; a method is sufficient; this is why all it took was resistances from the regimen and prejudices to dynamically give coherence to the efforts of all the philosophes of the Enlightenment. The situation of the individual in this effort of attack directed against prejudices and the political order consists in an attitude that does not seek to assume the universality of the vision of the world, nor does it seek to absolutely assume the universality of the individual's place in the world; those who would wish to do so are qualified as "visionaries." This is the attitude of critique and hostility, which, in this open team, realizes a coherence that lasts for as long as the activity of critique lasts; if the problem of individuality no longer seems to exist for the philosophes of the Enlightenment, that is because this problem could only be posed through a total vision of the being, i.e. of the society in which he struggles, against which he rises up, and which constitutes the focal point of all these efforts; the center of the system, the point that forms the unity of these attitudes, is that there is a given, namely an ensemble of social, political, intellectual, and affective structures that form a unity of the goal—that of the thing to be destroyed—and a unity of being, insofar as the thing to be destroyed exists. There is thus an intellectual hypothetical that conditions the activity of the "philosophes" of the eighteenth century: that of the fact that it is the state of society and thought at the moment in which these beings who are aware of their individuality live. If individuality takes on the lived form of an essentially dynamic being in expansion, that is because this apparently unconditional dynamism was realized by the conditions of intellectual activity in the second half of the

eighteenth century. What is found in the philosophes of the Enlightenment is not a refusal of the systematic unity and universality of reflection, but an implementation of the conditions of thought that were temporarily favorable to a thought that can be unleashed from reflection's aspect of universality. The thought of counter-revolution was like the intellectual compensation for this lack of universality with a contrary lack of universality; it is therefore necessary to comprehend a certain aspect of the individualism of the eighteenth century as an attitude that expresses exceptional circumstances, whose counterpart is the symmetrical and opposite attitude; a reflexive study must unite these two attitudes, which only pose the complete problem of individuality in their relation. By contrast, the sociological or biological thought of the nineteenth century will again attempt to pose the problem of individuality in its universality, precisely so as to escape from this impasse in which the knowledge of man was engaged in the debate between the "Century of Enlightenment" and the thought of writers like Burke or Joseph de Maistre and Bonald.

#### CONDILLAC

Condillac becomes aware of the logical power of the individual being, who possesses a veritable manufacturing faculty of ideas and carries out their genesis within himself: "Our errors stem from the fact that our ideas are badly made. The only way to correct them is to remake them." Intelligence or reason is not a natural block that its origin must justify by explaining it; it is a sort of building or factory; the whole future of the mind is engaged in this work of reform, of reconstruction by means of philosophical reflection, which will allow it to remake better what was made spontaneously. All truths arise from the operation of individual intelligence: in the *Language of Calculation*, Condillac does not introduce any definition, any maxim, and produces all the truths of the operation of calculation; *simples* come from the senses; these are "the simplest ideas that the senses transmit to us," a sort of inert matter for the mind, which will combine them. The development of the mind occurs due to the diversity of the connections established according to utility; in the end, it's a question of "knowing how to form these links in accordance with the aim one proposes and the circumstances in which one finds oneself." The individual should then no longer withdraw into solitude, for inner invention is less abundant and more limited than reality; the presence of the world and of society is not an entertaining diversion but the occasion of experience, which provides a matter to our mind's

activity of elaboration. The indefinite possibility of this progressive labor ensures a dynamic unity for the individual being. The encyclopedic nature of reflection manifests as a presence of the individual to the whole richness of this experience. The individual's connection to the whole is this manufacturing activity of the individual. "Philosophy is no longer the science of a man who meditates with eyes closed; it values all the arts." In order for this constructive method to be valid and fruitful everywhere, it suffices to be able to establish between signs and ideas a correspondence as rigorous as that which mathematics realizes, in such a way that every word is determined there in a fixed and invariable manner. The deductive synthesis is a fruitless method and a teacher of errors; only analysis is valid. The vices of the great systems are understood in this way, as the *Treatise on Systems* reveals. Thanks to this method of construction, an individual who would have nothing but a single sense would possess an understanding with as many faculties as with five altogether; it is the statue of the *Treatise on the Sensations* that shows this independence of the five senses with respect to one another; it is quite similar to the man of the *Essay on the Origin of Human Knowledge* who, in a state of spiritual innocence, sheltered from prejudices and traditions, would be created by God with organs so well-developed that from the very first moments he would have a perfect use of reason. This individual in the state of nature would perfectly realize within himself a perfect constructive genesis of thought without any preliminary system. The *Treatise on the Sensations* only goes further than the *Essay* by striving to show that all mental faculties are anterior to the use of signs; the art of signs only teaches to "take the light further." Therefore, from the very beginning, the individual would possess these mental faculties; those that seem to be superior to this primitive stage (for example, to the primitive capacity—independent of any sign—to know how to count to three) "are only these same faculties which, applying to a large number of objects, develop further." The role of signs makes it possible for the individual to operate this extension.

#### CHARLES BONNET

This same hypothesis of the statue with its signification relative to individuality is found in Charles Bonnet. It is worth noting that for Bonnet, there is a distinction between sensation properly speaking and activity: the preference that the statue gives to the sensation that is most pleasing to it is an action that the statue exerts on this sensation; to prefer is not to act: it is to be determined

and to act; attention is a faculty distinct from sensation; direct internal observation also possesses an undeniable validity, as the ideology of Destutt de Tracy and Maine de Biran will show.

#### DAVID HARTLEY

One of the authors who has best revealed this search for the individual as an operator of information, the creator of his own structures based on his activity, is David Hartley. The as yet superficial study of his thought reveals a very remarkable faculty of discovery in this man who wanted to extend Newton's discoveries into physiology by explaining the connection of ideas through the universality of a dynamic schema of psycho-physiological origin: ideas are linked together by the same process as the one that links in the brain small vibrations retaining the tendency to be reproduced in the same order as the vibrations originally produced by the senses. One hypothesis of Newton's *Optics* attributed the production of sensations to the vibrations of an ether contained in the sensory organs, the nerves, and the brain. In this sense, the individual is the center of an autonomous but non-arbitrary activity that connects sensation to a psycho-physiological activity and connects abstract thought to sensation; this is not an empiricism here properly speaking, since the unity and identity of the dynamic schema ensure a transition from the world to the subject, who posits in an extremely new way the rapport of the particular being to the universe. The individual is no longer isolated in a substantial aseity beyond which a contemplative knowledge would attain a participation in total reality; the contact between the universe and the particular being occurs according to a modality which is neither a modality of activity nor of passivity, but of communication. This thesis is new; it safeguards the particularity of the subject without locking him into himself; it in fact defines the individual being as one in whom and through whom an operation of relation is effectuated; it is the operation of the individual that is an operation of relation; the individual is not substantially isolated from the world; he is inscribed in the world through an operation that distinguishes him not as a complete being in its aseity, but as the author-being of an operation of relation; individuality is the structural identity of this operation repeated on different levels. The psycho-physiological relation, the relation of sensation and of abstract thought then becomes not the problems but the expressions of this reality that the individual is, an active reality of relating. The still quite imperfect state of physiological knowledge in Hartley's time did not allow this author to pursue his research into the

details of psycho-physiological organization; but his hypothesis conserves an important meaning as a representation of the individual's reality.

#### HUME

The dynamism of the individual is revealed in the philosophical method of Hume, who considers philosophical thought to be a strictly unconditional activity. "When an opinion leads to absurdities, it is certainly false; but it may not be certain that an opinion is false due to the fact that its consequence is dangerous." Metaphysical studies do not have to justify themselves through their utility and attractiveness: "And though these researches may appear painful and fatiguing, it is with some minds as with some bodies, which being endowed with vigorous and florid health, require severe exercise, and reap a pleasure from what, to the generality of mankind, may seem burdensome and laborious." Philosophy thus becomes a critique that begins with man's appreciations and beliefs to seek out their principle through analysis and induction. Nevertheless, it may be said that this unconditional activity at least acknowledges a limit beyond which it cannot reach: the individual himself, insofar as he possesses the principle by which he evaluates. In the same way, and in the relation of the individual to the external world through sensation, Hume accepts the individual as a limit because he takes an impression for an absolute and does not seek to go further than it; the associative relations between ideas do not require a physiological explanation, contrary to the intention of the Cartesians and Malebranche in particular. In the mind, order is maintained through the law of association, just as order in the universe is maintained by Newton's law. However, within the individual, the important point is the activity of thought: for example, error is explained by a confusion between ideas which occurs when "the actions of the mind through which we consider them are not that different." This activity is completed through habit, which founds spontaneous belief and characterizes the imagination. And yet, this doctrine, which places so much importance on the activity of the individual, cannot, due to its method, lead to a knowledge of this individual reality: belief in the identity of the self as a permanent reality superior to the changing unfolding of impressions and ideas is unfounded; the notion of the identity of the self is no more concrete than that of the identity of external bodies; it is the imagination that creates the fiction of this permanence. Hume nonetheless states in the appendix to *A Treatise of Human Nature* that this explanation is unsatisfying, and that he doesn't know how "our successive perceptions unite in our thought or consciousness." In ethics,

the individual remains the center of relations and not isolated substance: Hume condemns Diogenes's crazed individualism or Pascal's isolation, in which he sees "religious superstition or philosophical delirium."

#### VAUVENARGUES

In turning to the work of Vauvenargues, we can begin to see a difficulty of attempting to define the individual within specific limits. Vauvenargues gains an insight into the existence of an ideal of power, as much for intellectual life as for moral life; we are our passions, "which are not distinct from our being," for the origin of the passions lie in the "feeling of power," which we want to increase, and in the feeling of "smallness and subjection," which we want to inhibit; our freedom consists only in the determination of our acts by our thoughts and our feelings, i.e. by ourselves: "it would be madness to distinguish one's feelings from oneself." Passion surpasses the limits of the individual; as soon as it is strong, it leaves aside our possessions and our well-being; the amour-propre defined by La Rochefoucauld is opposed to self-love, which seeks its happiness outside itself in the exercise of the passions that reveal "the insufficiency of our being." In this sense, greed is "the desirous instinct that calls on us to increase, to support, to strengthen our being." The love of glory, one of the strongest stimulants for great souls, gives us a natural authority over hearts and minds and incites us to work. From this notion, we can see how a certain definition of a man's worth or value arose, which is distinct from mere moral qualities and which is formed by the potentials contained within the individual, thereby leading him to undertake tasks that require him to go beyond himself or his perceived limits. The genius and heroism that characterize the human being concerning what is most elevated in him are the faculty of surpassing vulgar contradictions and inventing a solution to the most difficult problems according to an act of absolute independence. For the hero, the rule is fidelity to oneself and to one's dominant passion. According to Vauvenargues, "everything that has some being has some order."

#### DIDEROT

We see the emergence of a different conception of individuality (albeit one based on the same inspiration) with Diderot, who, by way of physiological and biological reasoning, shows that individuality is not an ultimate or absolute reality; the survival of certain organs detached from the body, like the heart of a frog, gave rise to the development of new theses. The Montpellier

school, whose conclusions Diderot accepts, sees in the animal an aggregate of animalcules, which, when joined with one another, become the organs for the whole: there is no other unity in the whole than this unity of aggregation that incessantly varies and transforms without there ever being a veritable death.

#### PHILOSOPHY OF NATURE

The philosophy of nature that is revealed in various ways in the eighteenth century brings about both an expansion and an abandonment of the limits of the individual being: sometimes the individual being is connected to a natural world with which it is contemporaneous, sometimes it is presented as the result of a long evolution; it is in the object that the individual knows himself and contemplates himself or feels himself exist and become the causes that surpass him; the philosophy of the Aufklärung also attempted to provide man with awareness of himself, but it did so by showing him the objects that he elaborated and that constitute his own civilization. This closed domain of progressive and optimistic humanism does not concern itself with the natural object, but only with the object elaborated or completely created by man, that which has a human utility; it concerns itself with institutions in particular and considers the whole content of morals, customs, religions, language as something institutional, both to annex to the human domain all that is human and to be given the right to continue the work undertaken by past generations; what has been made by man can be unmade to be remade better: the humanism of the eighteenth century utilizes a doctrine of universal artificialism as an instrument; the individual being then appears essentially as the inventor or reformer, one who increases this human domain of manufactured or instituted things, or repairs it and improves it by replacing old institutions with new ones. Conversely, the philosopher of nature cannot limit the human individual to this voluntary and conscious task that is completely oriented toward the purely human domain. He connects the individual back to a society that is not a pure institutional work but has something natural about it; moreover, human society is profoundly a community, and the origins of human right are found in this *de facto* state of the human community, which does not proceed from itself but originates with a cosmic becoming according to a supernatural intention; even within what seems purely institutional, the artificial has little place: language is of divine or natural origin, but it does not result from a convention. Man is an individual as a constitutive unit when he is a member of a contractual society instituted by men; but he is an integral part, vaster, more connected, less precise in

his limits when he is a member of a *de facto* community, since the fact is the source of right because the fact is natural. The individual then becomes nothing and everything, nothing by himself in his isolation, and everything through universal participation, which gives him an intuitive awareness of the world and the destinies of humanity in the world; this nature is at the same time a supernature, for it surpasses itself in itself, and the individual is these two things at the same time, because he is a simple unit and a being who participates. The traditions of Neoplatonism and Christian mysticism become mixed with certain influences that perhaps need to be connected back to the cult of Mithras by way of a long elaboration of initiatory sects. In the cult of Mithras, the individual being is formed by sunlight, the first reality; upon his death, the individual being dissolves again, progressively disappears into its elements, and these elements are absorbed by the sun, back to which they ascend by following its rays. Here, the relation between the animated principle of beings and each individual being is a direct, material, and spiritual relation; in Platonism, this is a relation of exemplarism, which is also direct but without the exchange of matter: both traditions and both conceptions seem to coincide in German initiatory philosophy and seem to be animated by an inspiration coming from Christian mysticism. This philosophy of the object is therefore profoundly different from that of the humanists of the Aufklärung; the object, in the presence of which the individual knows himself and becomes himself, is something that emanates from nature; it is reality and symbol qua reality in the ancient sense of the term, the symbol as a reality separated from another reality with which it constituted an original whole and in which it enjoyed its true nature. This fragment of reality isolated from the other constitutes with its twin a couple of σύμβολα [súmbola], beings which, as they come together (συμβάλλω [sumbállo]), coincide by resurrecting the original being, like the two halves of a broken amphora. The individual is conceived as a symbol, i.e. a being which, quite far from having its whole capacity of existence within it, is not completely given to itself and feels a caesura, a void, a lack, which is the result of this separation and the sign of the absence of the other symbol, the individual's complement with respect to the absolute. Symbolism is a philosophical and mystical conception of the individual well before being a poetic doctrine. This search for the individual's complement, after which the self discovers that it is incomplete and frustrated, leads to bringing a quite particular attention to signs: signs become the indices that permit the particular being to rediscover its complementary symbol and therefore to attain absolute unity, the veritable individuality it does not possess in this existence because

it has been paradoxically divided and separated from itself and is nothing more than half of itself. The feeling of incompleteness becomes an instrument of discovery, the first step in the metaphysical ascension and the migration toward the being's unity. This metaphysical symbolism finds an expression in French Romanticism a century later, particularly with Lamartine, where he expresses himself through an inspired Platonism in search of the soul-sister. We find the metaphysical feeling of incompleteness in Chateaubriand, where he expresses himself in reverie and in search of the sylphid more so than in an ideal *élan*. With Vigny, reflection postulates this complementary being, and the veritable individual is the couple, since Eva is at the same time the double, the sister, and the wife; she is also thought and the will itself: "You push man by the arm; he gets up armed." But it is undoubtedly with Gérard de Nerval that the conception of individuality is more clearly inspired by an initiatory philosophy of the symbol. Throughout his life, Gérard de Nerval always searched for the complementary being; within the unity of this complementary being fuse and merge the image of the mother "lost in the cold mist of the North," the image of Adrienne, the descendent of Valois, the image of Aurelia, who magically grows up to the limits of the world, the image of the young girls of the *Daughters of Fire*, whom Gérard de Nerval tries desperately to identify their images with one another, and ultimately the image of the Virgin Mary or the Sainte, or the priestess and the witch, and finally, the fairy.<sup>163</sup> This complementary being is one and multiple, according to a singular circularity that makes it such that the images replace one another through a continual substitution that is only possible due to a basic identity: "The thirteenth returns, it is still the first." In this alternating and recurrent image, animated by a continual rhythm "like the alternatively white and pink star of Aldebaran's constellation," the opposite aspects fuse together, "the sighs of the Sainte and the cries of the fairy." The search for the complementary being is expressed in life by a will to return to the origin of things, the origin of being, to the locales of the oldest civilization, to the place from whence the day comes.<sup>164</sup> In his madness, Gérard de Nerval traveled toward the Orient.

In the eighteenth century, the main precursors of this metaphysical symbolism in France are Rétif de la Bretonne and Senancour, who are themselves preceded by Diderot.

#### NATURALISM, MATERIALISM

For Diderot, the idea of nature is accompanied by the refusal to specify the limits of particular beings; individuals do not have rigid limits assigned to

them: "There is nothing precise in nature . . . nothing is the essence of a particular being. And you speak of essence, poor philosophers." Nature is a whole into which particular beings dissolve. *D'Alembert's Dream* expresses a naturalism wherein Bordeu, a vitalist doctor, expounds the thesis of the animal, an aggregate of animalcules which, by joining together with one another, become organs for the whole; in the individual, there is no other unity than this unity of aggregation, which incessantly varies, transforms, without there being a veritable death and without reaching the whole. There is a general flux that must change the species completely from one planet to another and from one era to another. The transitory identity of the self only exists through this whole: "Change the whole, you necessarily change me"; there is in each being an image of all the others: "Every animal is more or less man; every mineral is more or less plant; every plant is more or less animal." This naturalism blurs the limits of the individual and brings him closer to nature; instead of being an unchangeable term, the individual appears to be fashioned by nature: "The organs produce needs, and needs produce the organs." Morality is transformed by this naturalism; the individual's return to nature is this return to the instinct described in *Supplement to the Voyage of Bougainville*. Already in the work of a humanist philosopher, we can get a sense of the early sketches toward a philosophy of nature that connects the individual back to something other than humanity and makes of him a being relative to the evolution of the world and to human realities.

Thus, even though materialism is not a philosophy of nature properly speaking, it implies a conception of the relation between the individuals of the human or animal species and nature: there is a type of unity among all observable, physical, vital, moral, social, human, or animal phenomena, and this type of unity is founded by a common rapport to nature. This intuition of a profound kinship of phenomena is the seed of a conception that is not humanist, even though its starting point is found in certain humanists like Diderot, La Mettrie, d'Holbach, Helvétius.

#### D'HOLBACH

A certain return to Ionian physiology becomes apparent with d'Holbach: "movement is a manner of being that necessarily follows from the essence of matter," according to *The System of Nature or, the Laws of the Moral and Physical World*.<sup>165</sup> Each being has an inherent movement, a proper movement, which excludes the Cartesian principle of the homogeneity of matter: "Each being can act and move only in a particular way ( . . . ) Each being has laws

of movement which are proper to it and constant acts following its laws, as long as a stronger cause does not interrupt its action.”<sup>166</sup> It seems that we again find here the principle of the physics of the Epicureans, who gave each atom a power of movement and attributed to each being the force to persist until a greater force dissolves it by breaking its cohesion. Matter is therefore profoundly individualized according to the materialists; matter is not at all this ungraspable and unnamable being that the prime matter of Scholasticism had presented as the contrary of a form contributing intelligibility with determination. Quiddity is already in matter, which, for the materialists, is endowed with spontaneity and dynamism; this is how, in the confrontation between spiritualism and materialism, we can understand the very great difference in the degrees of dignity given to matter; for the spiritualists, matter is the most ignoble of beings because it is the very contrary of the individual; but for the materialists, matter is not something ignoble; it is individualized and is the productive source of a constructive dynamism.<sup>167</sup> This philosophy of nature is a philosophy of spontaneity and of the individuality of matter. Opposing Leibniz to Descartes, d’Holbach cites with the greatest honor the principle of indiscernibles, whose formula he borrows from Bilfinger. Finality, which is needed to organize a matter from outside without spontaneity, becomes useless in this philosophy of nature; order in nature is nothing but a rigorously necessary arrangement of its parts founded on the essence of things; the beautiful organization of the seasons is the result of gravitation. The human individual is also a mixture of matter, “whose arrangement is called organization, and whose essence is to feel, think, and act.”<sup>168</sup> The mind of each individual follows from his physical sensibility, which itself depends on temperament. The individual’s spontaneity is revealed in the search for pleasure and the fear of pain.

#### HELVÉTIUS

It is in this same way that Helvétius shows in his work *On the Mind* that the diversity of individuals only depends on mental dynamism, which is identical in everyone and which comes from physical sensibility but which is oriented in various ways, because attention takes up this or that object; “we become stupid as soon as we stop being passionate”; the individual coincides with his dynamism; there is no essence of particular beings. What constitutes the genius of statesmen is not an individual’s particular character but various circumstances; inventors are not exceptional individualities, since they have precursors. In this sense, the individual is found to be strictly connected

to his conditions of genesis; the dynamism with which he is endowed is that of nature; he is the bearer of a force that does not characterize him; the individual is not singular. Education is capable of completely fashioning the individual, of giving him this or that particular passion; passion is not constituted by an innate character of the individual, an indestructible nature: it only has to do with circumstances; man can almost be a completely artificial being, as Helvétius tries to show in his treatise *On Man*.

This materialist philosophy is therefore a philosophy of nature in a sense, even though it leaves a lot of room for artificialism; this philosophy is in fact ambiguous, and another aspect of the philosophy of nature will be the one to replace it by renouncing it: "We did not understand," says Goethe in speaking of the *System of Nature*, "how such a book could be dangerous. It seemed so dull, so Cimmerian, so deathlike, that we could hardly bear the sight of it."<sup>169</sup>

#### BUFFON AND ROBINET

This philosophy of nature becomes more precise with the biologists and naturalists; Buffon and Robinet think that there is no matter that is not alive, i.e. capable of nutrition, reproduction, and growth; this idea existed in Diderot, who took it from the alchemists of the Renaissance, who were anti-mechanists. Individuality coincides with the simplest forms of being. Nature solves a problem that consists in realizing the three functions of matter with the most perfection possible; the individual is what realizes these three functions, but it can do so with more or less perfection. In this search that is the production of species, nature has followed, according to Buffon, a single and continuous line of species, in which each more closely resembles its neighbors than all those species which are further removed, in accordance with the Leibnizian axiom of the "plenum of forms"; "it must be supposed that everything that can be, is." Beneath the different species, there is the unity of a living type that in all possible variations manifests through the continuity of species, which is nothing but the unity of the natural plan. Thus, there exists a sort of archetype of living individuality anterior to varieties and to species, which is the solution of the great problem of nature: the individual comes to resolve a problem of incompatibility and perfection in the mutual relation of the three functions of nature. Citing the works of Daubenton inserted in the fourth volume of the works of Buffon, Diderot raises the idea of a "prototype of all beings," the metamorphoses of which are the living species. The notion of series (which is perpetually present in Buffon) gives to the panoply of living beings an aspect that makes the individual into both

the model of nature and that which is connected to the universe in a strict way; the continuity of species indicates the unity of a natural plan; the actual state of the living world has its reason in certain rapports inherent in this very state; it is the order of simultaneity that prevails over the order of succession; in this sense, the individual's relation to the species does not indicate any anteriority of the species relative to the individual; on the contrary, when the thesis of evolution will become established, replacing the fixist thesis of series, the species will appear to be more significant than the individuals: the individual will be at the service of the species. This is why it is important to note that the philosophy of nature that emerges from the works of naturalists like Buffon and Robinet makes the individual into a term that is on the same level as the species and is neither anterior nor posterior with respect to it. This is the conviction that marks Robinet's work entitled *Considérations philosophiques de la gradation naturelle des forms de l'être, ou les essais de la nature qui apprend à faire l'homme* [Philosophical considerations of the natural gradation of forms of being, or the attempts of nature that learns to make man]. The human individual is the most elegant and complicated solution to the problem that nature has given itself: individualization is progressive from the mineral up to man; in the mineral, it is very imperfect, since the activity is completely subservient to matter, such that all the operations are related to the material subject; in the animal, progress is marked by the advent of spontaneous activity, albeit still linked to the material mass. Finally, in man, matter is nothing more than the organ of activity; higher still, it could be that activity completely dematerializes and becomes pure intelligence. The living individual is therefore the term starting from which, through a movement on this side of and beyond, we can know the full extent and variety of the real. The living individual is thus the model of reality, for the structure of nature is either the simplest—that of a series (or of a chain)—or, more precisely and more profoundly, that of a ramified tree replacing the overly simplistic schema of the chain, according to Charles Bonnet: “the scale of nature might not be simple and thrust out to one side and the other the main branches which would themselves push out subordinate branches.” This conception is also that of the naturalist Pallas, for whom the linear series becomes a ramified tree. Lastly, Buffon further perfects the schema of ramification by making it universal and homogeneous: “nature does not take a single step that is not in all directions”; starting with a given type, nature projects out species that are connected to all the other types of species; there exist relations of analogy in a plurality of directions: the quadruped includes species similar to birds (the bat) and others that are similar to reptiles (the

anteater). The network makes possible the realization of all possible types on each level, to the extent that this level includes it. The natural topology of the network unites at the same time the two opposite images of the chain and the network: the chain indicates filiation based on a single type, on an archetype that surpasses in dignity and perfection everything that will come after it: the subsequent individuals are an imitation of the archetype. The topology of the tree on the contrary supposes that there is a search for an ever-higher term, carried by that which is already realized but destined to surpass it; individuals are approximations of a type not yet created. Buffon supposes these two movements of conversion and procession can coincide, and that the veritable topology of nature is that of a network wherein the motifs repeat indefinitely in all directions, such that the chosen individual is always complete in itself, a source for others and the result of others: in the highest sense of the term, it is a symbol of others. The universe has the structure of a crystal, of which the individual is the lattice.

