THE TECHNICAL UNIVERSE IN AN ONTOLOGICAL PERSPECTIVE

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I. INTRODUCTION

The question of technology can be approached philosophically according to different perspectives: action, ethics, historicity, relationships with science or between technology and nature. The perspective which will be proposed here is the perspective of ontology, in which reality is considered from the point of view of its relation to Being. That perspective was established already at the beginning of philosophical thinking, such at least as it was constituted in the Western tradition. It gives an answer to the concern for what is radical, which animates and in some measure defines the philosophical project. The problem was to find a point of view from which a radical understanding could be developed. Now the very idea of what is radical can be understood either in the sense of what is absolutely encompassing, in the sense of totalization, or in the sense of what is thoroughly fundamental, primary, originary. But each one of those meanings links to the other: an encompassing point of view must be a principle which permits seeing things in terms of what is in them the most essential. What is most essential links them to one another most tightly and determines their common belonging to the same totality; reciprocally, a point of view which seizes things in their most essential constitution must be a principle which permits seeing them in what is their common sharing, which thereby gathers them in an encompassing view. An absolutely radical point of view, according to the two meanings of the term, must have the character of an ultimate perspective, both in the sense of an encompassing totality, which cannot be included in another one, and in the sense of a foundation which cannot be set on a more fundamental foundation. The concept of principle expresses precisely that double requirement.

Now there is, in reality such as it manifests itself to us, an aspect which is at the same time the most common and the most essential, namely, what it takes quite simply for reality to pose itself as real, that is to say as existing, in a manner which is evident but at the same time (when you think about it) surprising. After all, any particular reality could have not existed, and at each moment it could no

longer exist. Every real thing is an occurring which does not cease to occur, it affirms itself in what it is by surmounting unceasingly the possibility of its disappearance, in a sort of continuous victory over nothingness. The *Poem* of Parmenides represents in a striking manner that radical opposition which separates what is from nothingness, and it brings to the fore all the semantic amplitude of the verb by which the language expresses that opposition and suggests the presence in each existing thing of that self-positing force by which it sustains itself as the reality which it is. The verb *to be* designates thus the first determination which, in every thing which is, supports all the others and is itself reducible to no other.

In a certain way, however, it is not a detertimination, because it is the possibility of every determination. The *Poem* of Parmenides expresses this by saying that about Being, rigorously, we can only say that it is, and that it is possible to evoke it only by signs, which refer back to Being only by means of negation. Of Being we cannot say that it is no more or that it is not yet, nor that it is engendered or that it is perishable: "It never was nor will be , as it is now, entirely at the same time, one, all in one piece. . .; it is not possible to say or to think a way for it not to be " (Fragment VIII).

Thus it is in existing things themselves that a constituting radicality reveals itself, as a primary fact. At the same time it is a primary condition, which suggests by itself a task for thinking, entirely attuned to the project of a radical understanding. We have to see things in the perspective of what thus reveals itself in them and is expressed by the verb *to be*. We can say that this point of view is totalizing, to the degree that it aims, in every thing, at the same primordial efficiency—which, at the same time and in every thing, is its most manifest and most concealed aspect. But it is precisely that by which such efficiency is the same in every existing reality, that is to say, what makes it really radical, that also makes the aim to understand Being the truly ultimate point of view from which a "first philosophy" can be instituted.

But the point of view of Being is not purely conceptual. It is the reflection, in the organization of thought, of what belongs to the very constitution of things; and it finds support in what, of that constitution, shows itself effectively in the manner in which the real reveals itself in its reality. We have however no direct access to Being itself , but only to things which are, to concrete beings. It

is in these that Being manifests itself. And it is from the taking into consideration of being precisely as being that the point of view of Being can be instituted. This is because a concrete being, in its manifestation, appears to us at the same time both as pure positing of itself and as determined in such or such a way. Thereby a remarkable duality reveals itself in the constitution of the being: between, on the one hand, what is simply existence and on the other hand the characterizing determination which marks the essentiality of the thing. Existence is an act of self-positing, by which the being affirms itself in its subsisting reality, as separating itself resolutely from nothingness, and as capable of persevering in that position in spite of the double negativity of the "no more" and the "not yet" which is introduced by time. That act is truly proper to each of the beings in which it effectuates itself; it thus has a singular character. Nevertheless, it is, in every being, the particularized expression of the same constituting function, and this grounds the community of beings. The philosophical tradition speaks of this community in terms of participation: it is by taking part in the function of the self-positing by which all beings are that each of them is capable of sustaining itself in its singular self-position.

Each being's characterizing determination is precisely the measure according to which every being enters into that participation, and thus the measure of the particular modality according to which the act of its self-positing actualizes itself for it. This determination has a positive character inasmuch as it represents the real part that the being receives of the absolute amplitude of Being—that is to say, of pure existence—and it has a negative character inasmuch as it restricts that amplitude and grants to each being only a part of it. This internal duality of determination is the signature of finitude, characteristic of the beings which enter into the field of manifestation. The crucial question which must be raised with respect to the status of the manifested being is to know how we can conceive the possibility of pure existence, even though in what is manifest we can only apprehend its reflections within the limits of determination. The duality—of existence as pure position expressed by the concept of "being," and of determination—introduces a dissociation inside the perspective of Being. It compels us to recognize that we cannot reach the existing as such—that is to say the position of Being in its radical character—but only determinate beings. In them, to be sure, the existing makes itself manifest, but only inasmuch as the determination/limitation remains adherent to it. This also compels us to recognize that determination does not at all produce existing as such; it does not even

contain in itself a demand to exist. Thus, existing and determination, effectively linked to each other in the structure of a concrete being, are separable in principle; so each one of these components can be taken into consideration apart from the other.