These theoretical studies and constructions were supported by Charles Bonnet's discovery of beings with a homogeneous structure, like the polyp.<sup>170</sup> The ascending series of beings can no longer be envisioned as a passage from the confused to the distinct in the way Leibniz envisioned it. The intrinsic character of a continuous progress of distinction in the series is no longer sufficient: what must be considered is the structure of an individual term of the series, and it is only with respect to this structure that others can be classified; the highest term is one that allows to classify all the others based on this relation of analogy that goes from term to term. Consequently, one term of the series doesn't merely have a function insofar as it is placed on a certain rank; it also has a meaning in accordance with its own structure; to use a mathematical image, it can be said that the cardinal character of the term determines its ordinal character. Due to analogical relation, the individual has a consistency and a constitutive value that it didn't have with Leibniz. There is reversibility between the proper nature of each being and the manner in which the place it occupies in the ensemble determines its nature. The structure of the network as a topological schema of nature supposes that there is a complete reversibility between the singular individual being and the ensemble.

#### BOSCOVICH

In physics, an effort to conceive reality in this way appears in Boscovich and in Kant's *Monadologia Physica*. For Boscovich, physics can be reduced to a

single law of dynamics, as the title of his work indicates: *Philosophiae naturalis Theoria redacta ad unicam legem virium in natura existentium* [Theory of natural philosophy derived from the single law of the forces that exist in nature]. This reduction is possible because the universe is constituted by an ensemble of points that attract when their mutual distance surpasses a certain limit and repel when the distance is below this limit; the universe is completely constituted by this ensemble of points; matter is therefore reduced to an ensemble of points, and energy is reduced to the forces exerted among these points; the existence of a limit in which the direction of the force is inverted creates a structure comparable to that of a network.

#### END OF THE EIGHTEENTH CENTURY

Toward the end of the eighteenth century, this search for a conception of the individual within a philosophy of nature will be accentuated and deployed in a sense that is less scientific, more affective, more mystical, and in general linked to the meditations of German philosophy. The human individual encounters within himself the feeling of a void that is a postulation and an infinitely valuable movement of the soul. Rousseau felt this void and this drive: "I find in myself an inexplicable void that nothing can fill, a certain reaching out of the heart toward another sort of enjoyment of which I cannot conceive, but for which I still feel a need. And even that, Sir, is enjoyment, for it pierces my being with a vivid poignancy, an appealing sadness with which I would not part."<sup>171</sup> Thus, the individual feels within it a destiny that carries it beyond the world and surpasses its material and actual limits: "my heart, confined within the boundaries of being, finds itself too constricted; I am suffocating within the universe; I would like to hurl myself into the infinite." In this sense, there are transcendent faculties in the individual that are not necessarily developed in every man; the heart has ideas that are its own, according to the expression of Duclos. The illuminism and esoterism of the end of the eighteenth century arises from this search. *Schwärmerei* ("enthusiasm") is unleashed from the philosophy of Enlightenment. The real is supposed as continuous, constituted by a chain of beings; the existence of the individual is situated in all the rapports that link him to the rest of the universe and to its author; this chain of beings is suffused by a universal force; Mesmer explains animal magnetism through the existence of a universal fluid that is always in movement; therein are revealed the intimate and sympathetic connections of all beings to each other. The public was hungry for

physics experiments in which the instantaneous transmission of a fluid from individual to individual established a tangible schema of communication. The Leyden jar discovered by Musschenbroek spreads across the whole continent of Europe because, when it was charged by electrostatic machines, it made it possible to give shocks to a chain of people holding hands, with the chain closing through the dielectric of the charged capacitor. It is reported that a congregation of Carthusian monks conducted this experiment across a length of three kilometers. The same experiment was conducted on a company of royal guards in front of the king at Versailles. Today, we are surprised by the fact that the propagation of electric charges struck Musschenbroek's contemporaries not by its instantaneous propagation in very thin and very long continuous bodies, like a metal wire, but by its ability to pass from one individual to another: electricity is above all what establishes both communication and communion between individuals. Fashion created a cane hiding a capacitor that was charged by means of a rabbit skin before offering it; the two people felt a shock at this moment. Many patients became attached to the Mesmer bathtub to try to become healed. Lastly, the extreme interest aroused by the invention of the lightning rod and the controversy that followed are not just due to the utility of this device, but also to the possibility of capturing the power of thunderstorms, this mysterious force of nature that exalts and transports if it does not strike fatally. The storm exalts the power and desire of communion; it connects the individual to nature. Art itself has felt and used this profound irrational power of the storm: Fragonard, elsewhere delicate and cheerful, painted in *Le Chiffre d'Amour* one of the most passionate paintings of the eighteenth century; the silhouette of the amorous young girl is cut out by a stormy sky, full of menace and hope, blowing away toward the beyond, awaited and mysterious.

#### RÉTIF DE LA BRETONNE

With Rétif de la Bretonne, the individual cannot be the object of a unique relation; for the individual to be fully known and possessed, for the relation to be absolutely true and complete, the latter must exhaust all the possibilities of human, social, affective situations; relation multiplies in the search for an absolute of relation that would give the being itself beyond all situations. This passion of complete relation is expressed in *Les Contemporaines* and in a novel in which Rétif narrates the story of a man who takes in a young girl and is at the same time her benefactor, her adoptive father, and

her husband: the author seeks to conserve the three feelings by joining them without fusing them, as if a single relation, with a single type of feeling, were insufficient to provide an exhaustive connection to the individual being. In this work, there is not, properly speaking, a search for a mixture of feelings that would give rise to an analysis; in fact, what preoccupies Rétif de la Bretonne is synthesis, because what must converge are the three relations and not the feelings that they involve. The world system that Rétif de la Bretonne accepts is also a universal connection in which the individual discovers himself at the end of a vast procession and at the beginning of a conversion: the planets—which are living individuals giving birth to the species that derive from one another and, over thousands of centuries, lead up to man—become unmoored from the sun; then, through an inverse movement of resorption, all beings return to the center.

#### LAVATER

This continuity of beings is still affirmed by Lavater, according to whom “each nature constitutes the copy of all others.” In the *Spirit of Religions*, Bonnevillie considers the world as a “great animal” whose soul is God. The idea that the institutions and forms of society are natural products and not the work of the will of an individual is opposed to the artificialism of the philosophy of Enlightenment. According to Saint-Martin, languages are the expression and the fact of life itself; societies and governments form by themselves and are natural products; expressing the will of individuals, a contract cannot give rise to society. Knowledge does not come from experience, which is always apprehended by the individual; “facts are merely the confirmation of the intelligence and only deserve second rank.” Maistre and Bonald will develop these ideas according to which the individual is little in the world and nothing by himself.

In the doctrines of Lessing, Goethe, Herder, Jacobi, and Kant, we find the critique of the argumentative intellect. And yet, this intellect provides a limited representation of the individual, without participation, without relation, which ends up turning the self into a substance. Critical thought stands against this conception of individuality.

#### LESSING

With Lessing, the human being is envisioned and judged in his dynamism, in his effort, rather than in his fully realized state. “It is not the possession of

truth, to which no man arrives and does not believe to arrive; it is his sincere effort to attain it that constitutes his value; for it is not through possession, it is through the search for truth that his forces develop.”

#### HERDER

Herder grasps the life of the individual as a pulsation within the life of the great whole, within the unity of the divine design. The being invents without convention: “to invent language is as natural for man as to be man” (*The Origins of Language*, 1772). Man has a natural gift for the intuitive view of things and for their expression in a pure, original, native language. Individuality is a natural structure of organization capable of various degrees; each degree is a stage in the development of nature. “From the stone to the crystal, from the crystal to metals, from metals to the plant kingdom, from plants to the animal, we see the form of organization become elevated.”<sup>172</sup> Nature passes from one form to the other through a continuous and unimpeded transition; forms are continuous starting with a primordial type. Nature is then a force in becoming that produces new forms within the limits of the type that it has assigned itself. Nature is creative.

#### GOETHE

This doctrine is also held by Goethe, who opposes his theory of epigenesis to that of the emboîtement of germs and also to that of the “plenum of forms.” Forms do not belong to the individual, nor even to the species, which is in becoming, but to nature. In his *Metamorphosis of Plants* in 1790, Goethe shows how all the organs of the plant are merely the leaf transformed. In the same way, the physiologist Camper knew how to reveal in his schematic designs the transformation of the brain of the fish into a human brain. Epigenesis is a metamorphosis in which the individual is instrument, agent, and theater: only the immediate intuition of the very work of nature, bearing close kinship with feeling and art, can allow us to grasp these geneses; the understanding, which thinks through fixed concepts, cannot serve to think epigenesis.<sup>173</sup>

Hemsterhuis seeks to grasp in the human soul an internal and inexpressible feeling, more primitive than the convictions derived from reasoning: “In the well-constituted man, a single sigh of the soul that manifests every now and then toward the best, the future, and the perfect is a more than geometrical demonstration of the nature of divinity”.

BEGINNING OF THE NINETEENTH CENTURY:  
HEGEL, COMTE, MARX

Sociological thought marks the advent of a new period of reflection on the individual; after having exhausted all the ways of thinking the individual according to the order of simultaneity, then according to the order of succession, and finally according to the object into which he projects himself—either the artificial object that is a technical thing or human institution, or the natural object to which he is connected through his genesis, like the crystalline lattice to the whole crystal—and with the critical period having posited the necessity of recommencing to take up problems in a new spirit, it seems that thought renewed this vast movement of interrogation first bearing on the order of simultaneity, then on the order of succession, and finally on the object in which the individual being is expressed or to which he is connected. But the position of the problems is no longer effectuated on the same level: the individual is no longer an exemplar of being; he is always one among several, he is the member of a collectivity. The counterpart to this advent of sociology is that of the theory of species, of genetics, and of the theories of races. The order of simultaneity as well as the order of succession is defined by way of the interindividual rapport; society as a system of simultaneity and the species as a system of succession frame the individual and make it such that he is no longer studied as an absolute.

The third stage, coming after the search for the order of simultaneity and for the order of succession, has not ended; it made its appearance with the thought of Marx, who sought to define man collectively by his rapport to the technically elaborated object, which contains a reference both to the order of simultaneity and to the order of succession, insofar as a part of human reality is found to be contained in capital and more generally in the forms of nature's exploitation by man, which are considered to be evolving in time: above Marxist theory, there are indeed presuppositions of this doctrine that are new with respect to sociology and the theory of evolution, because they include the reference to an object that expresses man, i.e. the artificial object. A search for man's expression in the natural object also appears in our era.

As noted by E. Bréhier,<sup>174</sup> what changed at the beginning of the nineteenth century is the way in which man appears to himself; Hegel, for example in his *Philosophy of History*, refuses the attempt made by Rousseau to grasp an immediate and absolute essence of man to which mores would be added afterwards; as Bréhier says, taking up Hegel's thesis again, the human being is defined only as burdened with history, and humanity will not be attained

by an abstraction that strips away everything it has acquired, but, on the contrary, by the very law of this acquisition that makes it what it incrementally is. Knowledge is mediate; it only takes place by reflecting the becoming that produced it. This vision of human reality and of all philosophical problems grasps the individual not as a fully made reality, endowed by itself with reality and substantiality, but as a being who represents a certain moment of a reality vaster than it. This integration into the order of the successive corresponds for Auguste Comte to an integration into the order of the simultaneous through which the integration into the order of the successive takes place; the two forms of integration in fact exist for Hegel as well as for Auguste Comte; but, for Hegel, integration into the order of the successive is fundamental, while for Auguste Comte, integration into the order of the simultaneous is what is fundamental; history and society are the two realities on the basis of which individual reality can be grasped. Marx will seek to unite these two basic realities within the reality of class, which has a social aspect and a historical meaning at the same time and effectuates an intersecting of the two orders: the individual is then grasped as the integral part of a class. Faith, instinct, love of humanity or altruism, the intuition of becoming, and class consciousness replace the analysis of the eighteenth century, which sought to grasp the expression of the individual in the object. The individual rediscovers within himself the feeling of nationality, of race as the guiding forces of events, or of the positivity of thought as the conclusion of human becoming, and it is through this discovery that the individual grasps his essence; according to Renan's phrasing, the individual feels himself participating in the Tower of Babel, the floors of which are peoples. History is a faith and a source of energy: the human individual becomes aware of himself through the human sciences; a mediation is introduced into self-knowledge. The individual draws the forces of his action from a nature which is an immense reservoir of energy. Nature is no longer conceived as a structure, but as an ensemble of fields and of potential. In general, the vitalist character of the dynamism of the nineteenth century is revealed, and certainly with good reason. But it should be added that the discovery of the laws of electromagnetic induction, the precise measurement of fields contributed to providing new schemas for reflexive thought. The individual is connected back to the system that surrounds him, even in the absence of any material contact, because he is in a field. The cohesion of the real is that of an ensemble of fields; fields exert an action extremely different from the actions by contact of the static or the dynamic in mechanics: whereas antitypy is a property characteristic of the material solids of mechanics, which makes it such that there can be

only a single solid in one place—excluding all superposition and simultaneity of action—in this same place there can be a multitude of fields without acting on one another but all acting simultaneously on a single object in that place. For example, a body can be submitted at the same time to a magnetic field, an electrical field, and a gravitational field; the physical individual is that which is sensitive to fields, while fields not only do not exclude one another but are not generally sensitive to one another. Furthermore, nascent thermodynamics also provided new schemas of thought, introducing a remarkable extension to the notion of potential energy and confirming at the very heart of scientific rationality the irreversibility of energetic transformations according to the principle of the increase in the entropy of a closed system. The singular being as well as the particular state are found to be connected to a universe according to space and time; a historical law appears in the physics of energy; the geometry of forces becomes that of fields and gradients. These realities are not mysterious properly speaking; they are measurable with as much precision as those of eighteenth-century physics. But they introduce schemas of thought in which the whole is no longer reducible to the sum or combination of elements; the place and the moment are no longer Kant's ideal diversity, the pure dispersion of the phenomenon; the phenomenon is already a spatial and temporal system in the form of a field or law of convergence of the series of successive states.

#### RELATION WITH KANT

A critique of knowledge like the one Kant produced could no longer apply to the world of electromagnetism or thermodynamics, for the field or the law of the increase in entropy are not only a way to connect phenomena, but also the very weft of phenomena, their manner of being, and more than their condition of appearing. The *a priori* forms of space and time as Kant defined them cannot account for the fact that the manifold of sensibility is unified prior to any apprehension in the form of a field or convergent series; the field and the convergent series of the transformations of energy are neither a sensible intuition nor an *a priori* form of sensibility. They are no longer the result of a synthesis, but a coherence belonging to phenomena, which displaces the very notion of phenomenon and prevents the distinction between noumenon and phenomenon from persisting in the way Kant considered it. The simple opposition between subject and object is no longer possible; knowledge discovers in the object certain forms of coherence that are not phenomenal. The field or the convergence of the series of transformations is something

quite different from a law. These realities separate and distribute the real as much as they unify it; they distinguish in order to synthesize. The rapport of the multiplicity of the sensible to the unity of the understanding can no longer be upheld. The type of intelligibility is no longer that of the law, the rapport between phenomena, but that of the field, of the spatial domain or temporal series; this is not a unification of the manifold, but the postulation of a systematic of the real prior to all apprehension; the given, the starting point, is no longer the phenomenon, but the system or the series given at the same time as the terms; the system and the series are the phenomena and what must be explained. One does not start with terms that would need to be unified, but with domains, with coherences whose extent and expression must be found. The individual can no longer be identified with an isolated elementary being. The great scientific discoveries of the nineteenth century were syntheses that simultaneously introduced the continuity and diversification of the real, particularly Maxwell's theoretical synthesis unifying the laws of optics and the laws of electricity in the formula of the propagation of electromagnetic perturbations, which defines the electromagnetic field. What is quite remarkable in this new stage of science is that there is not, on the one hand, diversity at the starting point and, on the other hand, unity obtained through the imposition of a law onto the manifold of the sensible: there is and there remains diversity and unity from the starting point to the endpoint; what scientific thought carries out is not an identification but a universalization through the expansion of the domain: the law becomes the formula of the domain's continuity; thus, in the electromagnetic theory of light, it cannot be said that Maxwell properly speaking discovered an identity between an electromagnetic perturbation and light; the formula that states the characteristics of an electromagnetic field is also and at the same time what allows us to distinguish different frequencies and to predict the differences of phenomena according to differences of frequency, not just for light compared to a longer or shorter wave, but also for very nearby wavelengths belonging to visible light, for example that of indigo and violet. What Maxwell discovers is not so much the unity but the homogeneous continuity of a domain of diversity constituted by a schematism whose characteristic parameters are capable of a continuous variation, excluding a classification. This continuity of a domain is therefore very different from a unity through real identification, like that of the attraction of stars and the force of gravity, or formal identification, like that of gravitational attraction and electrostatic attraction. The domain of reality discovered by Maxwell is homogeneous but not identical, and it submits to a continuous formal variation; its homogeneity is

that of a schematism, not of a substantial reality, but it is no longer just a homogeneity of formula alone; there is unity in the energetic characteristics. The science of the nineteenth century tends toward the energetics of Ostwald, who wants to condense all sciences into one.

In the individual, there is a form of energy that is at once nothing and everything and that constitutes the homogeneity of the individual domain through the homogeneity of its schematism: the will, which is weak in Senancour and strong in Stendhal's heroes, is that which introduces a common schematism into all situations and all domains; it is the will that leads Faust's soul, desiccated by knowledge, to attain through the arts of magic the supreme powers of nature, the Mothers, and to carry out every transmutation; feeling and the dream are the fruitful grounds upon which the will is born. In the form of the messianic pride of the inventors of systems, in the fervor of the traditionalist, in the discovery of a new faith as well as in hopelessness and resignation, there is the will, like a basic schema, always homogeneous with respect to itself, but infinitely diverse in its situations and its manifestations. The will is what connects the individual being to the world and to history; it is what can become every act and generate every feeling; it forms the internal continuity and coherence of the individual, just as it establishes the link of reciprocal causality with the social world and historical becoming: the individual is an element of will in an ensemble of fields of forces. Despite Balzac's assertion, the nineteenth century wanted to create a physics more so than a chemistry of characters; it is a chemistry only in the sense in which Balzac understands it when, with Balthazar Claes in *The Quest of the Absolute*, he wants to discover in nitrogen the origin of all life and all energy. This elementary will of the individual seeks to encounter in the world a vaster and stronger will, that of a historical *fatum*, of an immanent law that scoffs at resistances. The individual is not the center of a decision but of an adhesion, not of an initiative but of an encounter; the individual does not posit the real through himself; he associates himself with the real as he makes himself, when he discovers the sense of this will immanent to the real; it has been said that this was the age of feeling; in reality, there is no distinction between feeling and the will to adhesion, for feeling is the prophetic force that introduces the sense of becoming; what is suitable for the will that precedes and assumes decision is analytical intellectual knowledge; but for the will that seeks consent, what is suitable is the affective intuition that orients the being in this field of forces that the world is. Bonald, Joseph de Maistre, Auguste Comte, Saint-Simon, Fourier are borne by affective intuition within the direction of the *fatum* with which their will unites.

What traditionalism seeks is indeed a principle independent of the arbitrariness of intellectual knowledge so that the individual will can adhere to it.

JOSEPH DE MAISTRE

According to Joseph de Maistre, the individual should adhere to the supernatural, which is denied and obliterated by the natural sciences; religious life is the communication of man with the sphere superior to humanity; Joseph de Maistre transposes illuminism and Martinism into religious doctrine. The individual being submits to this *fatum*: "each active being exerts its action in the circle sketched out for it without ever being able to escape."<sup>175</sup> Nevertheless, despite this somewhat cellular structure of the universe, there can be asymptotic relations between one order of reality and another: the animal's instinct can be "asymptotic with reason." Our reason, in turn, can be asymptotic with a superior mind; certain phenomena of the inferior order that are inexplicable through this order itself could be due to the action of this superior order; the action of the superior order on the inferior order is possible, but this action is irreversible: a mysterious divine action penetrates the order of matter; for the individual, the field of the possible is not limited by the consideration of natural causes; the individual being in fact can also be in veritable communication with the superior order as well as with the inferior order; he is inserted in both orders, and he possesses two types of effectiveness which are not at all identical. A prayer can be as effective against lightning as a lightning rod; it acts on the same reality but through totally different means, because they are part of two different orders, the inferior and the superior. The Lyonnaise illuminism known to Joseph de Maistre transforms into a philosophy that places the individual in the midst of a network of forces and fields of different orders: the field of superior forces becomes superposed on the system of material realities without modifying this system, since it is not sensitive to this field; thus, a magnetic field can be superposed on a system of gravitational masses without modifying it at all; but if a body is found in this system that possesses both a gravitational mass like the others and magnetic masses that belong to it alone, it will be, out of this whole system, connected to the magnetic field by the forces and yet will conserve its gravitational mass within the system in which it is inserted, without modification of the system. It is in fact as an individual sensitive to the magnetic field, and not as a gravitational mass forming part of the system of the other gravitational forces, that this individual is in a relation of participation with the magnetic field. In the same way, the enlightened is in

a relation with the order of supernatural forces, while remaining inserted in the order of natural realities and while submitting to the actions and reactions of these realities. The individual is not part of a single system; even when he is inserted in a system, the individual surpasses it, overflows it, and is connected to a superior reality that he never manages to comprehend. It is therefore through the adhesion of the will that the individual is connected to this superior order of forces, not through the intelligence; the justice and providence of the supernatural order have nothing to do with human justice and providence; the reversibility of the culprit's wrongs against the innocent is opposed to the culprit's responsibility. Religious sacrifices, wars, the French Revolution invoke a type of relation that we cannot understand, which is analogous to that of the reversibility of wrongs.

#### BONALD

Bonald's supernaturalism searches between the individual and supernatural reality for several mediations, which have a mysterious character superior to any artificial construction of the individual or of society: in the order of knowledge, between ideas and the human individual, is found language, which, far from being an arbitrary convention, is of divine institution; language is the Word; it has the power to evoke thought in the individual; the word is not the sign, but the expression of the idea: "man thinks his speech before speaking his thought." "Speech brings light into the darkness and so to speak calls upon each idea, which responds, like the stars in Job, here I am."<sup>176</sup> A second mediation is one that god-man realizes, the model of political power, the mediator between God and men; the fixity of power in a family ensures for this mediation a character of permanence and very great stability; the family is in fact the fixed and unalterable "natural society," which is the model of civil society. The individual is therefore connected to ideas through the mediation of language in the order of knowledge, and to God through the mediation of legitimate hereditary power in the order of action.

#### LAMENNAIS

Lamennais seeks to expand this participation of the individual to the supernatural by fleeing, on the contrary, from the mediations that Bonald sought, or rather by taking them into society as a whole and into history as a whole: revelation did not take place at a precise moment in time; it has not been given to one church alone: it has been given to all humanity throughout all

history and is now contained in the general beliefs of humanity. The indifference in matters of religion, which is a veritable intellectual and moral suicide, comes from an unlimited and excessive confidence of the individual in himself; in fact, the individual must have recourse to this mediation that humanity is. According to the thirteenth chapter of the *Essay on Indifference in Matters of Religion*, the isolated individual can attain nothing but misleading evidence, evidence which appears to Descartes when he is completely isolated from the world and from his peers: "Descartes demonstrates nothing; to say: I think, is to say: I am thinking, is to posit as certain what one wants to prove."<sup>177</sup> Madness is precisely an absolute isolation of the subject that involves an invincible, individual, yet erroneous conviction. Certainty can be found only in common reason: "I call authority this common reason"; the axioms themselves are recognized as true because they strike the reason of all men equally. Unlike for Buffier, it is no longer individual faith that founds common consent and common sense; for Lamennais, common sense is a criterion by itself and does not need support. "The Catholic faith and human reason rest on the same foundation and are submitted to the same rule, such that, lest one fall into the most absurd inconsistencies, one must either be Catholic or renounce all reason": indeed, Lamennais's formula is the same as that through which the Church regulates beliefs: "*quod semper, quod ubique, quod ab omnibus traditum est*" ("what has been handed down everywhere, always, and by everyone"). Lamennais considers that religion constitutes the substructure of society, "social conscience," according to the expression he uses in a letter to Mazzini. Only the people, as Lamennais thinks after 1830, can be the instrument of its own liberation, thanks to the appearance "of a powerful religious faith that will doubtless be born, but the seeds of which we will hardly perceive."<sup>178</sup> The universe manifests everything that a finite being can have of the infinite, according to the *Essai d'un système de philosophie catholique*. In nature, there is a gradation of beings that respects a trinitary structure: all creatures are an image or trace of the divine Trinity; each singular body supposes a force or power that posits it, a form that designs its contours and determines its properties, a life that perpetually connects force to form, up to man, who is an active, intelligent, and loving being.

#### THE IDEOLOGUES: DESTUTT DE TRACY

With Destutt de Tracy, the will is a faculty of knowledge that allows the individual to situate himself; his analysis of voluntary effort was taken up again

by Maine de Biran: perception and the belief in the exteriority of objects would be impossible without the feeling of resistance that our voluntary movement encounters when it is applied to matter. "Our will makes our muscles contract, (...) and we are warned by a feeling (...). Soon, many experiences teach us that the existence of this feeling is due to the resistance of what is called matter, and we certainly recognize that what resists our will is something other than our sentient virtue that wills, and that therefore, there is something else besides this sentient virtue that constitutes our self (...). If our will had never acted directly and immediately on any body, we would never have doubted the existence of bodies."<sup>179</sup> In the same way, language is not made of words, static realities; as Destutt de Tracy says, language is essentially discourse, and the word is initially discourse, manifesting an activity, a will; the first sign is the interjection that already utters a judgment; it is only then that the attribute is separated from the subject and that the interjection becomes verb; the primordial unity of language is therefore the indissoluble totality of the proposition composed of subject and verb, not the word. The will expresses itself as judgment in the proposition. Lastly, the fourth section of the *Elements of Ideology* is a study of the will; the first seeks to discover how desires form in the individual and their conformity or opposition to the true conditions of our being. The genesis of love is studied in this section, and this study was utilized by Stendhal. The second part studies the way the will exerts its effects in action to provide for our needs. This study is important because Destutt de Tracy envisions the relation through which the different states of society and labor act on the individual: the association, the corporation, the family have different actions on the will. The will is therefore in fact an individual faculty, but it receives the influence of the social structure, and the individual's will is modeled by social forms. Destutt de Tracy borrows significantly from the economist Say, who shows a preoccupation with the knowledge of *de facto* states and of the individual's integration into the social dynamic; it is through the infinitely varied reactions of the regime of the will that the individual is inserted into the field of social forces.

#### CABANIS

Cabanis wants to connect the study of the individual to that of physiology, since the individual is a whole composed of body and soul. This point of view will also be that of Auguste Comte, who will make the analysis of the human faculties a chapter of physiology. For Cabanis, ages, sexes, temperaments, sicknesses, climate have a very large importance through the influence

exerted on the intellect and mores. The individual finds his unity in organic sensations, which are independent of internal impressions and constitute instinct. It is in this way that Cabanis explains the suckling movement of the newborn and the spontaneous acts connected to the reproduction of the species; instinct is the result of the impressions received by the internal organs. The movements of instinct are comparable by their organization, their systematization, to those of the reflexive act; they are not reducible to simple irritability; their condition is a felt internal impression, just like the external impression that precedes acts, and not an element of sensibility that would have first passed through consciousness; consciousness is not the exclusive and distinctive characteristic of sensibility; sensibility determines a number of important and regular functions without the self having received any warning; organic changes in circulation or digestion have an unperceived influence on consciousness. After amputating the nerve innervating a muscle, the excitation of this muscle, exerted locally, produces the same movement as before. By following this path, Cabanis does not refuse to accept Van Helmont's hypothesis according to which there are several centers of sensibility that each have a kind of partial self. The affirmation of the strict connection between the soul and the body is expressed by an invitation to consider the individual as composed of a plurality, but not an absolute plurality: this plurality consists of partial centers that each realize a certain unification within a particular domain. Individuality occurs in several stages and involves a synergy of functions of unification. This idea is quite rich and quite fruitful; it breaks with the substantialist representation of the individual being; it leads to studies that go all the way to those (which are properly biological but extremely important for reflection) of Sherrington with the law of integration.<sup>180</sup> This distinction of centers of partial unification in the individual makes it possible to avoid the dualism and bi-substantialism of the soul and the body; no doubt, in a certain sense, the continuity of the activity of the internal organs is opposed to the discontinuity of external impressions; but, while in Maine de Biran and Bichat this duality is an irreducible given, Cabanis on the contrary considers that thought is a cerebral function, just as digestion is a function of the stomach: "If thought differs essentially from animal heat, just as animal heat differs essentially from chyle and semen, it will be necessary to resort to unknown and particular forces to bring into play the thinking organs and to explain their influence on the other parts of the animal system."<sup>181</sup> There is a unity of nature; various bodies, inorganic and living, consist of the same matter; their various manifestations are due to the different way in which their elements are combined: there is no difference

between the influence of the moral on the physical and that of the organs on one another; it is merely a particular case, as *Mémoire XI* asserts, whose title is *The influence of the moral on the physical*. Nature has within itself the necessary and sufficient conditions of its progress. The physical contains the principles without which our inclinations and our intelligence would have no direction; the moral could be isolated only by an artificial abstraction. "Sensations can be conceived only connected to one another and dependent on organic functions."<sup>182</sup>

Thus, at the same time as the individual loses his substantiality, he gains through his activity an extremely strong constitutive role; with his will and his instincts, the individual is the principle and starting point; in this sense, the individual is not, as with the ideologues, a simple moment of becoming; he expands his power to act and discovers his capacity in another way than that of messianism and the synthetic vision of the world with a participation in supernatural forces; the individual is the being who can take an initiative, who can construct his life, who affirms himself unconditionally; he does not participate in a reality, he is an agent.

#### STENDHAL

This doctrine is also found in Stendhal: with Stendhal, the individual feels himself exist and discovers himself not insofar as he participates, but insofar as he does not participate in the situation in which he finds himself; the individual is the ultimate ensemble; there is nothing that contains him and in which he participates: Fabrice does not participate in this supreme thing that is a battle as significant as the battle of Waterloo; there is no individuality of the battle, because the battle does not have its own unity and coherence; it is nothing but the unconnected form of this ground that cannonballs are pummeling, of red uniforms who are dying with piercing screams, of generals who are passing by. The veritable individual does not participate in the situation; Fabrice asks the sutler who is this general berating his neighbor; and the sutler, who is participating in the situation, treats Fabrice as an imbecile because he doesn't know that this man is Marshal Ney; this non-participation is in fact a superiority because it implies an absolute lucidity and also an absolute will: what others do poorly due to habit or instinct, the Stendhalian hero does willingly, according to a reflexive plan, aware of himself. The hero is capable of behaviors that are more perfect than those provided by an unconscious impulse. He knows how to analyze himself and to be impassive: while escaping from the fortress, Fabrice analyzes himself and

controls himself. The child Julien Sorel, perched on the frame dominating the paddlewheel of his father's sawmill, does not participate in this rough and powerful nature of the mountain and the forest. Only his book exists for him; he refuses to participate because he wants to be himself, against nature, against his family, against the sawmill, or at least without them. Stendhal's "egotism" seeks, with Julien Sorel or Fabrice, to grasp religion not as a means of participation, a mediation that allows man to gain access to the supernatural, but as an ensemble (which is not coherent by itself) of behaviors inspired by various motives, behaviors which are quite different among the mediocre seminarians, the brilliant and young bishop who is learning how to bless, or the ultramontane milieus mixed with politics. In love itself, something voluntary, constructed, and cold remains to separate the individual from the partner and prevent a veritable participation in the unity of the couple; the conquest and possession of Mathilde are as constructed as Julien Sorel's self-victory when grabbing Madame de Rênal's hand. There is a link between ideology and pessimism, for this absence of participation leaves a profound emptiness in existence; it can become a style, but it is also a lack; throughout its whole Italian side, the intellectual system of ideology is a blatant pessimism with Leopardi, Verri, and Gioia. With Stendhal, ideology becomes positive only in critique: this critique constitutes the interest and constructive aspect of the work entitled *On Love*. Chapter XVIII is presented by the author as inspired by the Italian translation of Destutt de Tracy's *Ideology*. After this chapter, Stendhal calls for marriage to be based on the free choice of the partners. A veritable reform of society is predicted to ensure the individual's freedom of choice; this freedom would create a responsibility much greater than that which results from pure marriages of convenience and would reduce the seriousness and number of cases of conjugal infidelity that constitute a veritable institution in Paris, whereas in Switzerland, a country of free will and choice, they are quite rare. Stendhal even imagines the construction of an Elysian palace designed for wives who would want to divorce and in which they would be kept for two years in isolation; a whole ensemble of laws and penalties, from life in prison to a simple fine, is organized to strengthen this new institution of marriage founded on the free will of individuals; for the same reason, Stendhal is a supporter of the legal possibility of divorce, albeit with a legal organization obligating the individual to be fully aware of his responsibility. The origin of everything real is in the passions and feelings of the individual, in these great ensembles that a society or a religion are.

Thus, despite the extreme difference between the theory of the ideologues and that of the traditionalists, a striking resemblance in the starting point of

the conception of the individual brings them closer together; the individual is not a substance but an activity; he has no value and does not exist except through this activity, this will, this passion: this passion brings him to discover the messianic path that will transform him into the genius revealing the supernatural world, or this passion will bring him to experience his will in the self-concentration of the realization of an ambitious plan that suffuses all situations and difficulties with an implacable energy without allowing himself to be locked into any of them through a deceptive participation; the individual is always one who knows how to detach himself through his will, either from this world of everyday things to reach the supernatural, or from the current situation to surpass it in a career that does not tolerate rest and always wants more, like Napoleon in his conquest: the true individual is the being who is capable of surpassing either according to transcendence or according to immanence.

#### BICHAT

Bichat introduces duality into the physiological study of the individual through the distinction between the functions of organic life, like digestion and circulation, which are exerted by the non-symmetrical organs continuously, and the functions of animal life, which have their focal point in the symmetrically placed organs and are intermittent, interrupted by periods of sleep. Organic life is subtracted from the influence of habit, and it is the origin of the passions. Animal life is the origin of the understanding and the will.

#### FICHTE

A doctrine of extreme importance appears in Fichte's thought: that of recurrent causality as foundation of the being's freedom; this recurrence of causality occurs not for the singular individual properly speaking, but for humanity, upon which it confers unity and cohesion through knowledge; the instrument, the vehicle that carries out the transfer of causality, is the theory of science; while Fichte's contemporaries search for a mediation capable of connecting the human individual to a transcendent reality (according to the theory of the traditionalists) or to an immanent reality that always flees before the subject's movement (as in the ideologues, Stendhal, and Leopardi), Fichte instead posits the necessity of a mediation; but this mediation is a mediation of the being with respect to himself; it is a causality that exerts itself between two terms that are the being. This being is humanity, and the mediation of

the being with respect to itself is the theory of science. Through the theory of science (which is self-mediation, or recurrent mediation, according to the vocabulary of information theory), "Humanity as a whole will hold itself in its own hands, under the dependence of its own concept; it will make of itself, with absolute freedom, all that it can want to make of itself."<sup>183</sup> Freedom is a drive that surpasses the given, but it is not an irrational or arbitrary activity; veritable freedom is that which finds its law within itself; it is coherence and invention at the same time, fidelity to reason and the effort to think by itself; it is self-renewal and affirmation in being; this aspect of continually surmounted contradiction, of compatibility discovered between terms that were not compatible without the act of freedom and the subject's effort to invent, this ambivalence of freedom is revealed through the always two-fold and paradoxical aspect under which it presents itself and through which it reveals itself: it is progress in oneself and is also inversely and consequently education of others. Personal freedom is inseparable from the freedom of others, because "man is man only among men." Freedom is self-finalized: it cannot be assigned any other goal than its own development in oneself and in others, or, what amounts to the same thing, that of the humanity in oneself and in others. In this sense, there cannot be a preliminary determination of becoming by thought; self-knowledge for the singular being cannot reach the future: "I cannot grasp my total and complete destiny; what I must become, what I will be, completely surpasses my thought."<sup>184</sup> The Contract, which arises from the freedom of individuals, cannot hinder this freedom in any way; it cannot be a principle of social constraint; each individual retains the right to break it at any moment. Economic liberalism itself must be sacrificed to the freedom of the individual, according to the theory of *The Closed Commercial State*. Socialism of the State consequently seems like a desirable system; moreover, the State must be closed to outside commerce and become an economic community that suffices unto itself within its "natural boundaries." Here again, the necessity of freedom appears as an urgency of the being's autarchic but creative return to himself; the State within its natural boundaries is a veritable individual; within it, recurrence is a limit and enclosure. Freedom is not a state but an act, a certain schematism of this dynamism of the being's recurrence. This is why freedom is first realized in a local, almost insular way, then increases incrementally by extending its domain, like a chemical reaction that propagates when it has been initiated at a set point: it will therefore first be individuals of the elite or restricted communities who will realize freedom. This dynamism, which results from a high degree of organization in the relation of oneself to oneself, must

therefore exist locally but completely and then expand through propagation: certain very restricted groups of experienced men will be the true fore-runners of freedom, on the basis of which the spirit of freedom will radiate outward. Freemasonry is a sanctuary in which "it was necessary to shelter ideas that the public was unable to understand or that it would have misused." The scholar is the social apostle, the "priest of truth." Similarly, the German nation has between all peoples the mission of freedom that Fichte and his circle have between all men, for the German people is the one that most clearly possesses among all modern peoples the seed of human perfectibility and "to whom precedence in the development of humanity is due."<sup>185</sup> Freedom is therefore essentially conceived as movement and dynamism oriented toward the future, outside any participation in a tradition like that of the unity of empire or Catholic unity, which only belong to the past.

But this freedom of the individual or of the community requires that action can penetrate into nature, which must be transparent and knowable by man and penetrable in its intimacy. "It expresses nothing but rapports and relations of myself to myself, and just as certainly as I can hope to know myself, I can certainly promise to scrutinize it." Kantian idealism becomes a means of bestowing the determinism prescribed by the understanding with freedom, as in the *Critique of Practical Reason*. The determinism of nature is nothing but the projection of the conditions under which the human mind knows objects. Moreover, for Fichte, nature is object of the self because it is the condition posited by freedom for its own exercise and its progress. The existence and characteristics of nature are deduced from the requirement to act and to accomplish one's duty. Nature is like a milieu that the activity of the subject determines. The problem of the production of nature is identical to that of the conditions of morality. The foundation of the principle of identity is the action of the Self that posits itself for itself and that is because it posits itself. The spontaneity and action of the Self are beyond consciousness because they are its condition. The action of the Self positing itself is an initial and immediate given of intellectual intuition. The being posited by the self and the action that posits it coincide in the intuition of the Self. However, the construction of consciousness that begins with the Self as principle is definitely not, according to Fichte, a gnosis that would claim to describe the effective genesis of consciousness, but a construction analogous to that of the mathematician, who, through the combination of ideal elements, arrives at truths concerning reality: "The determinations of real consciousness—to which the philosopher is forced to apply the laws of consciousness that he has freely constructed, in the manner in which the

geometer applies the laws of the ideal triangle to the real triangle—are for him as though they were the result of a primitive construction (. . .). To take this ‘everything happens as if’ for an ‘everything happens in this way,’ to take this fiction for the narrative of a real event, which would take place in a certain era, is a blatant falsehood.”<sup>186</sup>

The dynamism of the Self is expressed through tendency; but tendency requires a limit so that the Self can maintain the constitutive tension of effort. To exist as such, aspiration must be limited; it encounters in front of it an existing matter, an immutable reality that limits it. Unable to transform things, the Self strives to transform representation.

In order for tendency to be able to be thought completely, it must not fixate on a particular object, since it would be satisfied by this object; aspiration would cease, and with it all consciousness would be annihilated: tendency, excluding any particular object, must only will itself and must be satisfied only by itself; action only satisfies tendency when its object is such that it does not limit tendency. The Non-Self is posited only as a condition for the existence of moral effort: “the Self determines the Non-Self”; the field of moral action, the distance between the Self that posits itself as limited by a Non-Self and the Self that posits itself absolutely, is infinite. There exists a causality of the Self on the Non-Self: this is the objective activity of the Self. Nevertheless, since the Self is posited by an infinite activity, the infinite activity and the objective activity can only reconcile if the infinite Self knows itself as infinite in effort, which encounters a resistance equal to itself and which only affirms itself on condition of reproducing itself incessantly; tendency is this perpetual reproduction of effort, in which the limit gives a feeling of force, since tendency is only felt because one aspires to surpass it. Tendency, which can only affirm itself through the limit, pushes the ideal activity of the Self to produce the object, the condition of this limit. Nevertheless, if such is the role of the Non-Self already posited, it cannot be said that its position is homogeneous with respect to its role; the act of opposing the Non-Self to the Self is the object of an initial intellectual intuition that does not seem to be an expression of tendency. Fichte links the Non-Self to the principle of contradiction and presents it as a condition of this principle’s validity in the way the Self conditions the principle of identity. The Self is at once that which posits the opposites and one of the two opposites, at once reality as a whole and a portion of reality. We must free ourselves from this logical incompatibility without sacrificing one of the two terms, which is what happens with Spinoza and Berkeley. In addition to the logical rapport, the opposition of the Self to the Non-Self designates a dynamic rapport of the struggle between

tendencies that confront one another and seek to suppress one another; the object is that which resists the mind and is imposed upon it. The Self is the Absolute that limits itself in order to have occasions of struggle and, ultimately, of triumph.

The individual is not an end in itself; the individual is neither an initial given nor an isolated given; there are individuals because reason and self-consciousness can only realize themselves through individuality, which is therefore the means for a universal end; and each individual can only awaken to reason under the action of other individuals, since individuals only exist in society. To attain its end—the development of consciousness within each individual—society requires as its condition a limitation of the freedom of everyone, which is the very principle of right: the theory of right becomes a juridical transpersonalism, i.e. a theory of social right; society (*Gesellschaft*), non-organized national community, is superior to the State, which is merely a momentary expression. The exigency of right that the State must realize comes from the community, this transpersonal reality.

The community is a transpersonal reality; it is not what is opposed to the individual, but like a common ground homogeneous to individuals, non-individualized, transindividual. The community defines a real transductive relation between individuals; it is complementary with respect to the individuals and is on the same order of reality. Conversely, the State, which has no body, which is a form and an organization, is not of the same nature as the individuals; it is not homogeneous with respect to them.

This is why juridical individualism is not destroyed by the theory of *Gesellschaft*. Each individual must have a sphere of action in which he subsists and over which he is fully master: this means of action is the bodily organism, which is an instrument of freedom. The function of the State, the supra-individual power, is to enforce right; it is created by a pact, which determines everyone's property and the means to protect them. In this way, the individual becomes citizen, and society is a veritable organism "in which each part incessantly maintains the whole, and, by conserving it, one conserves oneself". Because of its unity, Reason requires a state of community of consciousnesses, which right does not realize, for the latter leads to a state of dispersion and reciprocal opposition of individuals; the realization of humanity guided by morality is not just the perfecting of an isolated and transitory individual; humanity is mankind as a whole, and it is the moral advancement of the whole, the universal progress that must be willed by all. The duty of education goes hand in hand for the individual with the duty to perfect oneself; the concern with the individual's perfection must not be disconnected

from the perfecting of the community of reasonable beings, since moral duty always tends toward the universal, not toward that which is individual. This is why the mission of the scholar is so important: the goal of this mission is the development of reason and freedom.

The greatest difficulty of this system is the necessity of determining the rapport between the Self and the Absolute. In a certain sense, the Self must be superior to the Absolute; in another sense, the Absolute would have to be anterior to the Self.

Here, philosophy bears witness to the eternal production of the word by the Absolute, to the extent that this Word refracts into individual consciousnesses, one of which is oneself, and in which the free aspiration of one's consciousness toward spiritual life is posited as a moral duty. The incarnation of the Word is the progressive development of morality and reason in the world.

#### SCHELLING

For Schelling, the living being consists of a pair of opposites and of a power superior to this pair of opposites, playing the forces of these opposites against one another so as to maintain life by inflecting them and playing them like instruments. Nature is the infinite activity that affirms itself by positing its opposite, just as in the Kantian dynamic the expansive force is opposed to the repulsive force, and Nature is infinite because it endlessly reestablishes the oppositions it has destroyed. The dynamic opposites constitutive of nature are therefore opposed to the Self and the Non-Self. From these opposites, an internal dialectic arises which, proceeding through syntheses and new oppositions, will construct every natural phenomenon. It is within nature that individualization appears through an attractive force, a veritable limit which, in the homogeneous fluid infinitely expanded by the universal activity of nature, produces cohesion in its various degrees. The individual organism is activity and cohesion at the same time; it is something penetrated by activity. But the condition of the organism's activity is the non-organism; the organism is determined by the inorganic in excitability, and the inorganic is determined by the organism. The inorganic, the non-individualized, is simple juxtaposition, simple mass, but active mass, in which rapports, oppositions, and connections are established; such is the mode of gravity, an attraction comparable to that of contrary electricities due to the reciprocal opposition of masses; in gravity, these opposites tend to penetrate one another, but the tendency stops at juxtaposition. This penetration occurs in chemical combination, whereas electricity, due to its polarity, reaffirms the dualism of opposites. In

the individual as well, the internal activity of the organism is revealed through oppositions and connections; it oscillates between sensibility and irritability. In sensibility, the organic subject limits its activity by its passivity; in irritability, there is a return of the heterogeneous to the homogeneous, with subjective activity tending to lose itself in the object. Nature is also living action and not dead product, contrary to what Fichte's theory asserts. Nature is autonomous activity and self-constructive, not heteronomous existence. Schelling consequently supposes that there exists an intuition of Nature, while Fichte supposed every intuition to be linked to self-reflection. Schelling's *System of Transcendental Idealism* adds to the deduction of the representative faculties that of the constitutive forces of matter. The forces that slumber in nature are of the same kind as representative forces: "Matter is nothing but spirit in the equilibrium of its activities."

The Absolute is identity of subject and object; it is neither subject nor object, nor individuality, nor indistinct continuum; it is neither spirit nor nature, because it is the identity or indifference of the two opposites, like the One of Plato's *Parmenides* or the One of Plotinus. Nevertheless, how is individualization possible? It is only possible if Spirit and Nature separate; and yet, they only separate if one considers that Nature and Spirit are each subject and object; neither of them are the synthesis of two terms initially existing separately, but identity of the one and the other. There is merely an excess of objectivity in nature and an excess of subjectivity in spirit. Each being can then be thought in itself. Intuition allows us to follow the transformations of the same in the other, just as Goethe follows the transformations of the leaf in all the organs of plants;<sup>187</sup> the being is independent of the spatio-temporal relations that connect phenomena. The science of Newton, which only determines beings through their mutual relations, is abandoned. Each being can be treated as an autonomous and free absolute, having nothing within itself but the law of its movement. Such is the meaning of the astronomy contained in the work entitled *Bruno, or on the Natural and Divine Principle of Things*, in which Schelling considers each celestial body as an autonomous and free absolute. Each being has a direct rapport with the Absolute. The method of the classification of concepts cannot assist in the specific determination of beings.