It appears therefore as possible to conceive the perspective of Being in two ways, though they are not totally independent from each other. It is possible to aim at understanding Being as inscribed in the structure of the concrete being, and thus as manifested only in its determination; and it is possible to aim at understanding Being in its purity, as detached from determination. In the first approach, we consider the concrete and individualizable status which the concrete finite being possesses in its manifestation—where its actuality is at the same time attested and partially concealed by the power of the determination (even if it is necessary, to be sure, to recognize finally that it is by virtue of the efficiency of Being that the determination itself is posited). In the second approach, we consider the universalized status of the horizon of constitution to which every concrete being belongs, and from which comes the efficiency which posits it and whatever could be. (In this approach, to repeat what was said earlier, we question the possibility of pure existing, and thus of what is ultimately implied in the givenness of that horizon which is, to be sure, inscribed in the structure of manifestation, but which refers back to the question of its own possibility.)

Using a terminology which has become common in phenomenology, we can say that the first approach belongs to an *ontic* point of view; it addresses itself to the question of Being through the question of the structure of the concrete being. The second approach belongs to an *ontological* point of view, since it addresses itself to the question of Being considered in itself. The ontic perspective takes determination into consideration in an essential way. There is a determination which is proper to each concrete being, as subsisting in its singularity. But it appears that those singularizing determinations can be reunited in different sets of determinations of a general character, and there it is no longer possible to recognize what makes the particularity of such or such an individual concrete being; it is only possible to recognize typical modes of relation to Being that reveal fundamental possibilities of inscription in the ontological horizon. We can refer to these general determinations by using the expression, "category of determination." The construction of these categories is based upon the intuitive data provided by natural experience. And despite the fact that they are susceptible

of different improvements, they retain their importance and legitimacy based on the manifest data from which they are extracted. The analysis of these categories from the point of view of the ontological function of determination—that to say of the role of determination in the constitution of the concrete being with respect to the position of this one in the realm of Being—is the task of what has been called "regional ontologies."

This expression is perhaps somewhat equivocal, to the degree that it contains the term "ontology," because the analysis which is here in question belongs to an ontic point of view, according to the terminology invoked. Nevertheless, the use of the term "ontology" might be justified, to the degree that this analysis bears on the type of being of a determined category of concrete beings. In order to prevent any misunderstanding, in what follows only the expressions "ontic point of view" and "ontic analysis" will be used for this level of analysis.

The empirical domain constituted by *technique* lends itself to a categorization in the sense just described, and thus to an analysis undertaken from the ontic point of view. But such an analysis must be considered as a step toward an ontological interpretation, as suggested by the title of this paper. An*ontic* analysis should bring out the meaning of the determining category which belongs properly to the domain of technique; that is to say the specific mode according to which the entities of that domain are related to Being, or the particular measure according to which those entities have a share in the amplitude of Being. But an *ontological* analysis should try to show what contribution the determination that is proper to the domain of technique brings to the understanding of Being as such; more exactly, it should show how the horizon of Being is refracted in that determination, and thus what Being reveals of itself in the particular modality of its manifestation at which the category, "technique," is aiming.

2. TECHNIQUE FROM THE POINT OF VIEW OF AN ONTIC ANALYSIS

A study of the domain of technique could pay attention to its roots, or to the technical objects considered in their individuality, or to what could be called the universe of technique. It is true that it is not possible to consider that universe by making abstractions of the objects which constitute it. But one of the important aspects of contemporary technique is that, more and more, technical objects are

related to each other, in a way constituting networks whose nodes condition each other; and those networks are more and more interconnected and more and more open to extensions—some already programmed but others not foreseeable.

It is perhaps not possible to speak of a "system" which would imply a very high degree of integration and of unification. But we must in any case deal with a field of interactions whose degree of connectivity is growing and which is susceptible of extending itself without a priori limits. At the same time that it reinforces its internal cohesion, this field autonomizes itself with respect to action—even action which has engendered it or utilizes it. It seems appropriate to speak of it as a universe, to indicate that it is characterized by a general condition of belonging, that it is therefore relatively well defined, but that it is at the same time extensible in principle. The term "world" would also be appropriate; we could perhaps think of the idea of the "third world" as introduced by Karl Popper. But the third world of Popper contains ideal objects, such as scientific theories, as well as material objects, like measuring instruments. And we have to do here only with a part of that third world: objects which have the status of material objects but which are, like the other components of that world, projections in materiality of the processes proper to the "second world," the world of thinking and acting subjects. Although it is only a part of the third world of Popper, the totality of technical objects, inasmuch as it is an open whole, can be considered a world; and belonging to that world can be characterized in relation to an horizon of constitution, which could be called the "horizon of technicity." Being circumscribed within that horizon endows a material device with the property of being categorizable as a "technical object."

But what is constituent of technicity is a certain mode of being, a particular and characterizing manner of inscribing oneself within that general and primordial condition which, in every concrete being, is the pure actuality of existing. The horizon of technicity is thus an ontic horizon. As a horizon, it is present in every technical object and belongs to the structure of the manifestation of that object, conferring on it precisely the quality of being a technical object. It is thus appropriate to ask questions about the nature of that horizon, seeking the characters which belong properly to technical objects.

Each one of those objects can be contemplated either in its proper consistency or in its belonging to a general field. In its proper consistency, the

technical object appears as the incarnation of a representation which is directed towards the realization of a certain type of performance. In that representation we can distinguish a component which controls the structure of the object and another one which controls its dynamics—the latter determined by the type of performance which it is intended to produce. The representation as such is abstract; in each of its two components it has the status of a form. The object itself is the concretization of that double form, a projection of the representation upon a substrate which plays the role of a material. Between the formal and the material intervenes a dialectic of reciprocal appropriation: the configuration of the form controls the nature and the configuration of the material, but reciprocally the available material gives way to possibilities the realization of which brings about a modification or, in general, a complexification of the form. If one modification is in the idea, then its objectification, in the sense of its becoming-object, is in the type of subsistence which is proper to the corresponding material. While objectifying itself, the representation detaches itself from the idea and acquires, so to say, an independent existence. The process of objectification is at the same time a process of autonomization. Correlatively, the finality proper to the object, which was first implied in an intentionality aiming at a certain type of performance, detaches itself from any intentionality and becomes a purely intrinsic finality.