Nevertheless, Schelling does not limit the application of his method to the grasping of individual beings: he wants to conserve the "continuity of forms" also for the powers of Nature and Spirit; thus, Nature, under its real and objective aspect, is cohesion, under its ideal aspect, is light and, as identity, is gravity suffused with light or organism. But the singularity of individual

beings disappears in the dispersal of identity; their distinction, their will, their morality cannot be conserved. Already in *Philosophy and Religion* (1804), Schelling acknowledged that finite being, unable to arise from the Absolute, which remains in itself, must posit itself through an entirely free act, analogous to that which Plotinus lent to the souls that want to live for themselves and to detach themselves from the world soul. Like Boehme and Eckhart, Schelling, wanting to make room for individual beings, is forced to resort to a mystical drama. In the beginning, this drama involves the existence of a non-individualized ground, a *Grund* without light or consciousness, empty and poor Desire. But Schelling is then in fact forced to introduce an already individualized being: this is the Spirit of God, moved by love, which links the understanding to desire, pregnant with all the forms of existence and becoming the creative will of nature; this is cosmogonic becoming; man is found at its culminating point. In the natural being, each being's own will remains united with the universal will; in man, this will wants to exist by itself and become its universe to itself; man consequently closes himself off from universal love. Theogonic becoming, or the return to God, begins with the fall of man. It is only in God that the foundation is immediately connected with existence; outside it, the foundation only reaches existence through the intermediary of nature and history. There is consequently a sin in the individuality that wants to be complete and absolute; only man realizes complete individuality; he realizes it in sin; this moment of complete individuality is therefore integrated into the totality of the drama. Even in God, becoming is a victory, overcoming the blind and destructive forces for which it serves as a base; affirmation only establishes itself over negation by rejecting into an eternal past the obscure and chaotic forms that attempted to be. Nothing is as dark and surrounded by dangers as a life that begins; but primordial capacities only renounce themselves by becoming the organ of a superior will. Thus, for Schelling there is a sort of conservation of forces, of potentials anterior to the whole drama with which an individuation begins. It is in this sense that it is necessary to accept the concept of Superdivinity, the basis of which is nature, constituted by the three capacities. Becoming is first and foremost that of God himself; in order for Him to be the primordial seed, which is his first capacity, He must become non-being; in opposition to this primordial seed, God is the being who is; this is his second capacity: the alternating and oscillating opposition between these two capacities, which want to be and which repress the other two in turn, will only cease through the common will of renunciation in favor of a will which is not that of any form of being because it is above all difference, the *Übergotheit*, absolute freedom,

Superdivinity. In the wake of a theurgy, Schelling is led to present Nature as the product of Wrath or God's negative capacity; the world of spirits is the product of Love or God's affirmative capacity. Finally, Love unites with Wrath to create the Wisdom of the World Soul.

Thus, a certain gap appears to remain between a philosophy that rationally constructs the universal, on the one hand, and a philosophy that grasps the effectively existing individual on the other: the existent is conceived as radically free and contingent, relative to essence and the possible. The "positive philosophy" that starts with the pure fact of absolute freedom, the principle of existence for oneself and for others, is opposed to the "purely rational philosophy" that constructs the possible. The individual therefore remains an irreducible given that serves as the principle for a philosophy.

#### NOVALIS, HÖLDERLIN, HENRIK STEFFENS

Furthermore, this opposition between two philosophies is the essence of Romanticism; and the paradox of individuality is still expressed in this opposition, for the individual wants to be universalized, and it is opposed by its quiddity to this universalization; the individual must be at the same time one of the terms of the opposition and subject of the opposition; the individual must be included in the order of simultaneity and the successive, but it can only be included therein if it understands this order, involves this order, and in some sense is the engine of this order. Novalis said: "The proper essence of Romanticism is to make absolute, to universalize, and to classify the individual moment or the individual situation." This is why mediations are always necessary to try to account for this paradox: the myth, the narrative, the sign elevated to the status of symbol are attempts that present a topology of being and a systematic of time in which a place or a moment are both a place among places, a moment among moments, and an exceptional place, a center of the value-laden world, or an exceptional instant, an absolute origin and absolute end, polarizing the order of time. The romanticist searches for places and times of exception, which are at once ends and limits, beings and origins, elements and the source that produces around it a field which is not this source but comes from it and unifies beings. The individual turns his instant into a date, i.e. an end and an origin, and not just a moment. The instant possesses an internal thickness and a consistency that make an eternity of it, for this instant is the active source of the duration of the after, and it absorbs the duration of the before; all duration passes through it, and the instant polarizes this duration, just as the pole of the magnet in which all the lines

of force of the magnetic field reenter to come back through the opposite pole; the magnet concentrates them and produces them; it is the reason and the cause of their convergence and their divergence; it is in the field, but it is the field's creator; it orients the field by which it is suffused. And this field opens out to the infinite and returns from the infinite to converge in this magnetized metal. The magnet is subject and element at the same time; the field that it creates is within it and outside it, within its circularity and through its polarity. Polarity in fact allows a being to differ from itself, which is the very essence of the individual. The non-individualized being does not have the capacity to differ from itself. The Romantic place also has this capacity of differing from itself, which situates it in space and situates space with respect to it, as if the place were the source of space. The place is a sanctuary, cradle and tomb, endowed with a proper force that is not limited in it but radiates beyond, like a place of pilgrimage that draws the map of the roads and punctuates the world of sanctuaries secondary to the pilgrims' stops; these stops are themselves like places of pilgrimage that participate in the movement toward the absolute place. The place is like the Orient that gives a direction to the world and a polarity to every being, from the hillsides to the tree trunks, which do not have the same color on the side of the Orient. Space is polarized by place; place is within itself and outside itself; it is that which is and also that which polarizes. The veritable individual is also that which is and that which polarizes; it is place and moment.

Hölderlin in fact intended poetry for such a discovery, insofar as it could grasp what philosophy can grasp only by becoming contradictory with respect to itself: "In the end, what is incompatible, philosophically speaking, is united in the mysterious source of poetry (. . .). Philosophy does not come from the pure understanding, for it is more than the limited knowledge of the given; it does not come from simple reason, for it is more than the demand for an endless progress in union and distinction; but clarify the divine phrase *hen diapheron heauto*, and then it no longer demands blindly, it knows what it demands and why."<sup>188</sup> Thus, philosophy is the Heraclitean knowledge of the unity of contradictory things; the organ of this knowledge is the spirit, which connects isolated beings: "O friend!" says Hyperion, "in the end the Spirit reconciles us with all things." Poetry is the harmony of minds that reunites what nature had joined and what the understanding had separated. Nature is "rude nature, which laughs at reason and which is linked to enthusiasm." "We separate ourselves only to be more united, to be in a more divine peace with all things and with ourselves". This peace is one that is different from itself, it is life and being: "to be, to live—that is enough, that is the honor of

the gods; and therefore, all things that but have life are equal in the divine world, and in it there are no masters and servants. Natures live together, like lovers; they hold all in common, spirit, joy, and eternal youth." This thought makes it such that man must be first a "skillful man before being child," for he must already be intelligent before having his sensibility ripen. This doctrine, this search is reminiscent of Plato's "long detour" through which the being fulfills itself.

Steffens, a mineralogist and geologist, shows evolution to be tending toward individuality and to be fully realized in man.<sup>189</sup>

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## Supplements



# Analysis of the Criteria of Individuality

This text corresponds to one of the first versions of the reflection that opened the thesis and was then abandoned due to the development of this thought. The final thesis fundamentally relates to individuation everything that concerns the individual or individuality. This text stood in place of the current first chapter of part one.

## PRELIMINARY NOTE

The object of this study is inseparable from its method. A relation of reciprocal conditions in fact links the reality of its object to the validity of the approach undertaken. We are utilizing a single postulate that has an ontological signification and a logical (or epistemological) value; indeed, we suppose that veritable relation is an integral part of being.

This postulate should not be considered as resorting to a method or doctrine that supposes the identity of the rational and the real. We are instead attempting to show that dialectical systems do not contribute a profound enough critique of the notion of substance and that a latent substantialism has not allowed these systems to think the reality of the individual adequately. Furthermore, we are essentially trying to indicate before beginning the study of the individual that this labor will attempt to unfold in the hypothesis that neither realism nor nominalism are rigorously legitimate. This labor would like to lead to a critique of universals and particularly to a reevaluation of the thought that supposes classification based on common genera and specific differences. According to the doctrine that will be presented, the generic or specific characteristics are an integral part of the individual in the same way as the most singular elements that distinguish an individual from other

individuals. The epistemological consequence of this inquiry would be the following: *there can be no science unless it is a science of the individual*. A new normativity may be discovered based on this consequence.

We would like to overcome the antithesis between nominalism and realism by showing that these doctrines are not valid for *relation*, which can be known *analogically*. To the extent that the individual harbors a constitutive relation, it concerns this kind of mode of knowledge.

The opposition between monism and dualism cannot endure in an apprehension of the individual; dualism is still too monistic to be able to be conserved; it supposes a substantialism.

#### OBJECT OF STUDY CONCERNING THE INDIVIDUAL

Every notion endowed with meaning by reflection can be grasped as an object of study without the need for a rigorous justification; however, the interesting choice can essentially come from two sources: the notion can be a vanishing point toward which the other problems that it involves converge; consequently, the chosen notion is grasped as the symbol of a privileged difficulty around which other research organizes; after examination, a new systematic of reflexive thought becomes established, and a new topology of the philosophical universe is proposed; the problem in this way has the merit of concentrating around its formulation a plurality of interrogations in which the philosophical intention emerges; its role is logical and normative. It seeks to bring about a conjunction of *constitutive instances*, whose power Bacon circumscribes within the inductive research of essences. This path is the one that Aristotle and Kant follow when they examine the nature of knowledge. But in opposition to this approach to normative and inductive logic is a usage of a problematic in which the consideration of a difficulty has the value of a principle rather than a criterion, and in which the central notion has the power to concretize in a plurality of real terms, whether they are enveloped in an anterior problematic or not. This method is the one Descartes employs when, starting with the problem of knowledge [*connaissance*], he finds in the development of this problem the principles for the progressive construction of the world of science [*savoir*]. From then on, the consideration of the genesis of the problem is merely secondary; it can be relative and arbitrary without this characteristic affecting future activity. Like decision in provisional morality, the initial notional choice is invested with a self-justifying value; it is defined by the operation that constitutes it more than by the reality that it objectively seeks, like the cosmogonic hypothesis of vortices, which does not need to be true to be legitimate.

This is the order that we would like to follow; despite immediate appearances, it is perhaps more akin to the method of the sciences than the directly inductive method. Every developed science (like physics) reveals a capacity to progressively transform a theory into hypotheses and then into almost directly tangible realities. The prestigious work of formalizing knowledge [*savoir*] must not forget the no less essential capacity of the sciences to concretize the abstract by realizing it. Corpuscular theories, which are still purely abstract in Leucippus, Democritus, Epicurus, and Lucretius, pass during the nineteenth century to the more concrete level of specialized theories, like the kinetic theory of gases, the theory of electrolysis, the atomic theory in chemistry, and the explanation of Brownian motion; today, it is almost possible to speak of a corpuscular reality or more exactly a multitude of corpuscular realities upon which technicians and researchers act in order to impose measurable and predictable accelerations, concentrations, and deviations on them. And yet, it cannot be said that the progress of the sciences limits itself to the recognition of founding an old theory by verifying the hypotheses that it allows to formulate: scientific activity has veritably constituted the concrete based on the abstract, for the concrete that verifies hypotheses is the concrete of a particular space: it is not the concrete of a *fact* but of an *effect* that would not exist outside the universe of thought and action created by this very development of science. By constructing its object with the real, we can see in what manner the scientific approach, albeit not logically but nevertheless really, is self-justifying. Our desire would be to follow this second method in order to deal with the problem of the individual. Philosophical thought is not limited to an inductive investigation; to be able to itself control the validity of its approaches, philosophy must be constructive in the order of reality and action that defines it. As a return of the subject's consciousness to itself, it must operate its particular conversion of the abstract into the concrete by producing a system of *axiological effects* that constitute the particular self-justification of a reflexive work. The necessity of finding a way to close the cycle (by way of ethics) that moves from the concrete to the abstract so as to then return to an integration into the constructed concrete has been expressed by Plato in the image of the "long detour"; at the end of the μακρὰν ὁδὸν [*makràn hodón*], philosophical consciousness is reincarnated in the sensible.

#### METHOD OF STUDY CONCERNING THE INDIVIDUAL

The preceding distinction between an inductive method and a constructive method excludes the possibility of an intellectual process that would start with a plurality of cases in which a problem of the individual emerges to go

toward a unity of the individual's essence, a unity whose discovery could be presented as a solution to the problem. Conversely, we will start with the simple to go toward the complex and with the abstract to go toward the concrete. This method requires a logic, or rather, a definition of criteria that would allow us to delimit the object of research in an unambiguous way; but, due to the self-justifying and self-constructive cause of this thought, we cannot utilize any norm external to the chosen field of reality. This is why we have decided to start with an already constituted domain in which the norms of a valid thought have already been determined by the progress of a constructive experiment: before *biology*, *sociology*, and *psychology*, *physics* provides the example of a thought that is rich enough and formalized enough to be able to be asked to supply its own criteria of validity itself. After having tried, on the one hand, to grasp the epistemological role of the individual notion in this domain and, on the other hand, the phenomenological content or contents to which it refers, we will attempt to transfer the results from this initial test to logically and ontologically ulterior domains. If this transfer is partially or totally impossible, the knowledge of the reasons for this impossibility will have to be integrated into the position of the problem. The *analogical* or *paradigmatic* method that these successive transfers suppose is neither founded on an ontological postulate (for example, the rationality of the real) nor on a Platonic type of universal law of exemplarism, nor on an implicit pantheistic monism; on the contrary, it is founded on the search for a characteristic structure and operation of reality that should be called individual; if this reality exists, it can be capable of different forms and levels but should allow the intellectual transfer from one domain to another by means of necessary conversions; the notions that will need to be included to pass from one domain to the next will then be characteristic of the order of reality that comprises the content of these domains. The ontology of the individual will be disclosed by the becoming of its epistemology, and the principles of a possible axiology will be generated by this examination, insofar as it will provide a foundation for a postulation of value that can integrate an awareness of ontological reality and of epistemological signification into a single act of self-constitution.

#### PRINCIPLE OF STUDY CONCERNING THE INDIVIDUAL

On whichever level it may be apprehended, the reality of the individual is from the start governed by an external and negative principle that can be called the *principle of energetic determinism*, or rather, the principle of energetic

conservation. If we consider a physical system from a macroscopic point of view, the principle of the conservation of energy (which, if we want to be absolutely rigorous, is generalized by the introduction of a parameter that expresses in units of energy the variations of mass that the system could undergo during energetic transformations) is absolutely valid, i.e. without considering the becoming internal to the system according to which individuals appear or disappear during the course of various successive transformations. It would no doubt be illusory to research the profound essence of the individual in an exception to the principle of energetic determinism, even by affirming that this exception is extraordinarily slight, as Bergson wants to do in order to safeguard the notion of a psychical freedom. At a time when the notion of kinetic energy wasn't clearly defined or precisely measured and was confused with quantity of movement, Descartes held strong in the belief of creating the possibility of an absolute initiative of the *res cogitans* that was dependent on the capacity of imposing a variation of direction *with an increase or decrease of labor* in the least dense parts of the body, i.e. in the *animal spirits*, which are rigorously those of *res extensa* and do not in any way participate in the *res cogitans*. Undoubtedly, the principle of inertia does not allow us to follow Descartes in this theory of the relation between two substances, but the example of Cartesian thought, with all the efforts meant to resolve the difficulties of bi-substantialism, is an exemplary illustration of a labor intended to found a theory of the distinction and relations between the essential interiority of an indivisible being and the rest of the entire world. We should particularly note that Descartes does not seek to found the distinction, on the one hand, and the relation, on the other hand, upon two different principles, which would amount to introducing a facility; Descartes struggles against such a facility when he refuses to resort to *impressed species*, which would have easily offered him a reference to scholastic doctrines. Since he refused the apparent simplification that would have been a recourse to the mixture as a mediate term of the relation between the substances of Thought and Extension, Descartes had to allow a flaw to remain in his system; but at the cost of this imperfection, a unity of method infinitely rich in signification and fruitful in developments is kept intact: the *principle of conservation* is guaranteed for the substance Thought as well as the substance Extension. Descartes particularly developed the consequences of the principle of conservation in the domain of physical quantities that measure the modifications of *res extensa* (theory of simple machines), whereas Malebranche applied this same principle of conservation to the modifications of the *res cogitans*, particularly in the study of attention; in Descartes, since there is conservation of

what we today call work, the displacement of the point of application of a force whose direction is parallel to this displacement is inversely proportionate to the intensity of the force; similarly, in Malebranche, the extension of the known object and the intelligible clarity of the thought that knows it varies in inverse proportion, just as the intensity of illumination produced by a bundle of light varies in inverse proportion to the area it illuminates; thought is conserved, but it can become concentrated through focalization or spread out through diffusion. Furthermore, Descartes had already employed this principle of the conservation of the same quantity of thought by establishing the rules of reasoning; straightforward and constructive reasoning draws its fruitfulness from the fact that it is not a tautology; but, precisely due to this, it cannot control its validity by means of the principle of identity: in fact, Descartes resorts to a principle that is analogous to the principle of conservation in simple machines; in the same way that the Cartesian machine is one that operates a *transformation* during which work is conserved—because the machine is in a state of continuous equilibrium throughout the transformation—reasoning is rigorous when it operates a “transfer of evidence” from one proposition to the next; Cartesian reasoning does not depend on *identity* but on *equivalence*; it operates a *lossless transfer* of sense from one proposition to the sense of the following proposition. This is why a doctrine like that of animals-machines seemed natural to Descartes: a mechanistic representation of vital operations to him was not able to seem like a reduction to an inferior level of reality, since thought itself unfolds its most authentic operations according to a principle of conservation analogous to what is at work in machines, which are simple and consequently perfect.

Nevertheless, Cartesian thought seems to have been unable to push the principle of conservation to its ultimate consequences; it announced two particular principles of conservation, one for *res extensa*, the other for the *res cogitans*, and it only attempted a generalization of the principle of conservation in the cases of exchanges between the two substances: prominent in Descartes toward the end of his life, this is the meaning of the tendency to admit the existence of an idea of the union of the soul and the body; but this doctrine was not fully explained, and it is instead in Spinoza’s doctrines of psycho-physiological parallelism or Leibniz’s concrete individual notion that the extension of this line of research could be followed. Only Descartes’s ethics could shed light on this subject, specifically the one that emerges from the *Passions of the Soul* or from his correspondence with Princess Elisabeth. The very fact that Descartes does not wish to absolutely distinguish the foundation of the judgment of perfection from that of the judgment of reality reveals

the possibility of a transfer that legitimizes an extension of the principle of conservation. Furthermore, the two demonstrations of the existence of God depend on such a principle, for the demonstration of the fifth meditation would fall under Kant's assault if it did not depend on that of the third meditation. The ontological transfer is valid because a first transfer has been defined and carried out: that which leads from infinity and from perfection (grasped not as concepts separate from their object but as veritable realities) to the whole of divinity, of which they are already integrating parts; transfer is possible because there is a passage, not from the concept to the thing, but from a partial reality to a total reality; judgment does not change modality at any moment; the approach begins and ends in epistemological realism, insofar as this approach is not a deduction but a transfer; the ontological argument is only valid to the extent that it utilizes the reversibility of an already accomplished transfer, just as in a simple machine motor work can be converted into resistant work through a slight change in the direction of displacement, which is the description of the very condition of reversibility. Thus, in Cartesianism we have the example of a thought that utilized a principle of *conservation* due to which relations other than identity or alterity (i.e. the equivalence or transfer of properties from part to whole) can be thought logically. Descartes went as far as contemplating the rapport between an operation and a structure, which was taken up by Spinoza in his theory of pathbreaking, intending to explain habits and corporeal memory with this ever-present preoccupation with reversibility due to which an act gives rise to the determination of a trace and a trace give rise to the further determination of an act.

Such is the path, opened for the most part by Descartes, that we will attempt to follow by engaging a theory of the individual. But the *principle of conservation* cannot suffice alone to found this research, since it is essentially negative: it prohibits supposing the intervention of a foreign term in the relation of the individual to the milieu, in the relation of the individual to itself, or in the relation of the individual to another individual; but it does not allow for the description of what the individual is considered in its structure and its operations; this path makes it possible with great difficulty to rigorously constitute a hierarchy of different levels of individuality and acts more like an epistemological precaution than a constitutive principle.

This is why the second principle, which is essentially positive, will not be able to be discovered in the simple formal inspection of the conditions of knowledge of the individual but will have to be sought in the direct analysis of the simplest forms of individuality grasped by way of the conditions of their genesis. In this sense, we will attempt to establish that there is on the very

level of physical individuality a certain bundle of conditions that cannot be conflated with the essence of the individual but are more than a simple occasion of the individual's production, since they extend their existence after the appearance of the individual as the individual's inherent characteristics: the individual incorporates and concretizes the conditions under which it has been born, such that we can contemplate the genesis of an individual as a sort of transfer of reality, another distribution of matter and energy, with a relative reversibility of conditions and the conditioned. In this sense, the genesis of the individual cannot be identified with an empirical and exterior description of conditions: the genesis of the individual must be envisioned as a change of state, in which the initial state is not the *cause* of the final state but rather its *anterior equivalent*. If this point of view is acceptable, it leads not just to the consideration of every individual as the complementary of a milieu, but also allows us to compare the asymmetrical ensemble formed by the individual and its complementary milieu with another ensemble, i.e. the initial system on the basis of which is constituted the passage to this second state of the system in which the individual is distinct from its milieu. We will therefore treat the genesis of the individual by way of the theory of equivalence in exchanges involving the transformation of a system. This theory can be called *allagmatics*.

# Allagmatics

Notes on Allagmatics that have been preserved from Gilbert Simondon's preparatory manuscripts.

*Allagmatics* is the theory of operations. In the order of the sciences, it is symmetrical with the theory of structures and is constituted by a systematized set of particular knowledges: astronomy, physics, chemistry, biology.

Each branch of *allagmatics* cannot be designated by an objective domain, like the study of matter, the study of life. . . . On the other hand, an initial but useful way to distinguish its specifications consists in using the already constituted sciences to denominate various intervals. Indeed, an interval signifies the possibility of a rapport, and a rapport implies an operation. In this way, we will obtain physico-chemical allagmatics, psycho-physiological allagmatics, mechanical-thermodynamic allagmatics. But the drawback to this concrete nomenclature is that we may neglect certain operations that could be theorized if another principle of classification were to make their discovery possible.

Perhaps it would be more appropriate to define the broad categories of operations and the different type of transformative dynamisms that objective study reveals, and then to try to classify these dynamisms according to their intrinsic characteristics.

And perhaps the theoretical goal would be reached if a single fundamental type of operation could be defined that would include all particular operations as simpler cases: these degrees of simplicity would then define a hierarchy that would be a rigorous principle of classification.

It is just as difficult to define an operation as it is to define a structure other than by example. However, since a structure is given as the result of a construction, it can be said that the operation is what makes a structure appear or what modifies a structure. The operation is the ontological complement

of the structure, and the structure is the ontological complement of the operation. The *act* contains the operation and the structure at the same time; furthermore, depending on the side of the act we focus on, the act retains the operation element or the structure element by leaving its complement aside. Thus, when the geometer traces a line that is parallel to a straight line through a point taken outside of the latter, the geometer focuses in the totality of his act on the structural element alone that interests geometrical thought (i.e. the fact that a straight line is being traced in a certain relation with another straight line). Here, the structure of the act is the parallelism of a straight line with respect to another straight line. But the geometer could also focus on the operation aspect of his act (i.e. the activity by which he traces) without being preoccupied with what he traces. This activity of tracing possesses its own schematism. The system to which it belongs is an operative system, not a structural system; indeed, this activity proceeds from a volition that is itself a certain mental activity; it supposes the availability of a certain energy that is free and controlled by mental activity throughout all the links of a chain of complex conditional causalities. The execution of this activity involves an internal and external regulation of movement in an operative schema of finality. Thus, geometry and allagmatics take divergent paths from the very beginning of their activity.

Perhaps we could nevertheless attempt to grasp encounters in which the very act is grasped simultaneously as operation and as structure. These privileged and exceptional cases take on both a normative and a metaphysical sense. They are axiological: these cases include Descartes's *cogito* or Maine de Biran's *volò*; in the *cogito*, the act of thought is grasped objectively as a structure and subjectively as an operation. The more thought doubts its own structural existence, the more this operation of doubt—grasped as structure, i.e. object-reality facing reflexive thought—presents itself to thought as an existence of which one cannot doubt. The oscillation of doubt, which is a reflexive alternation, allows for the act of thought to be grasped simultaneously and identically as object and as subject. The evidence of thought is evidence of the existence of thought. The Cartesian hypothesis of the evil demon is merely a means for increasing this necessary oscillation by making the subject aware of the twofold situation of his thought with respect to himself, sometimes grasped as object, sometimes as subject, sometimes as the structure of an operation, and sometimes as an operation on a structure. This second negating subject of the evil demon plays the role of necessitating the oscillating instability of self-consciousness by creating a reflexive consciousness of this instability: forced to think himself not just with respect to

himself but also in his rapport to the evil demon, the subject grasps himself as if he became exterior and superior to the twofold situation he occupies with respect to himself: he becomes a reflexive subject by taking (in order to resist the evil demon) the point of view not just of the subject being or the object being but of the being of the *act of thought*, which the attention of consciousness decomposes into operation and structure. Demoniactal negation endows the subject with the consciousness of his act and of his being. Maine de Biran elicited the same fundamental truth in the ordeal of the *volo*. Here, negation is provided by an exteriority that is no longer the exteriority of an *other* hostile subject but of an inert *world* that resists by revealing its irreducible alterity in this way. These two ordeals are the same: they are the ordeal of an *act*, and, insofar as the *act* is identified with *being*, they take on a signification as principle and point of departure; they provide an *ontology* and an *axiology* because they give the knowledge of a first reality to the subject, and since this reality is known absolutely, the success of this act of knowledge provides the paragon of eminently valid knowledge: the knowledge of a first reality provides the criterion of a truth.

However, even after a similar point of departure that seems to want to privilege neither the operative aspect nor the structural aspect of being, the thought of Descartes as well as the thought of Biran deal with structure on the one hand and operation on the other. To a certain extent, morality remains definitively provisional in Descartes, since it cannot strictly correspond to a structural science that remains unfinished. And Maine de Biran, through a leap into the world of pure operation, defines the hierarchy of three lives by abandoning the point of view of psycho-physiological unity within which the ordeal of the effort was situated.

The lack of a coherent scientific theory of morality in both the work of Descartes and Maine de Biran is due to the fact that they were both working before the emergence of sufficient conceptions of advanced structural sciences. The science of operations can be attained only if the science of structures becomes aware of the limits of its own domain from within. Allagmatics is the operative side of scientific theory. To this day, science is only half completed; it must now formulate the theory of operation. Nevertheless, since an operation is a conversion of a structure into another structure, there would first need to be a systematics of structures for this work to be achievable. Cybernetics marks the beginning of a *general allagmatics*.

The program of allagmatics—which seeks to be a universal Cybernetics—consists in formulating a theory of operation. But it is impossible to define an operation apart from a structure; consequently, the structural system will

be present in the definition of operation in its most universal and most abstract form; and to define the operation will amount to defining a certain convertibility of operation into structure and of structure into operation, insofar as the operation effectuates the transformation of one structure into another structure and is therefore invested with the previous structure that will be reconverted at the end of the operation into the following structure; the operation is a *μεταξύ* [metaxú] or middle-ground between two structures, and yet its nature is unlike that of any structure. Thus, we can predict that *allagmatics* will have to define the rapport of an operation to an operation and the rapport of an operation to a structure. These first type of rapports can be called *transoperative*, and the second type can be called conversions.

*Postulate of equivalence:* an operation is equivalent with an operation or an operation is equivalent with a structure when they each involve a transoperative rapport or a rapport of conversion with a third operation or structure.

*Definition:* analogy is a transoperative equivalence.

*Definition:* modulation and demodulation are equivalences of operation and structure: modulation is the transformation of an energy into structure, and demodulation is the transformation of a structure into energy. In that case, the structure is a signal.

We cannot determine in advance if the relation between two operations passes through the intermediary of a structure or if this relation is direct but supposes a structure of putting into relation. Nevertheless, according to the postulate we have posited, analogy and the analogical act would be different from modulation, which puts an operation and a structure into relation. We will suppose that the relation of modulation defines the application of a structure to an operation through the intermediary of a state that is the *μεταξύ* or middle-ground between the operation and the structure, i.e. energy. In modulation, we must distinguish between the veritable *structure* (which is the structure of the signal or *form*) and the structure that puts *form* and *energy* into relation. The operation is this putting into relation, or rather a condition of this putting into relation. For the putting into relation of an operation and a structure is an act, which supposes operation as energy and structure by way of form, which is also called signal.

The analogical act is the putting into relation of two operations, whether directly or by way of structures, while the act of modulation is the putting into relation of the operation and the structure through an active ensemble called the modulator.

All operations are aspects of the act of modulation or of the analogical act, or they are combinations of the act of modulation and the analogical act.

## THEORY OF THE ANALOGICAL ACT

The analogical act is the relating of two operations. Plato used the analogical act as a logical method of inductive discovery: *paradigmatism* consists in transporting an operation of thought, an operation which is first tested on a particular known structure (for example, that which serves in the *Sophist* to define the angler) and imparted to another particular unknown structure and object of research (the structure of the sophist in the *Sophist*). This act of thought, the transfer of operations, does not suppose the existence of an ontological ground common to the fisherman and the sophist, to the aspalieutic<sup>1</sup> and the sophistical. In no way does it seek to prove that the fisherman and the sophist result from the imitation of the same shared model through the Demiurge: logical *paradigmatism* is freed from metaphysical *exemplarism*. The transfer of the operation is validated by an identity of real operative rapports in the exercise of the aspalieutic and in the exercise of the sophistical. If the operations of the fisherman and the sophist are inscribed, and the terms between which these operations unfold are erased, one can abstract from the specification of the system of terms designating the fisherman's conditions of operation or the sophist's conditions of operation. The series of terms that constitutes the sophistical is replaceable term for term with the series of terms that constitutes the aspalieutic: "angler" replaces "sophist," and "fish" replaces "rich young people," whereas the operations between these terms remain in full; the operation of seduction and then the operation of profitable capture are the same in the two series: all the intrinsic characteristics of the terms themselves are exempt in the analogical act. And this abstraction, this independence of operations with respect to the terms, is what gives the analogical method its universality. Since the consideration of the terms does not change anything in the nature of the operations, one can pass from the large to the small or from the small to the large: such is the method used to define man starting with the city, because the larger logical model is easier to grasp. This method is similar to the one that mathematicians use, which is known as the rule of proportionality: the first operation (quotient of the first pair of terms,  $a/b$ ) is transferred to the second pair of terms ( $b/c$ ) and, given  $b$ , allows us to calculate  $c$ ; but in the Platonic analogical method, not only the operation of measure but every type of operation is transferred.

Plato consequently discovered a way to rationalize becoming, which, after having been the object of the Ionian physiological theories, had been abandoned to the domain of deceptive knowledge by the Eleatics, those theoreticians of the immutable and of non-temporal being. The analogical method

supposes that one can know *by defining structures based on the operations that dynamize them*, instead of knowing *by defining operations based on the structures between which they are carried out*. The logical condition of the exercise of analogy supposes an ontological condition of the rapport between the structure and the operation. For the transfer of *logical operation* by which a being is thought (from one being to an *analogous* being) is no longer legitimate unless the *logical operation* was modulated by the systematic ensemble of *essential operations* that constitute the being. If it were a simple transfer of modalities of thought by which one contemplates a being, the analogy to another being would be merely an association of ideas. Analogy becomes logical only if the transfer of a logical operation is the transfer of an operation that reproduces the operative schema of the known being. The analogy between two beings by means of thought is not legitimate unless the thought maintains an *analogical rapport* with the operative schema of each of the represented beings. Before the knowledge of the analogical rapport between two beings may be established, the knowledge of a being must already be an analogical rapport between the essential operations of this being and the operations of the thought that knows it. What thought transfers is the knowledge of an operative schematism, and this knowledge of a schematism is itself a schematism that consists in operations of thought. Analogical thought establishes a relation between two terms, because thought is *a mediation between two terms with which, separately, it has an immediate rapport*. This mediation consists of two isolated immediations: thought becomes the operative μεταξὺ [metaxú] or middle-ground of beings without ontological rapport, since they are not part of the same natural system of existence.

It should therefore be noted that analogical thought is a thought that arises from the identities of rapports, not from the rapports of identity, but it must be specified that these identities of rapports are identities of operative rapports, not identities of structural rapports. This is how the opposition between analogy and resemblance is revealed: resemblance consists of structural rapports. Pseudo-scientific thought mainly utilizes resemblance and sometimes even the resemblance of vocabulary, but it does not make use of analogy. Consequently, pseudo-scientific thought formulates a veritable profusion of images and keywords: wave, radiation. . . . These words only cover over confused images that can barely guarantee an affective resemblance between the propagation of a mechanical shock in a fluid and that of an electromagnetic field without physical support. Only recently have we been able to note the confusion between two neighboring consonances: that of “servomechanism” and that of the “brain,” in the sense that the brain can be called a center

of auto-piloting or self-regulation: the meaning of the “slave” and the meaning of the “control panel” are mixed together in the affective resemblance of everything on the “cybernetic order,” including the use of relays and vacuum tubes or thyratrons. Conversely, the usage of analogy begins with science. Thus, Fresnel actually utilized the analogical method when he defined the laws of the propagation of light; insofar as one wanted to conserve the *resemblance* between the propagation of light and the propagation of sound, one became paralyzed by the *resemblance* between the light wave and the sound wave. If a *structural* identity between the light wave and the sound wave is supposed, one is forced to arrange the elongation of sonic vibrations and of luminous waves in an identical fashion; on the contrary, Fresnel’s genius consists in abandoning resemblance for analogy: supposing a different *structure* of the light wave and the sound wave, he represents the light wave as having an elongation perpendicular to the direction of the propagation and leaves to the sound wave its longitudinal elongation parallel to the direction of displacement. From then on, *analogy* appears. Between these different structural terms, the *operations* are the same: the combination of waves, whether they be light or sound, occurs in the same way in the case of sound waves as in that of light waves. But *certain* structural results are different, namely those where the structural characteristic of elongation intervenes with respect to the direction of displacement; the structural results are the same when this structural difference does not intervene. The phenomenon of diffraction is different, but that of stationary waves is identical.

Such is the legitimacy of the analogical method. Yet every theory of knowledge supposes a theory of being; the analogical method is valid if it concerns a world where beings are defined by their operations and not by their structures, by what they do and not by what they are: if a being is what it does, if it is not independent from what it *does*, the analogical method can be applied without reservation. Conversely, if a being is defined by its structure and by its operations equally, analogical thought cannot fully access the being’s reality. Ultimately, if structure is what is primordial and not operation, then the analogical method loses its profound meaning and can only play a pedagogical or heuristic role. The first question of the theory of knowledge is therefore metaphysical: what is the relation of operation and of structure in *being*? If the answer is structure, we end up with the *phenomenalist objectivism* of Kant and August Comte; knowledge then necessarily remains relative and becomes indefinitely extensible through scientific progress; on the contrary, if the answer is operation, we end up with the *dynamic intuitionism* of Bergson; knowledge is absolute and immediate but does not necessarily reach

all objects: the inert term, like matter, can only be known as a degradation of vital dynamism, and the knowledge of the static is an intuition that degrades and disintegrates; furthermore, if the dynamic term can be an object of intuition, the very ruptures or limits of this dynamism are difficult to know through intuition; paradoxically, science becomes the pure pragmatism of knowledge, a recipe for acting. This method partially negates itself because, starting with the primacy of operation, it can no longer recognize the operative value of scientific knowledge or instead makes use of its operative destiny to brand knowledge as “utilitarian.” However, utility characterizes an operative congruence. Beginning with pragmatism, Bergson sublimated this operative inspiration of the theory of knowledge in order to privilege a “pure operation,” i.e. disinterested contemplative intuition, metaphysical intuition. Having introduced dualism into the very world of the operation by distinguishing between utilitarian operation and disinterested contemplative operation, this spirituality, rediscovered in the disinterested operation, turns back toward the materiality of the interested operation in order to judge it, condemn it, and reduce it to an inferior type of slavery. However, just like the invasion of positivist rationalism by principles that are irreducible to phenomenal laws such as thermodynamics defines them or biology utilizes them, thereby leading to the conception of the existence of two types of structure of unequal value (second principle of thermodynamics, or Claude Bernard’s principle of the organizing idea), i.e. the hierarchizing structure and the structure term of the law-relation, in Bergsonian knowledge this dialectic of the separation of two forms of intuition reveals *the impossibility of absolutely privileging the structure or the operation*. An epistemological monism of structure or operation does not remain true to itself and re-creates over the course of its development the term that it had initially excluded. Structural positivism reintroduces the notion of hierarchy, whether vital or energetic, and thus reintroduces a pure dynamism independent of all structure, since it produces structure. Bergsonian intuitionism distinguishes the pure operation (philosophical intuition) from interested, materializing, spatializing, and utilitarian thought, i.e. thought attached to artificial or natural structures: vulgar knowledge is a search for the identical throughout the endless fluidity of becoming, a refusal of movement on behalf of the static. To act, i.e. to operate, becomes synonymous with spatializing, immobilizing, structuring. Utilitarian perception abstracts and conceptualizes. The operative dynamism of life produces a systematics of immobility: via dynamism, structure is reintroduced into knowledge as a dishonored, dismissed, and second-class intuition. The aristocratism of pure intuition can do nothing against this

formation of a lower class. The former can only scorn the latter, neither nullifying nor even replacing it; the aristocratism of pure intuition cannot resolve this social problem of knowledge, and it cannot even pose this problem. In the same way, it consequently cannot discover the legitimate usage of the analogical method: it remains the deployment of metaphor, which presents itself as expression but not as definition.

The duty of *allagmatic* epistemology is to determine the veritable relation between structure and operation in *being* and therefore to organize the rigorous and legitimate rapport between the structural knowledge and operative knowledge of a being, between *analytical science* and *analogical science*.

Structural, *analytical science* supposes that a whole is reducible to the sum of its parts or to the combination of its elements. *Analogical science* on the contrary supposes that the whole is primordial and expresses itself through its operation, which is a holistic functioning. Analogical science establishes equivalences between operations, i.e. holistic functionings. To wonder *what the being is* is to wonder *how the functioning (the holistic schematism of a being) and the structure (the analytical systematic of this being) articulate themselves*: the *chronological* schematism and the *spatial* systematic are organized together in the *being*. Their union creates individuality, insofar as the *individual* is a domain of reciprocal convertibility of operation into structure and of structure into operation: the *individual* is the unity of the being grasped prior to any distinction or opposition of operation and structure. The individual is that in which an operation can be reconverted into a structure and a structure into an operation; it is the being prior to any knowledge or any action: it is the milieu of the *allagmatic* act.

*Allagmatic theory is the study of the individual being*. It organizes and defines the relation of the theory of operations (applied cybernetics) and the theory of structures (analytical and deterministic science). *Allagmatic theory* has a place in the theory of knowledge as well as in the theory of values. It is *axiological*, for it grasps the reciprocity of axiological dynamism and of ontological structures. It grasps the being not outside space and time but prior to the division into spatial systematic and temporal schematism.

The knowledge of the relation between *operation* and *structure* is established by a mediation between the temporal schematism and the spatial systematic in the *individual*. This mediation, this mutual condition, this reality not yet deployed into schematism and systematic, into operation and structure, can be called internal tension, supersaturation, or incompatibility. The *individual is tension, supersaturation, incompatibility*. This tension, supersaturation, and incompatibility develops into operation and structure,

into the operation of a structure, such that we must always consider the operation-structure *couple* that is *allagmatically* equivalent to the tension, supersaturation, and incompatibility of an individual. There are two states of the individual: the unified syncretic state (i.e. the state of tension) and the analytic state (i.e. the state of distinction between operation and structure). The *act* is the change of the individual's *state*.

There are two parts to *allagmatics*:

(1) the theory of the passage from the syncretic state to the analytic state.

(2) the theory of the passage from the analytic state to the syncretic state.

Every act of the first type is equivalent to an act of the second type. The first type of act can be called *crystallization* and the second type can be called *modulation*. We will hold as a postulate that every *crystallization* is equivalent to an inverted *modulation*, and vice versa. Starting with a syncretic individuality, *crystallization* is the act that transforms the latter into an analytic individuality, which consists of a spatial structure (topology of interiority and exteriority, birth of a limit, organized and homogeneous form in a milieu that has become amorphous, stable heterogeneity guaranteed by the topological limit) and of an operative function that reveals itself as an activity organized by an energetic temporal schematism: *crystallization* replaces the syncretic state of the *individuating individual* with the analytic state of the *individuated individual*, which is characterized in particular by the mutual alterity of the *structural form* and of the *material milieu* in which the latter exists. Conversely, *modulation* forges the synthesis of a *structure* and an *operation* by organizing a temporal *operation* according to a morphological structure: the force of an operation is informed here by a *signal-form* that guides this *force*. Every *demodulation* is the analysis of this syncretic complex of *form* and *force*. Every *demodulation* or *detection* separating the *form* from the *force* that it informs is a *crystallization*. Demodulation can only occur if the condition of *tension*, *supersaturation*, and *incompatibility* is fulfilled. If not, the *modulated force* remains an individuating individual without ever being analyzed into *structure* and *operation*.

Since there are a certain number of intuitions at the basis of every theory, here we will reflect on the two domains within which the two basic intuitions (whose symmetry we are postulating) originate: the first is *physical chemistry*, with the study of the conditions of the genesis of crystals, *supersaturated* or *supercooled* solutions, and the study of *epitaxy*; the second is information theory, and in particular the theory of the relation between the *signal*, the *power supply*, and the *structure of the modulator* in the different types of modulators that the technics of transmissions theoretically studies.

The latter study involves its reciprocal, i.e. the theory of demodulation, which is also called detection, provided that one understands by this term not just a rectifier applied to a modulated alternating current, but also the set of selective filtrations due to which the modulating form or forms are separated from the modulated energy and are rediscovered in the state of pure signal. After having contemplated the simple modulator, this study will have to describe the complex modulator (or intermodulator) in which the power supply has already received a preliminary modulation and then receives a second modulation; it will also have to describe the complex demodulator in which several successive detections are effectuated, insofar as the energetic residue of a previous demodulation takes on the value of modulated energy for the next demodulation.

At the end of this twofold study, the philosophical notion of *causality* will be enriched, and the notion of the individual will be defined.

Then we will need to specify the way that the act of crystallization and the act of modulation are linked in the becoming of physical, biological, psychological, social systems. This will be the role of the *allagmatic hypothesis concerning the nature of becoming*.

# Form, Information, and Potentials

This text was presented to the Société Française de Philosophie on February 27, 1960. It is comprised of both of the basic argument of the lecture that was subsequently given by Gilbert Simondon, after a brief introduction by Gaston Berger. With the publication of the partial edition of *L'Individuation psychique et collective* by Aubier in 1989, this text was inserted on page 31 under the title "Concepts directeurs pour une recherche de solution: Forme, information, potentiels et metastabilité".

## ARGUMENT

The absence of a general theory of the human sciences and of psychology makes it urgent for reflexive thought to seek the conditions of a possible *axiomatization*. With a view to initiating this labor, which necessarily involves a certain contribution of invention and cannot be the result of a pure synthesis, it is appropriate to revisit the main conceptual systems that have been employed without granting any privilege to the most recent ones: the discoveries of chemical theory at the beginning of the nineteenth century have renewed the atomistic schemas that were sketched out more than twenty centuries ago and have enriched them with the contribution of gravimetric analysis.

In this sense, we could analogously renew the principles of the indefinite Dyad, of the Archetype, of Form and Matter, and bring them in line with the recent explanatory models of Gestalt psychology, and then those of Cybernetics and Information Theory, by going so far as to invoke certain notions taken from the physical sciences, like that of potential. We would like to show that an outline of the axiomatics of the human sciences or at least of psychology is possible if we attempt to grasp the three notions of form, information, and potential together, on condition of adding (so as to internally link

them and organize them) the definition of a particular type of operation that appears when there is form, information, and potential: that of the transductive operation.

First, the notion of form, in all the doctrines in which it appears, plays a constant functional role: that of a *structural germ* with a certain guiding and organizing power; the notion of form supposes a basic duality between two types of reality, the reality that receives form and the reality that is form or harbors form; this privilege of form depends on its unity, its totality, and its essential self-coherence. Even in Gestalt psychology, the Form, which is no longer anterior to any matter, nevertheless conserves its superiority of *Ganzheit* (totality), and there is a hierarchy of forms (good form, better form). Whether immanent or transcendent, prior to form-taking or contemporaneous with this operation, form conserves its privilege of superiority with respect to matter or the elements; the foundation of every theory of form—whether it be archetypal, hylomorphic, or Gestaltist—is the qualitative, functional, and hierarchical asymmetry of form and of that which takes form.

Second, the notion of information, on the contrary, is the keystone of every doctrine of reciprocity, equivalence, or reversibility of the active term and the passive term in the exchange. The emitter and the receiver are the two homogeneous extremities of a line in which information is transmitted with the maximum guarantee when the operation is reversible; reversibility and univocity are supposed not only by the fact of control but by the very condition of intelligibility. Coding and decoding are carried out according to conventions shared by the emitter and the receiver; only a content can be transmitted, not a code. Information theory can be associated with any type of explanation that presupposes the symmetry and homogeneity of elements that are combined and take form through a process of addition or juxtaposition; more generally, the quantitative phenomena of mass and population, which stem from chaos theory and suppose the symmetry of elements (and their unspecified character), can be thought in information theory.

Third, the transductive operation would be the propagation of a structure increasingly accumulating a field starting with a structural germ, like a supersaturated solution crystallizes starting with a crystalline germ; this supposes that the field is in metastable equilibrium, i.e. contains a potential energy that can be unleashed only through the emergence of a new structure, which is like a resolution of the problem; consequently, information is not reversible: it is the short-range organizing direction emanating from the structural germ and progressing through the field: the germ is the emitter, the field is

the receiver, and the limit between the emitter and the receiver is continuously displaced when the operation of form-taking occurs by progressing; it could be said that the limit between the structural germ and the structurable metastable field is a modulator; the energy of the field's metastability, and thus the energy of matter, is what makes it possible for structure and thus form to advance: potentials reside in matter, and the limit between form and matter is an amplificative relay.

Phenomena of mass are not at all negligible, but they must be considered as conditions of the accumulation of potential energy in a field and, properly speaking, as conditions of the creation of the field as a possible domain of transductivity, which supposes a relative homogeneity and a progressive division of energetic potentials; the matter-form relation is thereby transposed into the transductive relation and into the progress of the structuring-structured couple across an active limit, which is the passage of information.

#### LECTURE

Mr. Director, ladies and gentlemen, as Director Berger just pointed out, there is a certain relation between a study of the technical object and the problem presented here, which is that of *Form, Information, and Potentials*. However, the *technical object* is only meant to serve as a *model, example, and perhaps paradigm* for interpreting—in a way that we do not seek to present as new but in a way we hope might be explanatory—the problem of the rapports between the notion of *form* in its various types, the notion of *information*, and ultimately the notion of *potential* or potential energy. What encouraged us to seek a correlation between form, information, and potentials is the will to find the starting point for an axiomatics of the human sciences. In our day, we speak of the human sciences, and there are indeed technologies of human cultivation, but this phrase “human sciences” is always in the plural. The plural probably signifies that we have not managed to define a unitary axiomatics for it. Why are there *multiple* human sciences, when there is only *a physics*?<sup>1</sup> Why are we always obligated to speak of psychology, sociology, and psycho-sociology; why are we obligated to distinguish different fields of study within psychology, sociology, and social psychology? And we shall not mention the other possible human sciences. By considering these three alone (i.e. a science that proposes to study groups, a science that proposes to study the individual being, and a science that explains the correlation between groups and the individual being), we find a multitude of fields and an almost indefinite subdivision of study; this reveals that even concerning only one

of these human sciences, the search for unity is quite problematic and that we must found an often reductive theory to arrive at the unity within each of these sciences. We observe a unity of tendencies rather than a unity of explanatory principles. If we compare the current situation of the human sciences to that of the natural sciences, such as this situation was in antiquity, in the sixteenth century, or at the beginning of the nineteenth century, we find that at the beginning of the nineteenth century there was *a* physics and *a* chemistry, perhaps even several physics and several chemistries. Conversely, little by little, at the beginning of the nineteenth century and at the beginning of the twentieth century, we have seen grand theories arise that have contributed various possibilities of axiomatization. Thus, in the domain of electricity and magnetism circa 1864, Maxwell's electromagnetic theory of light appeared, which is and probably will remain the example of a creative synthesis; it is a *synthesis* because it joins together the ancient elements of various studies on the reciprocal actions of currents and fields (on phenomena of induction), and it is *creative* because it contributes a new notion through which synthesis is possible and without which axiomatization would not exist: the notion of displacement currents; these displacement currents became the propagation of the electromagnetic field, such as Hertz revealed experimentally twenty years later.

Could the same work be accomplished in the human sciences? Could human Science be founded, obviously by respecting the possibilities of multiple applications, but by having at least a common axiomatics applicable to various domains?

What encourages us to pursue this inquiry is the vision of the evolution of the natural sciences. There once was a separate physics and chemistry: now there is a physico-chemistry, and we are seeing the correlations between physics and chemistry become increasingly strong. Would there not be between the two extreme terms, i.e. between the theory of groups (sociology) and the theory of the individual (psychology), a way to seek a middle term that would be precisely the active and common center of a possible axiomatization? Indeed, we see in several cases that, even if we take the most directly monographic and interiorist individual psychology, or even if we take the sociology of the largest groups, we are always led to a search for a correlation, one necessitated by the fact that in sociology there is no group of all groups, or in psychology, within the individual, there is no element or atom of thought that could be isolated so as to make it the analogue of the simple chemical body, which would enable the recomposition of everything through combinations with other simple elements. The isolation of a

monad (the psychological atom) or of a human group that would be a totality (a type of social universe) is found to be impossible. In sociology, there is no “humanity,” and in psychology, there is no ultimate element; we are always at the level of correlations, whether we go toward the search for elements within the individual or toward the vastest social groups.

Under these conditions, the lesson gained from the evolution of the natural sciences encourages us to reevoke the oldest principles of explanation that have been proposed within the human sciences, insofar as these principles are principles of correlation. This is why we have believed to be able to choose notions such as form, information, and potentials, starting with the notion of form. This notion is probably one of the oldest notions defined by philosophers, who have always been interested in the study of human problems.