But, as already mentioned, the technical object is not isolated, although it is isolable. It inscribes itself in interconnected networks and its specific nature is determined partly by its belonging to that field of networks. To be sure, the connections are concretely established by the users, but it is by reason of demands or requirements which come from the objects themselves. More exactly the extension of the connections is carried out in function of the already operating networks. Thus in a certain way the networks themselves have a tendency to expand and to link themselves to each other, engendering thus a proper universe. The users, in that process, are actually only the mediating agents which help the possibilities inscribed in the networks, in their turn, to project upon the available substrates. While expanding, the networks make their constraints more and more effective and manifest themselves in further extensions. By that process the networks more and more increase their autonomy, like the objects which compose them. But what makes the network is relations. As such, it is an ideal possibility. It becomes an effective reality by inscribing itself in the material devices which ensure the connections.

Inasmuch as it is made of dynamic interconnected structures and has the tendency to become more and more autonomous—thus to ensure, from its own resources, not only its subsistence but also its development—the technical universe presents some analogies with the universe of living beings. It is suggestive, in order to perceive the originality of the technical object, to compare it to the natural object, and in particular to living beings. It is effectively such a method which has been used by two philosophers, Aristotle and Leibniz, who have reflected upon the status of the artifact.

At the beginning of the second chapter of his *Physics* (192b 14-20), Aristotle establishes a comparison between the natural being (that is to say that being which exists by virtue of its *physis*) and the artificial being—which is produced by art, that is to say by the creative or poetical faculty of a human being. "Every natural being has in itself a principle of movement or of fixity. On the contrary a bed, a cloak, or any other object of that kind—inasmuch as each one has a right to that name to the degree that it is a product of art—does not possess any natural tendency toward change, except only inasmuch as these objects have the accident of being in stone or in wood or in any mixed element, and according to that relation." "Nature," *physis*, as Aristotle conceives it, is "a principle and a cause of movement and of rest for the thing in which it resides immediately, by essence and not by accident" (192b 20-23). The difference between the natural being and the artificial being is that the first one has in itself, inscribed in its essence, the principle of its becoming; whereas the second one has the principle of its making in the "poetic" art of those who have made it exist. In the same context in the *Physics*, Aristotle explains that nature presents two aspects: it is on one side form and on the other material (though it is fundamentally form). In generation, what the engendered receives from its generator is its form, characteristic of its species: it is that form which is the principle of its growing. But as the form of the engendered is specifically although not numerically identical to the form of the generator, it is finally nature-as-form which ensures the durability of the species and the replacement of individuals by one another in the sequence of generations and which, in every individual, controls its activities and ensures thereby the preservation of its existence according to the measure permitted by the specific type which is realized in it. It is therefore legitimate to use the term *genesis* in order to designate what is thus the principle of the generation as well as of the activity of a natural being— and thus also in order to designate that whereby it is precisely the

type of being whereof it can be said that it is "by virtue of nature" and whereof the living being is the most perfect illustration. The artificial being on the other hand does not have in itself such a principle; it is what it is only by virtue of someone's *poiesis*, and this is totally exterior to it.

Another account can be found in the principles of philosophyof Leibniz: "Thus each organic body of a living thing is a kind of divine machine, or natural automaton, which infinitely surpasses all artificial automata. Because a machine, which is made by the art of man, is not a machine in each of its parts; for example, the tooth of a metal wheel has parts which as far as we are concerned are not artificial and which have about them nothing of the character of a machine, in relation to the use for which the wheel was intended. But the machines of nature, that is to say living bodies, are still machines in the least of their parts *ad infinitum*. This it is which makes the difference between nature and art, that is to say between Divine art and ours" (*Monad.*, no. 64).

Leibniz explains, on the other hand, that a body, a compound substance, is made of an assembly of simple substances, the monads. They have no parts and "can not be formed nor destroyed." What provides the unity of that assembly is the fact that there is a central monad "surrounded by a mass composed of an infinity of other monads" (*Princ.*, no. 3). It seems thus that the decomposition of a "living body" must finally come to a stop at those absolutely simple and indivisible substances which are the monads.

To be sure, we must understand the expression "up to infinity" in the sense of a limit: in the infinite series of a decomposition into parts, we can come close—as near as we may wish—to the ultimate constituting elements which are the monads. But there we find another infinity, as the central monad of an organized body is surrounded by "an infinity of other monads." This "infinity" thus means, at once, the infinity of the process of decomposition and the numerical infinity of the final terms of the decomposition.

Whatever may be said about the difficult question of composed substances in Leibniz' philosophy, the criterion which he is proposing remains suggestive, whether the decomposition into elements is pursued to infinity or not. What is suggested is that the parts of a natural being (to return to the Aristotelian expression) are still natural elements, whereas the parts of an artifact, at a certain

stage of decomposition, are no longer artifacts but natural beings.

In Aristotelian terms, we can say that, in the constitution of the artifact, what belongs to *poiesis* must necessarily and finally be grounded upon elements which belong to a *genesis*. The production of art relates back to the production proper to nature, which generates its objects from itself. For Aristotle, natural production occurs in the process of generation, which is intraspecific. But the idea of "production according to nature" is in itself independent of that conception. We could speak in a general way of cosmic processes, so as to include the formation of the so-called elementary constituents in the formation of complex systems, and finally of living systems. The interest of the Leibnizian criterion is that it throws light on the sense of *poiesis*. The technical object has the principle of its provenance in another, the artist, but the artist cannot create except by taking over, so to say, from *genesis* (that is to say, from cosmic productivity) in an intervention which adds to the natural elements produced by *genesis* a principle of organization which completely changes the meaning of those elements. In art, there is a transition from a state of objects able to operate by themselves in the context of the interactions in which they participate, to a state in which natural elements become simply the passive subjects of a function which is susceptible, in principle, of being realized as well on the basis of other subjects.