Certainly, the notion of form has evolved quite a bit, but we first find it in the Platonic archetype; then in Aristotle’s Matter-Form relation and in the hylomorphic schema; we find it again after a very long winding path in the Middle Ages and in the sixteenth century, sometimes as Platonic and sometimes as Aristotelian; we also find it again at the very end of the nineteenth century and in the twentieth century in this resumption of old notions under a new influence called Gestalt psychology. Gestalt psychology renews the notion of form and to a certain extent carries out the synthesis of Platonic archetypal form and Aristotelian hylomorphic form thanks to an exemplary and explanatory notion drawn from the natural sciences: the notion of field. We will attempt to show that the notion of form is necessary but that it alone does not make possible the foundation of an axiomatics of the human sciences, if it is not presented within a system that includes information and potentials (in the sense in which we speak of potential energy). I will therefore attempt to trace a historical evolution of the notion of form, which is first archetypal, then hylomorphic, and lastly Gestaltist, and then I will attempt to show how it is insufficient for our axiomatizing intention; I will then add a certain number of considerations relative to Information, and finally I will attempt to present what would allow the notion of Information to be joined with that of Form: this is what I have called the *transductive operation* or also *modulation*, which can only exist within a domain of reality in a metastable state containing potential energy.

Here, we should add an explanatory aside concerning the subject of the term modulation. This word is not taken in the broad technical sense that it has when one speaks of the modulation of the final stage of an emitter, but in the more restricted sense that designates the operation being completed in an amplificative relay with an infinite number of states, like, for example,

a hot cathode (triode, tetrode, penthode) or a transistor. Modulation is the operation through which a signal of low energy, like one that is sent onto the grid of a triode, actualizes with a certain number of possible degrees the potential energy represented by the anodic circuit and the actuator, which is the external charge of this anodic circuit. The term is not perfect, since it is slightly ambiguous, given that one also means by modulation this mutual influence of two energies, one of which is the future support of information (like, for example, a high-frequency oscillation), and the other of which is the energy already informed by a signal (like, for example, the low-frequency current that modulates the high-frequency oscillation in the procedure of the anodic modulation of emitters). Thus, there is a semantic precision that must be contributed from the start in order to define this type of physical interaction.

If pure psychology and pure sociology are impossible because there is no extreme element in psychology and no set of all sets in sociology, it is necessary to see how the psychologists and sociologists of Antiquity treated the processes of interaction and of influence. Let's first take up the significative and complementary opposition between the archetypal form in Plato and the hylomorphic form in Aristotle. Plato's archetypal form is the model of everything that is superior, eternal, and unique according to a vertical mode of interaction. The Archetype—from ἀρχή [arché], meaning "origin," and τύπος [týpos], meaning "imprint"—is the first mode. This word designates the stamp by means of which money can be minted, what we call a hallmark today. The τύπος is the imprint and also the strike: with a piece of engraved steel, characters can be stamped onto a tablet of precious metal, and this archetype can yield the same figure, the same configuration with this deformable matter of the metal tablet. If the archetype is made of good steel, all the pieces minted with the same hallmark resemble one another and are recognizable because, in a causal manner, they all stem from the same operation of *modulation* based on the archetype. The archetype can certainly degrade, but its ontological superiority should be noted: if one of the pieces is lost, only this piece becomes lost, whereas if the archetype is lost, a new one must be cast from the piece, and the piece can only contain a lesser perfection than that of the archetype; the second archetype will not be absolutely similar to the first. In other words, from one piece to the next one minted with the same archetype, there is a certain number of random fluctuations—a grain of sand here, an inequality of metal there—covered by a central tendency; this central, normative, and superior tendency is represented by the first form, which is that of the hallmark, the archetype.

Here, we find a model of a *process of interaction* that hardly merits the name interaction but is an extreme term for all the other possible types of interaction: *the non-reciprocal, irreversible interaction without return* between the piece and the archetype, which harbors an asymmetry that is fundamental: the Archetype is superior to the piece; there is no complementary rapport, for the archetype does not require pieces to exist: it is both anterior and superior; it exists before every piece. This is the model of the theory of Ideas in Plato: τὰ εἶδη [tà eide], the Forms, which are like the Archetypes, allowing for the explanation of the existence of sensible objects; these sensible objects are comparable to pieces that were minted with hallmarks, the Ideas; the hallmarks are immutable, they exist beyond the sphere of the fixed stars and do not degrade. The engendered being, i.e. the sensible object, which is in γένεσις [génésis] (“coming-to-be”) and φθορά [phthorá] (“passing-away”), can degrade, but the Form, τὸ εἶδος [tò eidos], does not degrade. It is no longer capable of progress, which leads to a theory of knowledge in which man can only recall the form, on the occasion of encountering the sensible and the difficulties that arise when the knowing subject deals with the sensible object. Man can only recall the vision of the forms and interpret the sensible object based on this vision, without a veritable inductive approach of thought. Why? Because the entire perfection of form, the entire perfection of structural content, is given at the origin. Plato constructs a metaphysical universe and an epistemological system in which *perfection is given at the origin*. Perfection, the highest richness of structure, resides in this world that is beyond the sphere of the fixed stars, i.e. is itself eternal and transcendent and is subject to neither degradation nor progress. *Degradation* only characterizes what is engendered; what is engendered based on the relation of exemplarism can degrade, or instead, to the mere extent in which the soul is the sister of the Ideas, it can direct an ascent back toward original perfection; here we have an example of the first Platonism, whereby philosophy’s intent is to seek out, by way of this φρουρά [phrouará] (“ward”) under the watchful eye of the gods (this expression is attributed to Socrates), a return to this world in which we once again rediscover the archetypes.

If we wish to depict this manner of considering form in a single stroke, we will say that since form is perfect from the outset, Platonism constitutes a system of conservation and respect of the Idea given once and for all, or instead it is a return to the Idea; science is a reminiscence, an ἀνάμνησις [anámnēsis], and it is also a contemplation when one has rediscovered what the soul recollects because it is ἀδελφὴ τῶν εἰδῶν [adelphè ton eídon], sister of the Ideas. Individual morality is a conservation; it is the conservation of

the structure of the individual through which the individual realizes the idea of man; individual morality is the conservation of the relation that must exist appropriately [*justement*] between νοῦς [nous], θυμός [thumós], and ἐπιθυμία [epithumía] (“intellect,” “passion,” and “appetite”) according to a principle of justice (but, in fact, it should be called “justness” [*justesse*]) that preserves the structural system that characterizes the individual.

However, such as it is presented in Platonism, the Form, insofar as it is superior and immutable, is perfectly suited to represent the structure of the group and founds an implicit sociology, a political theory of the ideal group. This group is more stable than individuals, and it is endowed with such an inertia that it seems permanent; furthermore, relative permanence is considered by Plato as being or faced with being a true immobility: we know that the ideal city is one that must not vary. The task of the philosopher-magistrate, who knows the number of the city and the measure that characterizes the relations between the different social classes, just as he knows the rapport between the virtues of the individual (of νοῦς, θυμός, and ἐπιθυμία), is to be the guardian of the constitution; the law is what allows the city to remain unmodified, just as physical laws remind us of *invariants*. Plato has indeed discovered the invariant; however, based on the example of the sciences, we know that an invariant could be considered as characteristic of a physical theory: the conservation of energy, conservation of matter, conservation of the totality constituted by matter and energy. For Plato, the invariant is the Idea, but this Idea is the structure of the group, founding a metaphysical sociology, a pure sociology become metaphysics. Such a conception of form leads to a realist idealism and to a repudiation of any possibility of logical empiricism or of physical combinatorics, like those of Leucippus and Democritus that constitute the being starting with the elements and a fortuitous encounter due to chance. No doubt, Plato was not absolutely satisfied with his doctrine, since we see, due to what Aristotle left us in books M and N of his *Metaphysics*, that toward the end of his life and in his initiatory teaching Plato wanted to find a formula that could explain becoming: instead of seeking to flee from here to there, he wanted to be immortalized in the sensible. The doctrine of the number-ideas perhaps indicates a desire to discover a more precise, more essential meaning in becoming. In the same way, the notion of the indefinite Dyad (of the large and the small, of hot and cold), which allows for a more precise explanation of the μέτριον [métrion] (“the well-measured”), is more appropriate for sensible objects and their genetic becoming than the εἶδος [eidos]. However, the essential part of Platonic inspiration (at least in the form that was passed on to posterity and has become Platonism) is *the*

*archetypal form, i.e. the explanation and presentation of a process of influence that places the complete structure before and above all engendered beings.*

Conversely, the form of the hylemorphic schema presented by Aristotle is a form that is within the individual being, in the σύνολον [súnolon], in the “everything-together” that the individual being is; form is neither anterior nor superior to γένεσις [génesis] and φθορά [phthorá], to generation and corruption; form intervenes within the play of interaction between structure and matter, within the sensible being. *It does not lack a rapport with matter: matter aspires toward form, like the female towards the male*; there are tendencies in the living being, which is a field of reciprocal and complementary interactions. Instead of the vertical relation in Plato, a “horizontal relation” between the individual being and the form prevents thinking in group terms, like a microcosm, which is analogous to the city. In Aristotle’s doctrine, we have a signification given to the individual being based on an implicit or explicit biology. If Plato represents a pure Sociology become metaphysics, according to which the structures of the group and the group of all groups, the Universe, have become an archetypal form, Aristotle on the contrary represents the inverse tendency, the initial choice of the individual being, in order to find the explanation of becoming in the processes of interaction that it contains. *Becoming* consequently appears constitutive of the being: in Aristotle, there is an ever-subjacent *ontogenesis*, whereas in Plato this is not the case. On the other hand, in Aristotle the hylomorphic couple, the matter-form relation, explains becoming, which pushes the being toward its state of entelechy, its full realization, whereas with the eternal form Plato is forced to explain becoming and even the creation of sensible objects by appealing to a power that is not εἶδος [eidos], that is not structure: this power is the Good, τὸ ἀγαθόν [tò agathón], which is ἐπέχεινα της οὐσίας [epékheina tes ousías], illuminating the world of the ideas, thereby projecting, so to speak, the shadow of the ideas as sensible objects, just like the sun projects the shadows of objects, or like the thaumaturgists’ πυρ μέγα χαιόμενον [pur méga chaiómenon] (“great fire that burns”) projects the image of woodcarvings and ἀνδριάντα [andriánta] onto the display wall for the viewing pleasure of the crowd. The relation of exemplarism, with its progressive degradation starting from the idea, truly shows the existence of a *motor* that is neither εἶδος nor the relation between the idea and the sensible, between the form and the matter having received form. This power, potentially completed by that of the demiurge, is never inherent in the idea or in the rapport of the idea and the domain that receives structure. Conversely, in Aristotle there is a power of becoming *within* the hylomorphic couple; the matter-form relation inside the living being is a relation that pushes toward the future; the being tends to pass to its state of

entelechy; the child grows because it tends toward the adult; the acorn, which contains the virtual essence of the oak, the form of the oak in the implicit state, tends to become a fully developed adult tree. Here, there is indeed a somewhat horizontal interaction between matter and form with a certain degree of reciprocity. In the domain of knowledge, this leads Aristotle to an *empiricism*, because it is the individual that is first, and, insofar as the individual is the σύνολον [súnolon], it harbors the power of becoming; man relies on the sensible encounter of the individual being to found knowledge, and the form alone no longer contains all knowledge. The course of knowledge no doubt consists in going from abstraction to abstraction: from the different senses one passes to common sense, then to the more abstract notions; but when one goes from the apprehension of sensible objects toward the notions of species, then from notions of species toward those of genera, one loses some information, some perfection of knowledge; and, in Aristotle, the highest notion, that of being, is also the emptiest; there is an inverse correlation of comprehension and extension; a term that is applied to everything (like being) is almost devoid of content, whereas in Plato, since the archetypal form is first, the knowledge of the One or the knowledge of the Good are the highest and the richest. We therefore have an occurrence where two approaches oppose one another. Moreover, it could be said that thought since Plato and Aristotle has benefited from opposing the two senses of the notion of form in these two thinkers by rendering them as the extremes of the role attributed to form and structure whenever we wish to explain processes of interaction. Aristotle's form is perfectly suited to becoming and the individual in becoming because it conveys virtuality, tendency, and instinct; it is an especially *operative* notion. It is consequently better suited for interpreting ontogenetic processes, but it is much less suited for understanding groups. The notion of the city in Aristotle necessarily invokes the notion of interindividual convention, whereas in Plato the first reality is the group, the city, such that the individual is known as an analogue of the city, a reproduction of its structure, a microcosm in opposition to this macrocosm that the city is, a micro-organization that reproduces the macro-organization; this involves an individual typology founded on a social and political typology: the democratic or tyrannical structure, the mental and moral organization of the artisan or magistrate are individual modes of being; the city and the caste are the first realities reflected in the interior regime of the individual and give it a structure.

It seems that the long development of the Middle Ages and the Renaissance did not find a perfect correlation, a veritable μεταξύ [metaxú] or middle-ground that could completely unite the archetypal form and the hylomorphic form. There are certainly various doctrines that merit specific interest, like,

for example, that of Giordano Bruno, who identifies the different types of causes and who, by way of a rather Aristotelian vocabulary, perhaps made it possible to attempt to synthesize the archetypal form and the Aristotelian form. Nevertheless, he lacked a certain key in the analysis of processes of interaction, a notion that can be taken as a paradigm, and this notion only appeared at the end of the nineteenth century with Gestaltist psychology: this notion is that of *field*: the notion of field is a gift presented to the human sciences by the natural sciences. *It establishes a reciprocity of ontological statuses and of operative modalities between the element and the whole.* Indeed, in a field—whether it be electrical, electromagnetic, gravitational, or any kind whatsoever—the element possesses two statuses and fulfills two functions: (1) to receive the influence of the field and submit to the forces of the field; it is in a certain point of the gradient by which the distribution of the field can be represented; (2) to intervene creatively and actively in the field by modifying the lines of the field's force and the distribution of the gradient; the gradient of a field cannot be defined without defining what there is in a specific point. Let's take the example of a magnetic field: if we arrange a magnet here, another magnet at the back of the room, and another magnet in a corner, they are all oriented in a definitive way and possess measurable magnetic masses. A certain magnetic field immediately exists as a result of the interaction of the fields of these three magnets. Now, let's take a piece of electrical steel from outside, previously heated to a temperature higher than that of the Curie temperature and therefore not magnetized; that piece of steel does not possess this *selective* mode of existence that is characterized by the existence of *poles*. And yet, the moment we place it in the field, it takes on an existence with respect to the field, it is magnetized. It is magnetized according to the presence of the three magnets, but the moment that it is magnetized and due to the very fact that it is magnetized, it reacts on the structure of this field and becomes a citizen of the republic of the whole, *as if* it were itself a *creative* magnet of this field: such is the *reciprocity between the function of totality and the function of the element within the field.* The definition of the mode of interaction characteristic of the field constitutes a veritable conceptual discovery. Before this discovery, Descartes searched for certain mechanical complications, which are a credit to his creative genius but which do not lead to a definitive elucidation of phenomena so as to represent influences at a distance via processes of action by contact. To explain how a magnet attracts another magnetic mass, he is constrained to imagine tendrils of subtle matter; originating in the poles of the magnet, these tendrils would twist around one another, pulling together or pushing apart, something that—even at the hypothetical

and formal level—is not very easy to imagine: if one of the directions of rotation brings the poles closer, the movement of one of the magnets in the opposite direction should merely halt action at a distance and not create the repulsive action typically displayed in experiments. Descartes was unable to find a satisfactory schema for processes of interaction because he lacked the notion of field. He made subtle matter responsible for all the characteristics attributed to fields today. And yet, this notion of field has seen quite a remarkable development in the nineteenth century. At the end of the eighteenth century and at the beginning of the nineteenth century, the magnetic field and the electrical field were discovered and analyzed; afterwards, the interaction between currents and fields was discovered (Arago, Ampère), and then circa 1864, the electromagnetic theory of light appeared. It defines a new type of field, the electromagnetic field, which is not just a field that could be called static like the previous fields but is a field that involves the propagation of an energy and offers, between the element and the whole, a much more remarkable and more richly exemplary reciprocity by defining a *dynamic coupling* between elements. If we position an electromagnetic oscillator equipped with an antenna here such that it radiates a field around it, and if we put at the back of the room, or much farther away, another oscillator of the same type, and if the two oscillators have the same frequency, the second will enter into resonance with the first, whereas if they do not share the same frequency, they will not enter into resonance: we will sometimes have a blurred resonance, sometimes an acute resonance, and the quantity of energy exchanged between the oscillators will be a function of their similarity in frequency and not just a function of their distance and the importance of their couplers. Here, we see the *much more refined processes of interaction between the parts through the intermediary of the whole in which selective exchanges intervene*. This is no doubt why the notion of field at the end of the nineteenth century possessed a fairly particular pregnancy and entered into the world of the human sciences almost through a sort of breaking and entering. It was introduced by philosophers who meditated on the ancient notions of interaction, on the processes of relation between matter and form. We should not forget that it was Brentano who was the precursor to Gestalt theory and who inspired the works of von Ehrenfels, specifically his “On the Qualities of Form.” Later, Kohler, Koffka, and all the other Gestalt theorists increasingly utilized the notion of field, and it could be said that it is the fundamental notion for the level of the latest development that this doctrine has received with Kurt Lewin, who founded a theory of social and psychosocial exchanges with his dynamic interpretation of a hodological and topological universe.

However, Gestalt theory, which has emerged with the application of the notion of field, refuses both the *empiricist* vision and the *idealist* vision of form laid out by Aristotle and Plato; it replaces them with an *instantaneous geneticism*;<sup>2</sup> perception is the grasping of a configuration of the perceptive field. There is a field, the perceptive field; the various elements that *are found in the field* and *constitute it* (this is the characteristic twofold situation of the field) are in interaction, like magnets in a magnetic field. It is not just perception but also action that is the grasping and realization of a configuration; it suffices to extend the notion of field; if an exterior field exists, a phenomenal field in the process of perception, why not consider the subject as being *in the field*, and therefore a *field reality*? A total field would exist that would be subdivided into two subsets, the subject field and the object field; action would be the discovery of a structure, a configuration common to the exterior field and the interior field. But this is precisely where the *axiomatic insufficiency* of Gestalt theory appears: structure is envisioned as the result of a state of *equilibrium*. Without this insufficiency, it could be thought that the archetypal form and the hylomorphic form are joined together in Gestalt theory: the *archetypal* form is the whole, the *Ganzheit*; the hylomorphic form would be all the elementary structures in correlation with one another, since there would consequently be an organization spanning the very matter of the field; the elementary aspect, the organization of subsets, and the global organization of the whole would be accounted for. But, in order to account for this structure, which is a configuration, Gestalt theorists resort to the notion of equilibrium. Why is there a structure that is a structure of the whole? Why is this structure of the whole really participable by each of the parts? Because it is the good form, the best form. The best form is a form that possesses two aspects: (1) it is a form that envelops the most elements possible and constitutes best what could be called the tendency of each of the subsets to progress; (2) it is the most pregnant, i.e. according to Gestalt theorists, it is the most stable, that which does not let itself dissociate, that which is imposed. And the Gestalt theorists invoke an analogy between the physical world and the psychological world, an analogy that leads them to the postulate of isomorphism, which is the foundation for a theory of knowledge; studying morphogenesis in the physical world, they show that there are geneses of form and that there is a possible experimental morphology; these forms, for example, are forms of the distribution of an electrical field around a conductive body: let's suppose that a conductive body (like, for example, this microphone if it weren't plugged in) is placed on insulated blocks; if an amber or glass rod is electrified, and if the electrical charge of the rod is transmitted to

the conductive body, it is distributed on the surface of the conductor according to known laws: thus, the field<sup>3</sup> will be stronger around certain points. If a new charge of electricity is contributed, it will be distributed in the same way, the quantity increases, but the form remains the same; there would thus be a certain constancy of forms that only depends on the relation between all the elements and remains independent of any quantitative condition. Von Ehrenfels showed that within a melody, the total aspect of the melody is changed much more noticeably by modifying a single note than by raising or lowering the notes by an octave. But, in our opinion, there is a contradiction between the notion of *stable equilibrium*, which would be the foundation of the pregnancy of forms, and the other notion, that of *good form*. It seems very difficult to say that a form is a good form because it is the most probable, and here already a theory of information begins to take shape. What does it mean to say, “a form is a good form because it is the most probable”? Let’s suppose that we took this room and submitted it to a physical treatment that would shake it very violently in all directions at random, then abandoned it as a closed system and left it to its own unique becoming. At the end of a century, one could have certainly obtained a definitive and very stable state of equilibrium in this isolated system, which means that everything that was hanging on the ceiling would have fallen to the ground; all the differences of potential (electrical, chemical, gravitational) would have given rise to the possible transformations; all the energies able to actualize would have effectively been actualized; there would have been an increase in temperature, an increase in the degree of homogeneity, and whatever good forms there were would have been lost, i.e. living and thinking beings that have varied and coherent motivations and representations—sources of action—and, more generally, all the energetic reserves present here in all domains: a charged battery would run out of charge; the charged capacitors of the magnetic recorder would run out of charge, and all the chemical actions that can take place would have taken place between the electrolyte and the armatures. In other words, everything that can happen would have happened; there would be no further possible evolution for this room; it would be fully degraded, just like the potential energy contained in a grandfather clock<sup>4</sup> whose weights are at the top of the case; when the weights are at the bottom of their trajectory, an irreversible process has taken place, and, without an external intervention, the clock can no longer function: this state of non-functioning is stable, and it is also the most probable. In all domains, *the most stable state is a state of death, i.e. a degraded state starting from which no transformation is possible without the intervention of an external energy to the degraded system*. This

is a state that could be called pulverulent and disordered; it does not contain any seed of becoming and is not a good form, is not significative. If this room could be treated as a closed system, a result would be obtained that would be quite analogous to what would be obtained if any other room or any other set of objects of the same volume were treated in the same way. Every treatment of this type—disorganizing, applied to a highly coherent and highly valorized ensemble, rich in potentials—would lead to similar results at the end of the loss of form; *this path toward homogeneous stability does not initiate the genesis of pregnant forms*. It therefore seems that there is a confusion between the stability of a form *for the mind* (its power to establish attention and to remain in memory), which could be called the quality of a form, and, on the other hand, the stability of *physical states*. Here, there is a characteristic insufficiency in Gestalt theory, for a *convergent evolution cannot explain a stability of form*; it can only explain a stability of *the state*, and not the superiority of a form, which consists in *activity and radiation*, the *capacity to elucidate new domains*. Here, it is necessary to consider Plato's archetypal form to avoid this error, for the superiority of the good form is what gives it its pregnancy; good form is instead *the permanence of a metastability*.

In other words, Gestalt psychology has an exemplary value because it seeks to join the Aristotelian form and the Platonic form in order to interpret processes of interaction, but it has a fundamental flaw because it presents processes of degradation as processes of the genesis of good form. Consequently, would it be possible to invoke a theory of information so as to enrich and correct the notion of form such as it is presented by Gestalt theory? Would it be possible to appeal to the theory of Shannon, Fischer, Hartley, and Norbert Wiener? What is shared by the authors who founded information theory is that for them information corresponds to the inverse of a probability; the information exchanged between two systems, between an emitter and a receiver, is null when the state of the object about which one must be informed is totally predictable, absolutely determined in advance. The information is null, and it is not necessary to transmit a message when one is certain of the state of the object, so much so that there is no value in sending the message at all. If one sends a message, if one is seeking a message, this is because the state of the object is not known.

Information theory is the starting point for a set of studies that have founded the notion of *negative entropy* (or negentropy), showing that information corresponds to the inverse of the processes of degradation and that, within the overall schema, information is not definable based on a single term, such as the source or the receiver, but it is definable based on the relation between

the source and the receiver. The question to which information functionally responds is: what is the state of the source? One could say that the receiver poses the question: "What is the state of the source?" and information is what brings an answer to the receiver. This is why it is possible to present the quantity of information as  $\log P$ , with  $P$  indicating the probability of the state of the source. For secondary, albeit important, reasons, we have taken the logarithms in base 2 so as to define information in hartleys or in bits.