The difference between a natural object and a technical object is thus made clear by the difference between *genesis* and *poiesis*. They are two modalities of *provenance*, that is to say of that process by which a thing comes into existence and thereby becomes capable of appearing in the field of manifestation. The coming into existence occurs necessarily—for a finite being which does not exist in any absolute way in itself and for itself—as a coming into determination, as has been noted earlier. The provenance is the way in which that encounter occurs. *Genesis* is a provenance that in some way continues: a natural being inherits from a natural being, in chains of engendering the stages of which are reconstituted and the mechanisms of concatenation brought to the fore by science. All concrete beings which appear owing to that succession of emergences belong to the same sphere of belonging, the cosmos, in which each one of them is at the same time, at its level of emergence, the integration of preceding levels and the condition of further emergences. There is an embedding of forms which manifests, in the simultaneity of the elements of a complex structure, the temporal sequence of engendering which has led from the

elementary to the complex. *Poiesis* is a provenance which introduces into the linking of cosmic emergences a breaking off: it diverts some natural objects from their prior destinations and thereby breaks the continuity of the *genesis*; it gives them a new destination which is no longer of a cosmic nature. But it can do this only by taking advantage of the availability of those objects, by transforming their capacity for entering into the genesis of more complex natural objects into a capacity of being used as the substrate for an unprecedented configuration which comes from elsewhere.

It is that "elsewhere" which constitutes the essential nature of *poiesis*. The discontinuity introduced within cosmic processes—the visible expression of the difference between a natural object and a technical object—is not only a breaking off. It is also an unexpected occurring, in which a new element comes into play. That occurring relates back to a source, which can be called "invention." And its product can, possibly, be described in terms of "information." In the heart of *poiesis* there is a creation of information, a translation of natural genesis into original configurations. However, before being injected into the realm of materiality, the new information must already be present in an articulated and objectifiable form. In other words, we are dealing with re-presentation. And this implies that it must already have appropriate support. The act of *poiesis* is the moving of an invention from its primary substrate, upon which it has been based, toward an exterior substrate, upon which it becomes objectified. We thus have to distinguish the initial representation—which can be called the "project representation"—from the final representation, which can be called the "operating representation."

The moment of invention is of course crucial. It is then that the novelty of the technical object occurs. In what exactly does that novelty appear, and how is it possible? That question is properly anthropological. It is a part of the general problematic of the relationship between mind and body. Invention does not create from nothing. It is erected upon the already availabable information, and at the same time upon the data of a definite problem, itself expressed by means of already available concepts. There is a problem to the degree that there is a discontinuity between the available information and what could constitute a solution. In other words, a problem reveals gaps in the informational network. Invention consists in filling those gaps. To be sure, it has recourse to methodological guides, like analogy, extension, analysis of particular cases

followed by generalizations, and so on. But ultimately, at some stage in the process, there is effectively the injection of new information. Now in order to be usable, that information must be bound in one way or another, that is to say represented with appropriate grounding. In the work of conception, the substrate is the brain. Since the brain, as an organ, has its own functions, independent of the intentions which animate the inventive efforts, it could be suggested that invention is only the recognition, by an act of sustained attention, of an adequate configuration. It results from the transformation of the stock of already encoded information produced by the brain's partially or completely unconscious operations.

This brings the process of invention back to a particular case of *genesis*, and it amounts to naturalization, so to say, of the process of conception involved in *poiesis*. Its proper role would then be restricted to the projection upon an exterior subject of the product of cerebral activity. The question is how to know if what is called "thought" is only another name for this cerebral activity. It is, to be sure, indisputable that the activity of thinking is possible only in connection with cerebral activity. But the relative dependence which results from that link is not necessarily an identification. There is certainly a conditioning. But is it the kind that makes possible an emergence? In particular, is the capacity which thought possesses, of representing to itself effective processes, a capacity of the cerebral apparatus itself? Or do we have to see there rather an emergent capacity, based upon effective cerebral processes (in order to construct the necessary representations) but extricating itself from those representations by an act of reflexive thematization in order to prolong them in the virtual?

Even if there are reasons to say that cerebral processes belong entirely to the domain of effectivity, that is to say of calculability, it can still be said that cerebral functioning is able to generate, by itself, even outside of any conscious intervention, new configurations. Invention, then, properly speaking, would consist in recognizing in such configurations the key to the problem of constructing solutions on the basis of what was previously articulated. We could recall here an idea of Paul Valery about poetic creation: "The gods, gracefully, give us *for nothing* a first verse; but it is our task to shape the second, which must be in consonance with the other, and not unworthy of its supernatural elder" (*Oeuvres*, 1957, vol. 1, p. 482).

Be that as it may about the problem of invention (which remains an open question), *poiesis*, the representation engendered by an invention, is projected outward, with external support in an objectivity which becomes independent of the instituting act. Thus, while transforming itself into an operating principle, the representation becomes autonomous, and thereby it becomes capable of giving rise to original, even possibly surprising properties or situations. In terms of information, we could say that the functioning of the technical object, and of the technical universe in general, creates supplementary information.

Since that functioning must have the character of effectiveness, of getting something done, it can be called a kind of calculus. But it is a calculus without a calculator; that is to say, it is entirely objectified and could extend itself indefinitely, without any further intervention. This creative aspect of the technical universe brings to the fore strikingly what can be called the productivity of a calculus, where the term is understood in the most general sense of an effective process for the transformation of information. The technical object presents, in this perspective, some analogy with mathematical representation.

The process of mathematical modeling starts with a given empirical complex, and making it work is the object of a search for understanding; then a model is built in the form of a mathematical representation which lends itself to calculation (in the sense just explained); and finally there is a return to the empirical complex, with an interpretation of the results of the calculation in appropriate empirical terms. It is thus the mediation of the calculus which, bringing to the fore not-directly-visible aspects of the initial situation, makes it finally understandable.

The parallel process of the construction and use of a technical object starts from some project representation, which contains the specification of a task and the scheme of a procedure capable of performing it; then that representation is projected onto a material device which performs effective transformations capable of realizing the intended task; and finally there is a return to the initial representation under the form of an assessment of what has been accomplished by the device. It is the mediation of the functioning of that device which gives rise to an effective situation corresponding to the intention which subtended the project representation.

In the case of mathematical modeling, there is a transition from an empirical situation to an ideal representation from which it is possible to return, finally, to the initial situation in a form in which it has become understandable. In the case of a technique, there is a transition from an ideal representation to an empirical device from which it is possible to return, finally, to the initial representation in a form in which the intention has been realized.

We must now try to interrogate the technical universe from the point of view of its ontic meaning: what is the mode of being which belongs properly to the technical universe? We can usefully take our bearings with respect to that question by examining what the intrinsic finality of technical objects is in comparison with a type of concrete being which is particularly representative of natural being—namely, living beings. Such a being manifests itself in the performances which it achieves and which relate back to capacities and dispositions in which its essence expresses itself. Those performances contribute to maintaining the living being in life, ensuring the anti-entropic renewing of its material structure, and thereby the maintenance of its dynamics according to the circularit typical of life, in which the functioning of the living being operates in such a way as to enable it to pursue its life. But beyond the individual, that intrinsic finality concerns the survival of the species. In a perspective like that of Aristotle, this inscribes itself in a universal law, the law of the eternal return, which is interpretable in terms of finality as the form of a self-conserving becoming.

From a modern point of view, the destiny of the species is viewed in the framework of the more encompassing process of evolution. It can be said that the meaning of evolution is to prepare the coming of the species, *Homo sapiens*, with all the remarkable properties which we recognize in it. However, in addition to the line which ends up at *Homo sapiens*, there are many others. What is striking in evolution is its free structure, which corresponds to a growing specialization and diversification. That structure manifests a purely intrinsic finality independent of any anthropological direction; the different forms which appear, in the course of time and according to a scheme of ramification ever more extended, illustrate the extremely varied possibilities in which the type of being aimed at by the concept, "living being," can be effectively realized. Now one meaning which every living being can have in that perspective is local, to enable one of those possibilities to show itself in the actuality of a material realization—and thereby

ultimately to enable the local being concerned to show itself in actuality. That proliferation of forms, spread out in time, is the visible manifestation of an ontological process which can be called "the unfolding of Being." The internal finality of living beings would thus be to contribute to manifesting that process, which must itself express a fundamental disposition of Being according to the formula which scholastic philosophy applied to the good. Being is *diffusivum sui*.

It can be pointed out that the technical object also makes visible a definite type of configuration. There is an analogy, from the point of view of the multiplicity of forms, between the universe of technique and the universe of life. But that analogy is merely superficial. If it is asked in view of what a technical object exists, we must, it seems, answer that it exists not to exhibit a determined form but to achieve a certain type of performance. It would thus be performance, not the self-displaying of a form, which would constitute the intrinsic finality of the technical object.

And if we take into consideration the technical universe as such in a global characterization, it seems that its intrinsic finality is not its total autonomization—in the form of a giant machine which could continue functioning indefinitely by using solar energy for example—but to contribute, thanks to the interconnections whereof it is made, to ensuring and improving the efficiency of the objects which compose it. It would thus be performance which would constitute the intrinsic finality of the technical universe as such.

In living beings, to be sure, there are also processes which ensure the improvement of performance. But those processes operate in view of the finality which is characteristic of living being as such. It is that finality which gives meaning to its *genesis* and makes of it a principle of constitution endowed with a circular significance: life exists in view of itself; its *genesis* is a kind of continued hatching, which comes from itself and in view of itself. It is a self-genesis. The performance of technical objects is not reciprocal in this sense, as the manifestation of the mode of being which characterizes it. While operating it of course shows itself; but as destined to be involved in a project, borne by the initial representation and mediated by the functioning of the technical object.

There is this sequence: invention—performance— action; and this third refers back in a sense to the first, but only as incorporating within itself the

product of the second term. Seen in this way, the technical object would have essentially the status of a medium and would not have a purely intrinsic finality. The kind of finality that it receives in the framework of the project is extrinsic, and it contributes to its meaning only in the form of a supplementary qualification.

However, we must wonder, does performance not have, after all, a purely intrinsic significance? Is not the finality which it represents effectively the finality proper to the technical object?

What, then, is the meaning of "performance"? What a technical object achieves, in performing a specific task, is a sequence of operations organized according to an abstract schema of a general but applicable character that is concretized by the structure and the dynamics of the object. The type of reality which characterizes the performance is thus the reality of the operations. An operation is a transformation which is carried out according to rules, the determination of those rules being itself controlled by an internal finality. A concrete operation brings into play an operator and an argument, but the essential role belongs to the operator whose mode of action is fixed by the rules. Now as can be seen very well, for example, in combinatory logic—which can be considered a general theory of logical operators—the rule which defines an operator shows explicitly, with respect to undetermined arguments, how the operator transforms those arguments. The application of an operator in determining arguments is by way of substituting those arguments for the undetermined terms which occur in the rule. A simple reading of the rule, then, shows how those arguments are transformed by the operation. This has a purely formal character, in the sense that it is defined by its mode of action, independently of the objects to which it can be applied.