In spite of this, we do not know if information theory could be applied directly for our purposes, i.e. could allow us to grasp what makes a form a good form or a better form than another. Indeed, in information theory, one in fact considers—quite legitimately in the technological domain where this theory has a functional role to play—as fundamental the relation between an emitter and a receiver, which require a correlation, such that information is that by which a certain system, the receiver, can be guided by another system, the emitter; it could be said that the goal of the passage of information is to tighten the correlation between the emitter and the receiver, to bring the functioning of the receiver closer to that of the emitter; such is the case, for example, of synchronization; signals of synchronization are emitted to allow the receiver to synchronize with the emitter. Such a schema is suitable for a theory of apprenticeship, like the theory developed by Ombredane and Favergé in their work dedicated to the study of labor. Information theory is built for this, to enable the *correlation* between the emitter and the receiver in cases where this correlation must exist; but, if one wanted to transpose it directly into the psychological and sociological domain, it would contain a paradox: *as the correlation between the emitter and receiver becomes tighter, the quantity of information decreases*. Thus, for example, in a totally realized *apprenticeship*, the operator merely requires a very small quantity of information from the emitter, i.e. from the object on which he works, from the machine he controls. The best form would therefore be one that requires the least quantity of information. This is not something that seems possible. We cannot accept information theory into the psychosocial domain without modification because, in this domain, it would be necessary to find something that allows us to qualify the best form as one that possesses the highest degree of information, and this cannot be done based on the negentropic schema, on probabilistic research. In other words, there would need to be *a non-probabilistic term* added to information theory. Perhaps it would be possible—and this is the starting point for our personal thesis that we would like to present now—to speak of a *quality* of information, or of a *tension* of information. In an energy like electrical energy, one considers a factor of

*quantity* (Intensity multiplied by Time) and a *qualitative* factor related to the difference of potential between the boundaries and the source. In the same way, it would perhaps be possible to characterize form—in order to explain processes of interaction—not only by its quantity, but by its tension, and the good form would be one that corresponds to an elevated tension. “Tension” obviously seems like a rather singular term; however, if it is permitted to continue using this *analogy* between the natural sciences and what would like to be the initiator, the structural germ, of a human science, would it not be possible to invoke this type of notion? The quantity of energy that can be stored in a condenser is increasingly elevated for a certain surface of armatures the closer they are brought together, all while remaining isolated, unless we wind up with a disruptive discharge through the insulator. Is there not something analogous in the good form? Would it not be that which contains in it a certain field, i.e. both an isolation between two antithetical, contradictory terms, and nevertheless a correlation? Wouldn’t the good form be one that contains an elevated *field of form*, i.e. a good distinction, a good isolation between the two terms or the plurality of terms that constitute it, and yet between them, an intense field,<sup>5</sup> i.e. a power of producing energetic effects if something is introduced into it? The fact that there is a significant electrostatic field between two condenser armatures is indicated by the fact that if a body is introduced into this field it becomes intensely charged. Wouldn’t there be something similar in the good form? The good form, as Plato predicted, could be a *dyad* or a *plurality of coordinated dyads together*—i.e. already a *network*, a schema, something simultaneously one and multiple—that contains a correlation between different terms, a rich correlation between different and distinct terms. One and multiple, the significative link of the one and the multiple: this would be the structure of form. If this were true, it could be said that the good form is one that is *close to paradox, close to contradiction*, all while not being contradictory in logical terms; and the tension of form would be defined in the following way: *the fact of approaching paradox without becoming a paradox, approaching contradiction without becoming a contradiction*. This can only be a hypothesis, one that supposes an analogy between the natural sciences and the human sciences. In this sense, one would speak of a tension of form and to the same extent a quality of information, which would be a concentration up until the point where it attains a point of disruption, a joining of contraries into a unity, the existence of a field internal to this schema of information, a certain dimension uniting aspects or dynamisms that are usually incompatible. This good form or form rich in potential would be a tensed complex, a *concentrated, systematized*

*plurality*; in language, it would become a *semantic organism*. There would be *compatibility* and the *internal reverberation of a schema* within it. And perhaps it would also be possible to measure the potential of form, the tension of form, in the same way that an electrical tension is measured, i.e. by the quantity of obstacles that it manages to overcome, the external resistance across which it manages to produce an effect. It can be said that a generator possesses in its terminals a tension that is more elevated than that of another generator if it can manage to transmit the same current across a greater chain of resistances, across resistances whose total is more elevated. This property is what would characterize the form's *pregnancy*. The pregnancy of the form would not be its stability, in the sense of the thermodynamics of stable states and convergent series of transformations, but its *capacity to traverse, animate, and structure a varied domain, increasingly varied and heterogeneous domains*. The difference between this hypothesis and that of information theory is the fact *that a theory of the tension of information supposes that the possible series of receivers are open: the tension of information is proportional to a schema's capacity to be received as information by receivers that are not defined in advance*. Thus, while a probabilistic theory can be applied to the measurement of the quantity of information in the prediction of an exchange between emitter and receiver, a measurement of the tension of information could hardly occur except through experimentation, at least under current conditions. For example, it can be said that the hylomorphic schema or the notion of archetype possess a high tension of information because they have incited structures of significations for twenty-four centuries across widely diverse cultures. The tension of information would be a schema's property to structure a domain, to *propagate* through it, to *organize* it. But the tension of information cannot act alone: it does not also contribute all the energy that can guarantee the transformation; it only contributes this tension of information, i.e. a certain *arrangement* that can modulate much more considerable energies deposited in the domain that will receive the form, take on a structure. There can be form-taking only if two conditions are joined together: a tension of information contributed by a structural germ, and an energy harbored by the milieu that takes form: the milieu—which corresponds to the old notion of matter—must be in a tensed metastable state, like a supersaturated or supercooled solution, which is waiting for the crystalline germ so it can pass to the stable state by unleashing the energy that it harbors.<sup>6</sup>

This particular type of rapport that exists between the *structural germ's tension of information and the informable metastable domain*, which harbors

a potential energy, turns the operation of form-taking into a *modulation*: the form is comparable to the signal that conveys a relay without adding energy to the work of the actuator. Nevertheless, structures that can be compared to technical modulators are much rarer than domains in which processes of form-taking arise. In order for the hypothesis we have advanced to be applicable in all cases, it is therefore advisable to indicate according to what processes a form-taking can take place by way of modulation within a domain that is not contained in a modulator. We suppose that the operation of modulation can take place in *a micro-structure that advances progressively through the domain that takes form*, constituting the moving limit between the *informed* (and thus stable) *part*, and the not-yet-informed (and thus still metastable) part of the domain. In the majority of cases of form-taking, this operation would be *transductive*, i.e. advancing little by little, starting with the region that has already received the form and going toward that which remains *metastable*; we will therefore again find the mobile asymmetry of the hylomorphic couple, with matter capable of tendency, and the archetypal power of the form that preexists form-taking.

If this hypothesis deserves to be kept, it must be applied to the different types of form-taking, from ontogenesis and phylogenesis up to group phenomena, and it must allow us to indicate processes of interaction that conform to the schema of modulation, generally according to a transductive mode.

In the domain of *somatic ontogenesis*, studies like those of Arnold Gesell on growth and the embryology of behavior seem to be able to be axiomatized via notions like those we have just proposed as a hypothesis. Indeed, for Gesell, the ontogenesis of behavior, from conception till death, is an evolution that marks the succession of a certain number of stages, sometimes of adaptation to external worlds, sometimes of the at least apparent dedifferentiation of adaptive adjustments and the search for new adjustments. The crises through which these new adaptive adjustments are sought is characterized by what Gesell calls self-regulative fluctuations. The studies he has conducted on the regime of the self-sustenance of infants revealed that an infant by itself is capable of finding the structures of adaptation for *feeding behavior*<sup>7</sup> and for the regimen of rest and waking, just as much as when it is left to act by itself, as if definite frameworks were imposed on it. If it is left to act by itself for a certain time, it goes on the diet, for example, of seven meals a day and then sleeps for a certain time. Afterwards, when maturation has generated new *tendencies* and new demands, a period of dedifferentiation and disadaptation intervenes. The infant wakes at any moment whatsoever and seeks nourishment when it cries; all of a sudden, it *restructures* its activity, but on the basis

of six meals a day. After a certain amount of time, there is another phase of dedifferentiation, then an order of five meals, and so on. The schema is clear: alternation of adaptations to the external world and of disadaptations, the disadaptations mark a moment in the search for a new structure, when the already constituted regimen of adaptation no longer corresponds to internal tendencies and to the level of the organism's maturation (maturation of the nervous system, of the digestive system, of the motor system). In certain American authors (Gesell and Carmichael), we find a generalization of this idea in the notion of *the ontogenesis of behavior*, which consists in a succession of paths of adaptation followed by disadaptation and dedifferentiation. The "patterns," i.e. the schemas of an initial adaptation, seem lost the moment when one arrives at dedifferentiation, but, in fact, they are found to be re-incorporated into the new adaptation. Thus, in the study of what he calls "prone progression in the human infant," i.e. the fact of advancing in the prone position concerning human nourishment before the age of one year, Gesell discovers four successive cycles: crawling, then crawling on all fours, then crawling on all extended fours, and finally walking upright. However, the patterns that are acquired in crawling arrive at a type of perfection at the end of this initial period, then, abruptly, when maturation is sufficient, a disadaptation occurs, the infant begins crawling poorly; it crawls poorly and stands up on its arms and places itself on its knees; it no longer advances, it is disadapted. It then seeks a new type of adaptation, and, within this new type of adaptation, ipsilateral and contralateral relations of inhibition and facilitation (which already existed in crawling) are utilized again; the crawling is lost, yet the content of crawling is not totally lost but reincorporated. Consequently, there is a type of dialectics in this learning, since learning and maturation go together, such that, in walking upright, what was an ipsilateral or contralateral link in crawling becomes alternating movements of the arms and legs that allow for a harmonious equilibrium. It is possible to interpret the ontogenesis of behavior as created by the succession of highly formalized and individualized moments of full adaptation to the external world and of moments characterized on the contrary by the presence of a tension which appears to the purely behaviorist observer as a disadaptation and consequently as a regression but which in reality show that the organism is in the process of constituting within it what could be called *systems of potentials*, starting from which this domain of somewhat liquidated elementary schemas—thereby constituting a metastable field like a supercooled solution—will be able to be structured very quickly by its own energy around a theme of organization presenting a higher tension of form.

The authors we have just cited place these pulsations of the ontogenesis of behavior in parallel with the discoveries of geneticists, who represent the structures of genes as intersecting assemblages between chains of molecules; they want to find a much more general basis for this notion of correlation between chains; for them, moreover, the organism's maturation would take place according to a certain gradient, according to the cephalocaudal and proximodistal axis, and the organism's maturation could be considered to take place beginning with one pole, the cephalic pole, and then would pass through the organism in successive waves (as if there were structural seeds contained in the cephalic axis), propagating transductively throughout the whole body. Consequently, organic maturation itself, which is the condition of this alternation between adaptation and evolution, would be accomplished according to a transductive process in which there would be the propagation of a form-taking, the extension of an organization based on a reservoir of forms or a birthplace of forms in the organism. Consequently, it would have to be said that, in such a doctrine, the form remains archetypal in a certain sense due to its anteriority and its initial non-immanence to the structurable field, which is its *matter*; nevertheless, this form can only structure the field because the latter is in a metastable state and can pass to the stable state when it receives the form: in the transductive operation of modulation, which is veritably the hylomorphic operation, not just any form can unleash the actualization of potential energy of any metastable field whatsoever: the tension of a schema's form depends on the field to which it is applied. A supersaturated or supercooled liquid cannot crystallize based on any germ whatsoever: the crystalline germ must be of the same crystalline system as the crystallizable body:<sup>8</sup> there is consequently a certain freedom, albeit a *limited freedom*, in the possible *couplings* of form and matter. Thus, in the course of an ontogenesis, the contributions of structural germs due to external circumstances can somewhat orient the structuration that comes after a dedifferentiation. But a structural germ that deviates too much from the characteristics of the structurable field no longer possesses any tension of information with respect to this field. Tension can only be defined in a field that can form a circuit. It is not a property of the isolated source, but of the source + receiver system.

Therefore, in such a theory we find the idea according to which we cannot explain the genesis of a living being without invoking two very distinct principles: an origin of forms—here the cephalocaudal axis—and a field, a domain that receives these forms and through which, starting with the pole of this origin of forms, progressive extension occurs. Should this be brought closer in line with the theory of biological organizers?<sup>9</sup> Perhaps; in any case,

we must keep the idea according to which a dedifferentiation of the field (field of behavior or corporeal field) is necessary so that a new structuration can be transmitted into it. Thus, for the study of the individual, we will arrive at a new principle that would account for the two aspects of form evoked a moment ago: the archetypal aspect and the hylomorphic aspect. *There must be a field that externally dedifferentiates because it is essentially and internally potentialized*; this field would perhaps correspond to Aristotelian matter, insofar as it can receive a form. *The field that can receive a form is the system in which accumulated potential energies constitute a metastability favorable to transformations.* A behavior that disadapts and then dedifferentiates is a domain in which there is *incompatibility and tension*: it is a domain whose state becomes metastable. An adaptation that no longer corresponds to the external world, and whose inadequacy with respect to the milieu reverberates within the organism, constitutes a metastability that corresponds to a problem to be resolved: there is an impossibility for the being to continue living without changing state, i.e. structural and functional regime. This vital metastability is analogous to the *supersaturation* and *supercooling* of physical substances. This supertensed and consequently metastable state is favorable to a transductive form-taking based on a structural germ; the moment this germ presents itself, it modulates the closest region of the field; form-taking propagates and spreads throughout the whole field. In this conception, the totality—which was simultaneous and comprehensive, self-coherent and united with itself from the start in Gestalt theory, which makes the whole into an organic structure of totality (Goldstein evokes the Parmenidean *Sphairos*)—becomes the metastable domain that is capable of crystallizing as soon as a formal germ is contributed to it.<sup>10</sup> The archetype would be this formal germ that can initiate form-taking only at a certain moment of *supersaturation*, and thus a certain moment of an organism's *maturation*. Perhaps this is how the notion of archetypal form and hylomorphic relation could be applied to the ontogenesis of behavior and to the maturation of organic systems thanks to *an energetic theory of form concerning fields of metastability*.

There is not enough space to say how this doctrine could also be applied to the genesis of thought. However, we could say the following: we could consider the acquisition of ἐμπειρία [empeiría], the repeatability of experiments, as the activity that makes the domain of mental content pass from a non-saturated state to a supersaturated state. The experiment relative to the same object adds and superposes partially contradictory aspects, thus producing a metastable state of knowledge relative to the object. There is an operation of form-taking because at this moment a structural germ appears

as a new dimension, and we have a structuration that extends over this metastable field that *the experiment* is. For example, the left half-field and the right half-field in vision would lead to diplopia if the direct content of the messages contributed by each retina remained in the subject's vision. Incompatibility and supersaturation are avoided if we discover the *dimension* of the detachment of depths of field. This discovery of structure does not amount to conserving everything that is contributed by the left eye and everything that is contributed by the right eye:<sup>11</sup> furthermore, there is a utilization of what can be called binocular disparation, i.e. the *degree of non-coincidence* of the left and right messages for perceiving the staggering of fields; a theory of perception (theory of the relation between different sensorial messages) would be possible based on this notion of the structuration of saturated fields. This would consequently be the indication of a new path of research for individual psychology.<sup>12</sup> The analogous principle at the origin of this energetic theory of form-taking is drawn from the physical study of crystallization, whose effectuation begins with a crystalline germ in a domain where there is either supercooling or supersaturation, which are approximately equivalent conditions and which make possible the formation of an artificial crystal based on a crystalline germ. An energetic conception of form-taking can unite with the schemas of thought shared by information theory and cybernetics. Indeed, the action of the structural germ on the structurable field in a metastable field that contains a potential energy is a *modulation*. The archetypal germ can be quite small and may not add any or almost any energy; it is enough for the germ to possess a very weak modulatory field. But this field is comparable to the weak current that is contributed to the grid of a triode, and this extremely low energy, with the minimal field that it creates between the cathode and the control grid, can counterbalance the strong field that exists between the anode and cathode. This minimal field (several volts) manages to counterbalance in the opposite direction the much larger field (100 to 300 volts) that exists between the cathode and the anode; and due to the fact that this field created by the grid is more or less the antagonist of the other, it is capable of modulating the potential energy of the source of the anode-cathode tension and is therefore capable of conditioning considerable effects in the external actuator. Wouldn't such an exercise of conditioning causality be carried out when a structural germ, coming into a metastable milieu (a milieu rich in potential energy), manages to spread its structure throughout this field? Instead of conceiving an archetypal form that dominates the totality and radiates above it, like the Platonic archetype, could we not posit the possibility of a transductive propagation of form-taking

that incrementally advances within the field? In this sense, it would suffice to suppose that, after having modulated a zone immediately in contact with it, the archetypal germ utilizes this immediately proximate zone as a new archetypal germ to go further. There would be a progressive local change of the ontological status of the milieu: the initial archetypal germ would produce around it a first zone of crystallization; it would thus create a slightly larger modulator, and then this modulator would create a slightly larger modulator around it and would grow bit by bit, all while the *limit* would remain modulatory. This is how a crystal advances when an artificial crystal is sustained; starting with a microscopic crystalline germ, a monocrystalline solid of several cubic decimeters can be produced. Doesn't the activity of thought involve a similar process, *mutatis mutandis*? We could particularly look for the foundation of the power of discovery via analogy: the fact of having resolved the problems of a limited field of our content of thought by means of a certain mental schema allows for the passage to another element transductively<sup>13</sup> and for the "improvement of the understanding." At the very least, this is a proposed schema for interpreting one of the progresses of thought that does not allow itself to be reduced to pure induction or pure deduction. If we step back from the individual being, we can wonder whether *social reality* also contains potentials. Social and psychosocial phenomena are generally explained by processes of interaction. But, as Norbert Wiener notes, it is very difficult to introduce probabilistic theories into the social domain. He has used a comparison that I cannot fully develop here but which is summed up in the following way: to introduce a broader sampling into probabilistic study is no better than to increase the aperture of a lens when the precision<sup>14</sup> of this lens is not greater than the wavelength of light. We do not obtain a superior resolute power by increasing the aperture of a lens if the lens is not sufficiently perfect. Norbert Wiener is basically saying that random variations in the samplings of the human social domain do not permit veritable predictability or a veritable explanation, since the more the samplings are broadened, the more heterogeneous they are. Wiener arrives at this idea that probabilistic theories are weak in the sociological and psychosocial domain. With an energetic theory of form-taking, we would have a non-probabilistic method *that does not grant any privilege to stable configurations*. We would consider that what is most important to explain in the psychosocial domain is what happens when *metastable states* are involved: *what creates configurations is form-taking achieved in a metastable field*. Yet these metastable states exist; I know very well that these are not generally laboratory states but hot states, as Jacob Moreno said, i.e. states that cannot be experimented on for long.

In this case, we cannot organize psychodramas or sociodramas, and we also cannot trace the sociograms that correspond to them. But a *pre-revolutionary state* seems to be the exact type of psychosocial state to study with the hypothesis we are presenting here; a pre-revolutionary state, a state of supersaturation, is one in which an event is right on the verge of taking place, one in which a structure is about to be emerge; all it takes is for the structural germ to appear, and sometimes chance can produce the equivalent of the structural germ.<sup>15</sup> In a very remarkable study by M. P. Auger, it is noted that the crystalline germ can be replaced in certain cases by random encounters or a correlation of chance among molecules; similarly, perhaps in certain pre-revolutionary states resolution can occur either due to the fact that an idea descends from elsewhere—and immediately leads to a structure that spreads everywhere—or perhaps due to a fortuitous encounter, even though it is quite difficult to admit that chance has the value of creating good form.<sup>16</sup>

In any case, we would arrive at the idea according to which a human science must be *founded on a human energetics* and not just on a *morphology*; a *morphology* is quite important, but an *energetics* is necessary; one would have to ask why societies transform, why groups change in accordance with the conditions of metastability. However, we certainly see that what is most important in the life of social groups is not merely the fact that they are stable, but that *at certain moments they cannot conserve their structure: they become incompatible with respect to themselves, they dedifferentiate and become supersaturated*; just as the infant can no longer remain in a state of adaptation, these groups disadapt. In colonization, for example, during a certain amount of time there is possible cohabitation between colonists and colonized, and then, all of a sudden, this is no longer possible because potentials are born, and a new structure must suddenly appear. And it must be a true structure (i.e. one truly emerging from an invention), an emergence of form, for this state to crystallize; if not, one remains in a state of disadaptation and dedifferentiation comparable to maladjustment (as studied by Gesell and Carmichael). Consequently, here we are witnessing a perspective for creating a human science. This would be an energetics in a certain sense, but this would be an energetics that accounted for processes of form-taking and attempted to unite in a single principle the *archetypal* aspect (with the notion of structural germ) and the aspect of relation between *matter and form*.<sup>17</sup>

In conclusion, in the unity of the operation of the transductive form-taking of the metastable field, we will propose that in human science we distinguish between field and domain. We should reserve the notion of *field* for that which exists within an archetype, i.e. for these almost paradoxical

structures that have served as a germ for the individual, as we said earlier; a field would be the tension of form, just as there is a field between the two armatures of a charged condenser. But we should call *domain* the ensemble of reality that can receive a structuration, that can take form through a transductive operation or another operation (for the transductive operation is perhaps not the only one that exists; there are also *disruptive* processes, which are not structuring but merely *destructive*). The domain of metastability would be modulated by the field of form. The second distinction, which extends into an axiological principle, consists in opposing *disadaptation* and *degradation*: disadaptation *within* a domain—the incompatibility of configurations within the domain—and internal dedifferentiation should not be assimilated with a degradation; they are the necessary condition of a form-taking; they in fact mark the genesis of a potential energy that will make transduction possible, i.e. the fact that the form will advance within this domain. If this disadaptation never takes place, if this supersaturation is not there, i.e. an interior reverberation that renders subsets homogeneous with respect to one another—just as thermal agitation makes all molecules collide much more frequently in a space—then transduction is not possible. In other words, we should consider the process of dedifferentiation within a social body, or within an individual entering into a crisis period, just as the alchemists of yesteryear considered *Liquefactio* (dissolution) or *Nigrefactio* (putrefaction), i.e. the first moment of the Magnum Opus, when alchemists placed the *prima materia* into the retort: the Magnum Opus began by dissolving everything in mercury or reducing everything to the state of carbon, wherein nothing is distinguished, wherein substances lose their limit and their individuality, their isolation; after this crisis and this sacrifice comes a new differentiation; this is albification, followed by the *Cauda pavonis* or peacock's tail, which makes objects emerge from the confused night, just like the dawn distinguishes them by their color. Jung discovers in the Alchemists' aspiration the expression of *the operation of individuation* and of all the forms of sacrifice, which suppose the return to a state comparable to that of birth, i.e. a return to a richly potentialized, not-yet-determined state, a domain for the new propagation of Life.

If it is possible to generalize this schema and to elaborate it through the notion of information, through the study of the metastability of conditions, we can set out to found the axiomatics of a human science on a new theory of form.



# Notes

## VALUES AND THE SEARCH FOR OBJECTIVITY

1. [It should be noted that in this section, Simondon will distinguish between “psychological consciousness” (*conscience psychologique*) and “conscience” (*conscience morale*). In French, “conscience” and “consciousness” are the same word *conscience*, but when Simondon wishes to distinguish the two, he uses the adjective *morale* to designate when he means “conscience.” This distinction should be kept in mind in the following paragraph.—Trans.]

2. This likening is given as a comparison and not as an analogy.

3. [This phrase roughly translates to “no one errs willingly” and can be found in Plato’s *Republic*.—Trans.]

## INDIVIDUATION AND INVENTION

1. [Literally, “[he] is worth many [men]”.—Trans.]

2. [Eighth century BCE poet from Sparta who advocated devotion to the state in his political and military elegies.—Trans.]

3. [*Goetia* in Greek generally refers to “sorcery” or “witchcraft,” and it more specifically refers in English to the ceremonial summoning of demons performed by King Solomon in the Old Testament.—Trans.]

4. [The word in French here is *insolite*, which means “strange or unusual,” literally “out of the ordinary.”—Trans.]

5. [The word in French here is *refontes*, and this notion is specifically used in metallurgy, but it also more generally can refer to a “remaking,” which is closer to the etymological sense of the Latin *facere*, meaning “to do/make.”—Trans.]

6. [English in the original.—Trans.]

7. [English in the original.—Trans.]

## HISTORY OF THE NOTION OF THE INDIVIDUAL

1. *Phaedrus*, 270c.

2. *Theaetetus*, 176a.

3. *Symposium*, 203c.
4. Plato, *Euthyphro*. Translated G. M. A. Grube in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 6d.
5. *Meno*, 99c, 100b.
6. *Symposium*, 206d, 208b.
7. Plato, *Phaedrus*. Translated by Alexander Nehamas and Paul Woodruff in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 244b.
8. Plato, *Republic*. Translated by G. M. A. Grube in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 518e–519a.
9. *Republic*, 514a–516a.
10. *Republic*, 423d.
11. Plato, *Laws*. Translated by Trevor J. Saunders in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 797a [translation modified—Trans.].
12. *Laws*, 693d.
13. *Laws*, 701d.
14. *Laws*, 803c.
15. *Parmenides*, 131e–132b.
16. *Parmenides*, 132a–133a.
17. *Parmenides*, 133b–134e.
18. *Theaetetus*, 160c.
19. *Theaetetus*, 189a–190c.
20. *Theaetetus*, 201d.
21. *Theaetetus*, 203a–204d.
22. Plato, *Sophist*. Translated by Nicholas P. White in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 248e.
23. *Sophist*, 249a.
24. *Sophist*, 250a.
25. *Sophist*, 253a–d.
26. *Sophist*, 252e.
27. *Phaedrus*, 265d.
28. *Timaeus*, 26e.
29. *Timaeus*, 65a.
30. *Timaeus*, 26a, 30b.
31. *Timaeus*, 30a.
32. *Timaeus*, 53c–57c.
33. *Timaeus*, 52b.
34. *Timaeus*, 53c.
35. *Timaeus*, 35a.
36. *Timaeus*, 41b.
37. *Timaeus*, 41c–d, 43a.
38. *Metaphysics*, XIII.7, 1081a14.
39. *Philebus*, 23c, 23d, 26a–d.