With respect to the defining reflexive, in the sense explained, it is not sustained by an aim—although it can be integrated into an action and thereby taken up in an aim. But it is real; and it is real as productive. It effectively produces results, which give answers to what was expected, even if it is carried out without reference to that expectation. As real, it also has a relation to Being—not, however, as in the case of action, by way of its meaning, but by what gives it its concreteness. But what gives it its concreteness is its substrate, thanks to which what was only a formal representation or a pure virtuality becomes the effective functioning of a visible and tangible device. And that supporting structure, as

explained before, is ultimately made up of elements which are natural beings which belong therefore to the category of *genesis*. The concreteness of the technical object is thus attributable to the mode of provenance of its substrate, and its relation to Being is only indirect, as mediated by the being of the natural being. The autonomy possessed by the technical object, from the point of view of its functioning, is thoroughly relativized by the heteronomy of its ontological status.

This does not mean that it does not have an authentic property which does not at all depend upon the nature of its substrate; this is its productivity, that is to say, its capacity to give rise to new determinations on the basis of already constituted determinations. We could here use the analogy of evolution and the productivity of life, which gives rise to new forms. There is, however, from the point of view of productivity, a difference between technical objects and living beings. In the case of evolution, there is an "invention" of forms which express the multiple possibilities of the concretization of the general scheme designated by the term "life." In the case of the technical universe, we are not dealing with the invention by technique of new technical forms, but with the creation of new information and new configurations. These can be detached from the device which creates them and are thus exterior with respect to technique itself. They take on a meaning only to the degree that they are involved in action, and its dynamism is not the dynamism of the technical objects themselves.

We have of course to take into account the possibility, demonstrated by von Neumann a long time ago, of the reproduction of a machine by itself; of the improving of a program by itself, with only its own resources and prior information. There is thus a possible simulation, in the technical universe, of the process of evolution. However, the programs of self-replication and self-improvement are only some programs among others. It is accidental for a machine to reproduce or to improve itself. But it belongs to the very essence of life to unfold itself in forms which more and more adequately manifest its constitutive properties.

The productivity proper to technical objects is the productivity of their operations. And, as already noted, every operation is a regulated transformation, definable by a purely formal scheme—that is to say, independent of the kinds of arguments to which it can be applied.

What exactly is the productive virtue of such a transformation? Does it only make explicit properties which were already present in the initial data implicitly? Or is it able to give rise to determinations—properties, objects, information—that are absolutely new?

That question has a relation to the problem of invention in mathematics. To find the roots of an algebraic equation is to introduce new information. And this may be very difficult. But the roots were already implicitly present in the structure of the equation. Whatever the complexity of the method used, it after all just makes explicit what was already there. And the same can be said of the invention of a method. Even if a process can be simulated in an algorithmic way, that representation only comes afterwards and presupposes a first step which was not the application of formal rules.

Nevertheless, we can say that the procedure to be followed in order to solve an equation, even if considered in its most general form, was in a certain way imposed by the form of the equation and was thus in some way inscribed in it. But could we say the same of the invention of a method like the procedure of the diagonal? It is a truly creative procedure, which revealed itself as extremely fruitful in mathematics as well as in metamathematics. Could we say that it is simply the explicitation of what is contained in the concept of a real number? Perhaps initially there is the intuitive view of an excess of the set of real numbers with respect to the set of integers. But the virtue of the process is to build effectively an object which is in excess with respect to any possible enumeration. The invention of the diagonal brings into play possible operations, it thematizes that possibility, by placing itself at a level which is no longer strictly within the realm of the operations involved.

The productivity of operations is thus a limited productivity—limited to what makes the operations fecund, namely, their status of radical objectification. Invention, in the strong sense of positing a true novelty, belongs to the category of *action*. Action has recourse to operations; it is, as already noted, under the control of an aim borne by an intention, which reinscribes the operations in a horizon of understanding. The operation itself is entirely detached from the aim, and the proper horizon in which it is inscribed is only the horizon of operativity as such, not of understanding. The resolution of an equation of the second degree can be obtained by the simple application of a formula, and the only understanding

which intervenes in the process concerns the instructions given by the formula about how to do the manipulations. A machine can do that, precisely because its functioning is entirely detached from the aim which has guided its conception.

If this is the limitation proper to the realm of operations, its positive virtue is to bring into play transformations which succeed in transferring into an explicit status what was only implicitly present in the data; or, again, transferring the virtual into the real, the virtual being understood here in the sense of the *objectively possible*. But, thereby, the operation receives a properly ontological import, because the possible, as modality, belongs to Being. But it can be inscribed in Being either as the reality of a representation which constructs an imaginary world by reassembling data borrowed from the real world, or as belonging effectively to the reality which presents itself in the manifestation. The expression, "objectively possible," refers to this second category of possibility.

The status of a "real possible" is strongly paradoxical. Because the possible, that is to say what could be but is not effectively, is on this side of Being; it is a lack of Being, or a defect with respect to Being. The real, on the contrary, what is simply real, is what takes part in Being without reservation. Now Being is pure positivity; it is that simple and massive affirmation of oneself which, in every concrete being, is the force which sustains it above the abyss of nothingness. But if there is an objective possible, belonging, as possible, to reality itself, this means that there is, in Being itself, a defect of being. In finite being, in any case, the positivity of Being is held in check by a condition which limits it from inside. This affects it with that relative not-being that is evoked by the concept of the possible, which occupies, all in all, an intermediary position between a pure negation of Being and its pure affirmation. If there is some possible in Being, there is a shadow in its brightness.

But the idea of the possible is not purely negative; it contains a tension which is directed toward something to come, toward a positivity which announces itself and which already in some way is emerging in the actuality of the present. While inscribing itself in Being, the possible affects it with a limitation; at the same time it confers on it the virtue of being inhabited by an expectation, the imminence of an advent. And reciprocally, it receives from Being, in that gift which Being offers to it, the having of a part in the radicality which is proper to Being—while still possible, having the character of the real. Inasmuch as it is real

in this limited sense, sharing the reality of the Being which it is affecting, it is already present. And inasmuch as it is real *only* as possible, it is by appeal to that aspect of Being which inscribes already in the present the beginning of the becoming-real of what is still only a virtuality.

The possible thus, so to say, reduplicates itself in itself: it is an admissible and even expected determination, wrapped in the present as the reality of the virtual; it is the possibility of the actualization of a determination. It is thus possibility of itself. And as oriented toward its occurring, that possibility introduces within Being an internal movement, which is the tension in which the possible relates, in virtue of its constitution, to its realization. And if the presence, in finite being, of the dimension of the "real possible" must be admitted as essential, then the tension interior to Being, between the virtual and the real, must be seen as a really constitutive feature—and thus as an ontological disposition.

That disposition is the very principle of manifestation. Being shows itself in concrete beings; it makes partially explicit, in the immense variety of the forms in which its instituting power is distributed, what it is in itself as usual actualizing force. Manifestation is submitted to the condition of time. The forms succeed each other and, at each step of becoming, new properties emerge, actualizing possibilities unknown until then. What appears is a realm of singular, concrete, subsisting forms, but in them is manifestation as such—the process of their coming into appearance, or again the process of phenomenalization, which is indirectly revealed. Now the way in which, visibly, manifestations occur tells us something about what belongs to manifestation as such, about the concealed process by which Being effectively shares itself. The life of forms is the visible side of that movement, interior to Being, in which the virtual transforms itself into the actual, the implicit into the explicit. As this movement belongs to the very constitution of Being, it is an action of Being upon itself. It is that self-affecting of Being which is the principle of manifestation—which, as such, manifests itself therein.

By viewing what happens from the point of view of this internal movement of Being, of what Leibniz called the intrinsic tendency of the possible toward its realization, we can see in the evolution of living beings the reflection, in manifestation, of that kind of overabundance of Being which produces in itself

the proliferation of the possible. And we can see in the development of the technical universe—and more precisely in the institution of a universal field of operations which is at stake in that universe—the reflection, in manifestation, of the abstract scheme of that ontological process in which the really possible transforms itself into plain reality.

3. TECHNIQUE FROM THE POINT OF VIEW OF AN ONTOLOGICAL ANALYSIS

These considerations prepare us directly for the passage from the point of view of ontic analysis, which aims at understanding Being as manifest in concrete beings, to the point of view of ontological analysis, which tries to show how these ontic determinations affect our understanding of the horizon of Being as such.

Finite being is affected in an essential way by determination, which constitutes, we could say, its ontological style, manifested phenomenally in its morphology and its behavior. The relation to Being, in which it receives its reality, is modalized and thereby restricted by determination; at the same time, it is expressed by determination, the type of being which is qualified by the determination corresponding to virtualities which belong to Being itself, since determination cannot affect that relation except according to what is allowed by the constitutive dispositions of Being itself. Therefore an analysis of the general types of determination which appear in the field of our experience may give us indications about those constitutive dispositions. In this fashion, an interpretation of technique in an ontological perspective may be undertaken, or at least attempted.

The domain of natural beings, as already noted, can be characterized by the concept of *genesis*, which has direct ontological import inasmuch as it refers at the same time to a mode of provenance and to a mode of unfolding. Natural being proceeds from itself, which means that Being comes to it by the processes which are controlled by its determination. It is produced and develops "by virtue of its nature"; that is to say by the effectiveness of its essence, which makes the living being a being which exists "in view of itself"—or, what amounts to the same thing, "in view of life itself." The relation of natural being to Being is thus, we could say, a direct relation, interior to its essence. Through the sequence of generations, of metamorphoses, of emergences, Being comes to every natural

being from that immemorial background that mythical thinking represents as "the birth of the world," and which speculative thought can only conceive as creation. That is to say, as coming out of itself in the absolute positing of Being, designated by scholastic philosophy in the remarkably adequate expression, "ipsisizing"—the absolute positing, without origin, of cosmic reality, identified quite simply with the *ipse in esse subsistens*. (I recognize that this raises serious difficulties.)

On the other hand, from a phenomenal point of view, the general determination of *genesis* is ramified in a plurality of forms, the most remarkable of which, living forms, enter into the field of manifestation through an evolutionary process which is characterized by the ascent toward complexity and differentiation. Cosmic evolution, taken over by biological evolution, is the visible process in which the unfolding proper to *genesis* occurs. This mode of unfolding is in immediate relation to the mode of provenance of natural being; the evolutionary process is the concrete process which gives effectiveness to that transmission thanks to which the instituting force of Being distributes itself among natural beings.

Genesis thus makes manifest a fundamental feature of Being, which is what could be called its "diffusivity," its capacity to support an apparently indefinite variety of determinations. The proliferation of forms in the cosmic universe is like the refraction, in the domain of the determined, of the constitutive prodigality which is the mark of Being. It justifies, by the exemplifications which it gives of itself in the natural world, an aesthetic vision of the world.

Before taking up the question of the ontological status of the technical universe, it is advisable to invoke what is its antecedent condition, namely *action*. As already noted, technical objects take part in Being by virtue of the intervention of *poiesis*. And this is characterized essentially by creativity, that is to say the capacity of generating novelty. The crucial moment in *poiesis* is invention. It must be supported, to be sure, by the properties of natural beings, but art adds to those properties a totally emergent capacity. This is conceived initially in a project representation, then objectified in the material devices thanks to which it becomes autonomous, while separating itself from the instituting intention. If it is admitted that invention, properly speaking, is not simply an explication by operation-type transformations of what is implicitly present in the data, then *poiesis* raises an ontological question of great importance.