40. *Timaeus*, 28b.
41. *Republic*, 563e–574d.
42. Plato, *Statesman*. Translated by C. J. Rowe in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1997, 268e, 275b.
43. *Statesman*, 294b.
44. Plato, *Laws*. Translated by Trevor J. Saunders in *Plato: Complete Works*, edited by John M. Cooper, Hackett, 1977, 644d.
45. Aristotle, *Posterior Analytics*. Translated by Jonathan Barnes in *The Complete Works of Aristotle*, volume 2, edited by Jonathan Barnes, Princeton University Press, 1984, II.19, 100a16–100b1.
46. Aristotle, *Physics*. Translated by R. P. Hardie and R. K. Gaye in *The Complete Works of Aristotle*, volume 1, edited by Jonathan Barnes, Princeton University Press, 1984, III.1, 201a27–29.
47. *Physics*, VII.1.
48. See the opening lines of *Physics*, III.5.
49. *Physics*, III.6, 207a30–31.
50. See the opening lines of *Physics*, III.8.
51. Aristotle, *Metaphysics*. Translated by W. D. Ross in *The Complete Works of Aristotle*, volume 2, edited by Jonathan Barnes, Princeton University Press, 1984, XII.10, 1076a4; *Iliad*, II.204.
52. Aristotle, *Nicomachean Ethics*. Translated by W. D. Ross in *The Complete Works of Aristotle*, volume 2, edited by Jonathan Barnes, Princeton University Press, 1984, VII.13, 1153b32.
53. Aristotle, *On the Soul*. Translated by J. A. Smith in *The Complete Works of Aristotle*, volume 1, edited by Jonathan Barnes, Princeton University Press, 1984, II.2.
54. *On the Soul*, III.5.
55. *Generation of Animals*, II.3, 736b27.
56. Aristotle, *On the Soul*. Translated by J. A. Smith in *The Complete Works of Aristotle*, volume 1, edited by Jonathan Barnes, Princeton University Press, 1984, III.8, 431b20–22.
57. Aristotle, *Nicomachean Ethics*. Translated by W. D. Ross in *The Complete Works of Aristotle*, volume 2, edited by Jonathan Barnes, Princeton University Press, 1984, IV.2, 1122b26–28.
58. *Nicomachean Ethics*, I.8, 1099a32–34.
59. *Nicomachean Ethics*, II.6, 1106b21–23.
60. *Nicomachean Ethics*, X.6–8.
61. *Epistles*, II.1.
62. *Discourses*, II.19, 1–5.
63. Diogenes Laertius, *Lives and Opinions of Eminent Philosophers*, volume 2, translated by Robert Drew Hicks, Loeb Classical Library, 1925, VI.9.
64. *Lives and Opinions of Eminent Philosophers*, volume 2, VI.103.

65. *Lives and Opinions of Eminent Philosophers*, volume 2, VI.10–13.

66. *Lives and Opinions of Eminent Philosophers*, volume 2, VI.18.

67. [These successors were the immediate successors of Alexander the Great. After his death, they carved up his empire as a consequence of a series of conflicts (the Wars of the Diadochi). This corresponds to the beginning of the Hellenistic period.—Trans.]

68. Diocles in *Lives and Opinions of Eminent Philosophers*, volume 2, VII.54; Epictetus, *Dissertations*, I.6, 10. Cited by E. Bréhier.

69. *Lives and Opinions of Eminent Philosophers*, volume 2, X.134.

70. Or at least no anthropocentric humanism.

71. *On Love*, chapter 1.

72. *Enneads*, V.7.

73. On this subject, see also Franz Cumont's study *Lux Perpetua*.

74. We are certainly not claiming that the veritable Apollonius of Tyana was a charlatan: it could be that the magical and fantastical operation of this hagiographical novel was based on the legend surrounding Apollonius of Tyana, and that Philostratus, who was more of a sophist than a philosopher, eagerly gathered it together. What stands out for us is this elaboration of a hagiography that exhibits Eastern contributions.

75. This term is not strictly identical to what we call transductive reality, for the whole is not immanent to the end of a transductive series.

76. It would be in this sense that we could find in Proclus a fairly close conception of transductive relation: perhaps it would be necessary to attribute this to a certain influence of Platonism (theory of number-ideas). This doctrine contains a schema which is analogous to that of the parallelism of the attributes in Spinoza.

77. By characterizing the one who poses such a question as *insipiens*.

78. The critique addressed by Proclus to the notion of creation is also found in Spinoza.

79. *Histoire de la philosophie*, I, p. 497.

80. Even if it does not end up founding a "Christian philosophy," a philosophy which would be Christian in opposition to non-Christian philosophies, Christianity contributes to philosophical reflection a doctrine of the individual that will be able to be elaborated and reflected by various thoughts. It would moreover be quite contrary to the essence of Christianity and its sense of universality if there were a Christian philosophy: this would be to turn Christianity into a closed domain of thought.

81. In the individual according to Christianity, there cannot be pure juxtaposition but in fact *conflict*; however, the regime of causality of two conflicting forces is mutual conditioning: even in conflict, individual unity is dynamically maintained. Bi-substantialism is what makes conflict cease by isolating the regime of causality of each of the forces. If there is dualism in Christianity concerning the

individual, then it is a dualism of forces, not a dualism of substances. In fact, the words dualism and monism are not, properly speaking, suitable for the conception of the individual in Christianity. In Christianity, the individual is instead transductive reality, a reality which can only be grasped veritably through the series of its acts and its states. The fundamental historicity of being is the affirmation of the individual's transductive nature. This is why Christianity may seem dualistic with respect to a substantialist monism and monistic with respect to a substantialist dualism.

82. *City of God*, X.31 and XIII.13.

83. *On the Soul and Its Origins*, IV.2.

84. Or at least a being conflicting with itself: "*pars assurgens cum parte demissa*."

85. *Proslogion*, II and III.

86. *Confessions*, VII.1–3.

87. *Republic*, 381b.

88. Thomas Aquinas, *Contra Gentiles*, translated by Anton C. Pegis, Hanover House, 1955, I.3.

89. *Contra Gentiles*, II.68.

90. *Contra Gentiles*, II.81.

91. Avicenna, *Fons Vitae*, 13.

92. *On the Unity of the Intellect against the Averroists*, V.105.

93. Quickly enough, however, the tendencies of the Academies to legislate in matters of taste or sciences becomes apparent. But it wasn't until the eighteenth century that thought, or at least enlightened opinion, became a group reality. One cannot label the "philosophes" of the seventeenth century in the same way as those of the eighteenth to grasp them as a group.

94. A gear can be represented as constituted by a twofold series of levers that interact one after another following the revolution of the cogs, where the mobile point of the first is in contact with the resistant point of the next.

95. That according to which individual reality is not just ambivalent but consists of an internal duality that establishes an essential relation in it: in each of the points of view from which it can be grasped, the individual consists of the relation of two aspects: ontogenetic and phylogenetic, interiority and exteriority, substantiality and eventual characteristic, freedom and determinism, aseity and participation, profound instinctivity and hyperconscious rationality. This ambivalent duality could be called the problematic or self-problematic nature of the individual: the individual does not encounter difficulties, he is a difficulty to himself; he calls himself into question and is his own problem; he encounters himself on his own path. As one of the clearest aspects of this self-problematic nature, let us cite the analogy of the meaning of life and the meaning of death, of the coming-to-be and passing-away of individuality. Individuality is circular causality, confrontation of oneself with oneself, affirmation and negation of oneself by oneself: every tendency is twinned, capable of being inverted through the suppression

of one of the two branches; it is impossible to adopt either monism or dualism, which would be a suppression of recurrence, because there would no longer be but a single term or two isolated terms. There is neither one nor two terms but a term in the process of splitting and two terms in the process of unifying. The individual is the ongoing relation of unity and duality.

The individual's individuality is precisely transindividual, for the individual affirms its individuality by opposing its action to its substantiality (sacrifice, sympathy), but this sympathy and this sacrifice couldn't exist without a relative substantiality of the individual at the start. Action moves, but it moves starting from a point that becomes a point of departure because action distances itself from this point. Relation has the status of being vis-à-vis the terms, and the terms find their value as terms in the act that establishes relation.

In this sense, it would be false to say that the individual is merely information. It is in fact auto-position of information, condition of information. Information can be posited only relative to a point of view, and there is no point of view except through individuality. The transductive reality of the individual depends on the fact that the individual possesses within itself an allagmatic dynamism that consists in its unity and its plurality, as well as the fundamental bipolarity of its tendencies. Furthermore, in the individual's relation to other individuals and to nature or technical beings, the individual is invested in a transductive relation.

Finally, a third allagmatic rapport *permits* the first two rapports to exist and is conditioned by them: the allagmatic rapport between interiority and exteriority, between the interior transductive rapport and the exterior transductive rapport. Neither of the two initial rapports of interiority or exteriority would be stable without the third, which is the rapport of two rapports. But this latter would not exist without the former. There is simultaneity of three rapports. The transductive relation between the first two rapports is manifested by a *link of analogy* between their dynamic and static structures: these two rapports are transpositions of one another. But analogy is nothing but the symbolic aspect that reveals a transductive activity. In its reality, the rapport is transductive relation; it expresses itself externally as an analogical rapport. Analogy is the symbolic expression of transduction; analogy does not constitute transduction but merely *expresses* it. Plato's study on this subject doesn't just have methodological value, even if it is inspired by the technical paradigm of artistic imitation or the minting of coins based on an archetype: it supposes the transductive relation between the source of knowledge and the subject who knows, between the Good and the soul, between the Sun and the eye; the object is what materializes and mediates the transductive relation of knowledge. This transductive relation is asymmetrical in Plato, because the Sun and the eye, the Good and the soul are analogues without being on the same level in the order of beings. But we should note that based on the fundamental asymmetry between the model and the painting, between the idea

of the shuttle and the shuttle, Plato seeks a symmetrical relation: the soul is sister of the ideas and not just analogue of the Good. The eye veritably emits a light that will encounter the light that comes from the Sun and the object.

96. Even if a technical paradigmaticism is subjacent to this conception, technical work must not be considered a simple fabrication but a transfer of information. This information is present in the objective reality of the notion in the same way as the object qua formal reality: there is only a single mode of existence of information, and this mode is no less *real* qua objective reality than qua formal reality. The *realism of information* indeed founds the proof of the Third Meditation.

97. This supposes that information can be conveyed by a support without any quantity of energy, and not just a quantity as small as could be desired. Descartes carried out a passage to the limit that the energetic determinism of the nineteenth century has deemed excessive.

98. Animal spirits can therefore intervene as carriers of an effector energy and not just as carriers of a message.

99. The explanation of magnetic action based on spirals of subtle matter is illogical: one can indeed explain in this way *either* the attraction of two poles with opposite names, *or* the repulsion of two poles with the same name, but not both effects, for the hypothesis must change to pass from one to the other. If poles with the same name repel, poles with the opposite name have no effect on one another. If poles with opposite names attract, poles with the same name have no effect on one another (since the spirals turn in the same direction).

100. Pascal, *Pensées*. Translated by A. J. Krailsheimer, Penguin, 1995, p. 63.

101. This correspondence, perfect analogy, supposes an absolute and instantaneous transductivity of all the corresponding modes in each of the parallel attributes. Inadequation is a lack of transductivity. Adequate knowledge is the re-establishment of transductivity. Wisdom and *amor intellectualis dei* are transductivity extended to being as a whole. This type of transductivity is simultaneous.

102. *Ethics*, V.24.

103. Sin consists in not utilizing or utilizing badly this movement we have to always go further: man diverts toward a creature this movement to always go further; Adam's sin was to have made this movement focus a predominant and exclusive attention on Eve.

104. We have tried to account for this paradox of ambivalence and duality by invoking the notion of transductivity as characteristic of individual reality. Ambivalence is contained in the monadic series in the form of the identity of virtuality and actuality. Spinoza privileged external transductivity—that which ensures that the modes are parallel from one attribute to the other—and incorporated internal transductivity into external transductivity through the adequation of knowledge that is action at the same time. Leibniz carries out the opposite procedure by constituting internal transductivity and then incorporating external

transductivity into internal transductivity due to the calculus of compossibles through God the creator, who behaves as an individual fulfilling an act of internal transductivity.

The Spinozist individual who accesses the third type of knowledge internalizes external transductivity; the Leibnizian God who creates the world according to the calculus of compossibles externalizes an internal transductivity.

In this sense, none of Descartes' successors fully resolved the problem of the rapport between the two kinds of transductivity, which in Descartes seemed like a metaphysical problem of the communication of substances but which is in fact a logico-metaphysical problem, that of the rapport of two kinds of transduction.

105. This is how the rapport between two transductions is established. But we should note that the exteriority of reason relative to the transductivity of the series is only exteriority within a logical universe—thus within a world of internal transductivity.

106. This is the condition of the possible establishment of an equivalence between the two transductions, and this condition leads Leibniz to the difficult discussion in the *Theodicy* concerning providence and the freedom of the monad. Perhaps it would in fact be necessary to seek human freedom in the relation between internal transductivity and external transductivity. Every doctrine that seeks to identify these two transductivities or to reduce one to the other instead of seeking their conditions of compatibility in a third transductivity leads any thought that reflects on freedom to an impasse.

107. *Annales J.-J. Rousseau*, IV, p.1.

108. VI, pp. 209–212, September 1761.

109. To Rey, XIII, p. 264, 27 April 1765.

110. XV, p. 131.

111. *Annales*, Tome IV.

112. *Confessions*, VII.

113. XV, p. 479.

114. *Confessions*, I.

115. "Preamble," *Annales*, IV, p. 10.

116. If a study of the morphology of temperaments were sufficiently legitimate, we would present Rousseau as connected to the respiratory or mountain-dwelling type. Rousseau does not live well in cities and in the absence of all vegetation because this does not provide enough respiratory excitation. Differences of level, like the aromatic stimulations of grass and hay, elevate respiratory excitation. We can state that a part of Rousseau's morality is founded on the correspondence of situation and temperament. This does not suppose any materialism: it is natural for the individual to seek the state in which he is most perfectly himself by fleeing from the painful lethargy of a situation in which he feels himself diminished. At the end of his life, Rousseau, walking in the countryside of the Ile-de-France, was transported when he saw a haystack, a tuft of bushes, a grassy hedge.

117. "Première lettre à Malesherbes," VII, p. 36.
118. "À de Luc Père," II, p. 218.
119. *Confessions*, II.
120. *Confessions*, III.
121. "Troisième lettre à Malesherbes," January 1762, VII, p. 70.
122. "À Madame de Créqui," IV, p. 159.
123. *Annales*, IV, p. 24.
124. *Confessions*, I.
125. *Annales*, IV, p. 25
126. *Confessions*, I.
127. *Confessions*, XII.
128. *Annales*, IV, p. 10.
129. VI, p. 263.
130. III, p. 101.
131. III, p. 101
132. III, p. 240.
133. *Confessions*, III.
134. *Correspondance*, I, p. 369.
135. *Correspondance*, I, p. 372.
136. The propagation of fire is a phenomenon of self-maintenance in a transductive activity.
137. It is in this sense that the feeling of transductivity leads to an anxiety of the encounter; when transductivity is sometimes possible, sometimes impossible, and not *always* possible (as in Descartes), when the self-creative nature of action is lacking, the *Kairos* becomes preponderant again: the encounter, *tuchè*, is the condition of individual salvation. This is where the anxiety of time and place comes from.
138. *Correspondance*, III, p. 245.
139. *Confessions*, VII.
140. *Confessions*, VII.
141. *Correspondance*, XV, p. 338.
142. *Reveries*, p. 375.
143. *Reveries*, p. 379.
144. *Confessions*, III.
145. *Confessions*, III.
146. *Reveries*, p. 373.
147. This phrase reveals Rousseau's taste for the vegetal aspects of nature that stimulate respiratory temperament and that he opposes to the corrupted alimentary luxury of urban life.
148. *Confessions*, VIII.
149. *Second Dialogue*, p. 316.
150. *Confessions*, I; *Correspondance*, XIX, p. 309–310.

151. *Confessions*, VI.

152. *Confessions*, IX.

153. *Second Dialogue*, p. 163.

154. *Second Dialogue*, p. 211.

155. *Confessions*, V.

156. "À de Luc Père," XI, p. 191.

157. Here again, we find Rousseau's taste for plants, the stimulant of the respiratory temperament.

158. XVIII, p. 338

159. A fairly massive mountain that is steep toward the slope overlooking the Gier valley and Saint-Chamond or Izieux. Huge piles of stones, chirrats, alternate with slopes of pines and very dark fir trees; the mountain is 1445 meters in altitude.

160. "À Duclos," XII, p. 110. In fact, if botany keeps Rousseau from madness, this is because it integrates into his conscious life (through the composition of the herbarium) an activity that corresponds to his temperament; it resolves a part of the conflict.

161. I.e. in fact, an activity that justifies itself and integrates itself into rational thought.

162. *Reveries*, p. 370.

163. The ambivalence of individuality is also found in Gérard de Nerval, down to the complementary aspect of the simultaneous images of feminine beings, complementary via pairs of the individual, which is itself double: Sylvie and Adrienne, the nun and the actress, the Sainte and the fairy. Here, there is an analogical relation between the duality of individual reality, demanding a complementary duality, and the division that turns the individual into half a being in search of its complementary. The internal transductive relation that unifies the opposed beings into which the self splits calls for the external transductive relation between the opposed beings toward which the self tends in order to complete itself. External transductive relation and internal transductive relation, the principles of a twofold symbolism of the interior and exterior, become unified in the transductive relation of the two, internal and external, relations: this new relation, which is that of the self and the world, is the fulfillment of destiny as a search for the Orient, a voyage toward the Orient at the dusk of life, a return to birth through death, and the polarization of spatio-temporal existence through the transindividual drama. The act of orientation, which reconnects the individual to the world and gives the world a meaning in the individual, in fact supposes these first two transductions but reunites them: it is the act of the transindividual order.

164. The *Voyage to the Orient* shows that Gérard de Nerval had a real knowledge of the modern Orient and of the ancient myths elaborated there.

165. *Système de la Nature*, p. 22.
166. *Système de la Nature*, p. 17.
167. It is the reality in which a transduction is carried out: it makes something of life, and life makes something of the soul.
168. *Système de la Nature*, p. 12.
169. *Poetry and Truth*, IX.
170. Goethe relied on the differences between the plans of composition of various beings so as to prioritize them: radial symmetry is inferior to bilateral symmetry and cephalo-caudal polarity. The research of Charles Bonnet anticipates Goethe's study on *Gestalt* and *Bildung*, containing this idea that there is a form of development, a *Bildung*.
171. "Lettre à Malesherbes," 1762.
172. *Outlines of a Philosophy of the History of Man*.
173. Following this path, Goethe ends up considering that there exists a relation between the static form and the dynamic form, between *Gestalt* and *Bildung*; taking this path of research further, it could be asked at what level and according to which regime of causality this relation is established: Goethe seems to resolve the problem posed in this way by declaring that forms belong to nature and not to the individual or even to the species; but then the relation of the individual to nature would remain to be defined.
174. *Histoire de la philosophie*, p. 574.
175. *Soirées de Saint-Petersbourg*, I, 40.
176. *Législation primitive*, III, 163.
177. *Ceuvres inédites*, édition Blaize, I, 403.
178. Letter to Cabet, 1838.
179. *Éléments d'Idéology*, IV, p. 218–220.
180. In a certain sense as well, this idea could be compared with those of Jackson, von Monakow, and Mourgue.
181. *Mémoire XI*, paragraph I.
182. *Mémoire X*, paragraph XI.
183. *Sonnenklarer Bericht*.
184. *The Vocation of Man*.
185. *Addresses to the German Nation*.
186. *Sonnenklarer Bericht*.
187. That which is a case of transductivity, and the model of transductivity.
188. *Ausgewählte Werke*.
189. [The manuscript ends here.]

#### ALLAGMATICS

1. [This term is found in the *Sophist* and describes the manner in which angling approaches fish in such a way that is distinguished from the use of a spear.—Trans.]

## FORM, INFORMATION, AND POTENTIALS

1. [It should be noted that in French the word *physique* is a singular noun, something the English word “physics” obscures due to the letter with which it ends.—Trans.]

2. At least spontaneous and quasi-instantaneous, in the present of the system: the Gestaltists assert that there can exist pre-forms, *Vorgestalten*.

3. More exactly, the gradient of the field will have a larger slope around certain points.

4. In the clock-gravity/clock-Earth system.

5. With an elevated gradient.

6. In this sense, the definition of a modulator as negative resistance, which is current in the teaching of electronics, is an epistemological absurdity, one that reduces the triodic structure to a passive and therefore symmetrical resistance. Asymmetry is already revealed in the diode in all its forms.

7. [English in the original.—Trans.]

8. These are the conditions of syncrystallization.

9. See Dalcq's *L'Oeuf et son dynamisme organisateur*.

10. This field is global and simultaneous with respect to itself only as a field, *before* form-taking; the internal absence of boundaries expresses the rise of potential energies and the homogeneity through dedifferentiation that allow form-taking to advance transductively: matter is a metastable field *before* form-taking. But form-taking is precisely a passage from metastability to stability: informed matter is differentiated and is no longer a field; it loses its *internal resonance*. Gestalt theory attributes to the totality *simultaneously* the characteristics of a field and those of an organism; however, *the field exists before form-taking, and the organism exists afterwards*. Form-taking, envisioned as an operation of transductively propagated modulation, makes the real pass from the metastable state to the stable state and replaces a *field* configuration with an *organism* configuration. As a corollary, the energetic theory, such as we present it, of the operation of form-taking does not employ the notion of virtuality that is presupposed by the concept of good form; the potential, conceived as a potential energy, is *real*, for it expresses the reality of a metastable state and its energetic situation. Potentiality is not a simple possibility; it is not reduced to a virtuality, which is less than being and existence.

11. Instead of carrying out an impoverishment (which would allow one to presuppose an inductive hylomorphic theory) consisting in suppressing all messages not shared by both eyes. The theory that we are supposing, which is a doctrine of integration, allows us to avoid the inductive impoverishment of “common sense,” and consequently that of the formation of common notions and the nominalism that follows from them.

12. This theory would be distinguished from *realist innatism* (linked to archetypal theory) and *nominalist empiricism* (linked to a hylomorphic theory): the

progress of knowledge would indeed be a formalization, but not an impoverishment or a progressive distancing that abandons the sensorial concrete; formalization would be a form-taking consecutive to a problem's resolution: it would mark the passage from a metastable state to a stable state of the content of representation. The discovery of an organizational *dimension* of knowledge utilizes as a positive index of structural organization that which, in the content in a metastable state, was precisely the foundation of incompatibility: in the case of binocular perception, the disparation of monocular images is what renders them incompatible. However, it is precisely this degree of disparation that is taken as a positive index of the relative distance of fields in three-dimensional perception. Thus, knowledge advances by *positivizing incompatibilities*, by transforming them into the bases and criteria of a more elevated system of knowledge. The deductive theory of knowledge is as insufficient as the inductive theory; the inductive theory describes the conditions of the metastable field that precede form-taking; but it forgets the structural germ and wants to account for formalization by way of abstraction, which impoverishes the content of the field without positivizing the incompatibilities, since it eliminates them: it therefore distances itself from the real. Deductive theory describes the play of the structural germ, but it cannot reveal the latter's fruitfulness, since it considers the germ as an archetype and not as a germ. The theory of form-taking through the positivization of the incompatibilities of experience should allow us to take back up the problem of the schematism on new bases and to perhaps give a new meaning to relativism, just as it would provide a basis for the interpretation of all the psychical processes of genesis and invention. The modulator is a system of interaction.

13. In other words, it allows us to pass to a more extensive field, one that is both more powerful and more complex.

14. Which is called "resolving power."

15. Criminology discovers a new dimension in the study of dangerous situations: such situations constitute a particular type of metastable psychosocial state that cannot be adequately thought according to a deterministic theory or according to a theory of the free choice of actions.

16. An energetic theory of form-taking in a metastable field seems to us to be suited to the explanation of phenomena that are complex, rapid, and homogeneous albeit progressive, like the Great Fear.

17. In his study of the relation between cultures, Léopold Sédar Senghor adopts a hypothesis that would confirm the meaning of this principle of organized heterogeneity.



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