Does the act of invention, which takes place in the system, brain/thought, consist only in capturing a possibility which is already inscribed in Being under one or another form, or is it able to add to Being new determinations? We could invoke here the idea of the ingression of eternal ideas, as developed by Whitehead in order to give an ontological account of the occurrence of novelty in cosmic becoming. In the context of his thought, it is the mental prehension of eternal objects which accounts for invention. What inspires his conception of the eternal ideas is, it seems, a general principle of conservation. It states that every determination must be founded on an actuality, and all the possibilities which are actualized in the world must have been, before entering into the world, wrapped in an actuality which is outside the world. But could we think of an actualization without a prior actuality (other than in the case of Being's basic creative capacity)? To be sure, since Being involves radical positing, it is meaningless to speak of an increase of Being itself, as if there were degrees of being radical. But it is possible to conceive of an effective extension of the field of the determinations acceptable by Being. That acceptability is a kind of antecedence, but it is not the antecedence of an actuality. Creativity, understood in a strong sense, it seems does imply a disposition of Being which involves a reservation, the possibility of possibilities, not in the form of objective possibilities but in the form of an essential availability of radical novelty.

But we must ultimately come back to what raised the initial question. How should we conceive of the relation to Being, and thus of the ontological significance, of the technological universe? The characterizing concept which will be proposed here is the concept of *parapoiesis*. The technical object has its own productivity, as has been pointed out, under the form of what is peculiar to the field of operations. And the operativity of the object must be considered as a constituting moment of a universal operativity. It has a mimetic aspect—the universe of technique imitating in some way the universe of natural beings—and it represents a naturalizing solidification of what thought apprehends as pure formalism.

Its mode of provenance refers back to the extrinsic intervention of the *poiesis*. And its mode of unfolding tangibly displays Being itself as form, or, more exactly, the determined forms which it brings into play, the formal essence of form. In the operative forms of the technical universe, the pure, originary formality shows itself. Form is determination, and it is a principle of clarity.

The technical universe, by generating novel forms, allows us to see the determinability and visibility of Being. But it thereby overshadows that other aspect of Being which is revealed in *genesis*, and, in a certain way also, in *poiesis*—namely, Being as availability, as reserve, as withdrawal, as that abyssal foundation from which comes the proliferation of forms, the profusion of the possible. It also reveals the kind of thoughtfulness and infinite patience which gives free rein to the initiative of creation.

It is there, in this dimension of the depth of Being, which comes before determination and clarity, that the form-giving power and what can be called the generosity of Being are most authentically situated. The technical object is thus affected by a kind of ontological deficiency, and this is its status. The technical object can manifest form only by receiving it from *poiesis*, by finding a substrate which it borrows from the natural world, and thus from the domain of *genesis*. It receives from *genesis* its concreteness and its involvement in visible reality, but only according to a relation which remains accidental. By needing support, it adheres to *genesis*, but that adhesion does not belong constitutively to the essence of technical operations. It is this not-essential character of its relation to *genesis* which manifests its ontological deficiency.

Positively, however, we can see in the operativity of the technical universe a trace of creativity, in the sense that it remains always an objectification of an act of creation. It remains thereby tied up with the intentionality which provided the project representation. Pure form always only particularly detaches itself from the aim which produced it. *Parapoiesis* is thus situated between *genesis*, to which it remains attached by needing support, and *poiesis* in which it manifests creativity through its own productivity. In that intermediary status, it is, to be sure, detached from the initiating action, but it remains nevertheless always capable of being reassumed within it. Operation, in the last instance, is always subordinate to action.

There are still problems in the analysis of the technical universe, from the point of view of ontology as such. The central ontological problem remains the problem of the relationship between essence and existence, or again between determination and the self-actualizing force of Being. These are the two essential components of a concrete being. In the finite being, essence is separated from existence, in the sense that it does not contains in itself any necessity of existence.

If a finite being actually exists, it is in virtue of a received existence. Something allows it to take part in the power of self-affirmation and self-subsistence, and that is the power of Being. It is that power which gives existence to a finite being; it is receptivity according to which it receives itself in Being. That receptivity is its determination: it fixes the measure of participation in the absolute actuality of Being which is conferred on the finite being. It could be said of determination that it is a type of actuality: it is the precise and concrete mode according to which pure existing is given—and, by that very fact, restricted. There is thus, in the determination which measures the finitude of a finite being, at the same time positing and restriction. The positing is the participation in the absolute positing of Being, considered in itself in its total amplitude. The restriction is what introduces difference, non-adequation with respect to the absolute positing. However, inasmuch as the non-adequation comes from the absolute positing, determination involves both limitation and positivity.

What is the proper status of the relationship between essence and existence, of what could be called the essential ontological event, in the case of *parapoiesis*? Being a general type of determination, it must contain in its relative particularity both ontological aspects of determination, both aspects of the relation to Being of finite being—that is to say, positing and restriction. Positing is the mode of participation in the absolute positing of Being. The mode of participation of technical being in Being is determined by its participation in the creativity of *poiesis*, which, in its creative aspect (as argued here) makes manifest what in Being is at the same time the fecundity of the originary actualizing act and the availability with respect to radical novelty. Restriction is the non-adequation with respect to the absolute positing of Being. The modality according to which technical being is affected by restriction is what entails that its proper productivity is less than creativity. It is only the fecundity proper to pure formalism. That deficiency, which could be called phenomenological, refers back to an ontological deficiency, which manifests itself in the accidental character of the relation of the form to its support. Pure form does not produce by appearing; it can phenomenalize itself only by concretizing itself. Technical being has its relation to Being only by that aspect of itself which is its accidental adhesion in *genesis*.

Restriction qualifies actuality. The ambiguous status of *parapoiesis*, which arises at the same time from *genesis* and *poiesis*, makes manifest, finally, an ontological condition which belongs to the very status of finitude. The

separability of form, which is the condition of the power of operation, signifies the powerlessness of pure form to give itself by its resources alone that anchoring in reality which is the condition of concreteness.