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Potentiality and Virtuality[1]

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1. A DISSOLVED ONTOLOGICAL PROBLEM

'Hume's problem', that is to say, the problem of the grounding of causal connection, has known the fate of most ontological problems: a progressive abandonment, legitimated by the persistent failure that various attempts at resolving it have met with. Thus Nelson Goodman, in a famous article[2] can affirm without hesitation the 'dissolution of the old problem of induction'. This dissolution, as laid out by Goodman, concerns the ontological character of Hume's problem, which obliges whoever accepts its terms to accept the necessity of a principle of the uniformity of nature, a principle the proof of whose existence will then be attempted. The argument which, in Goodman, concludes with the dissolution of the 'old problem of induction' is as follows:

- The problem of induction as formulated by Hume consists fundamentally in asking how we can justify that the future should resemble the past.
- Goodman, following Hume, fully affirms that we simply cannot do so: this justification is impossible by rational means.
- We must therefore abandon this undecidable problem, in order to pose it under another form, in which it will once again become amenable to treatment, namely: which rule, or set of rules, do we apply when we—and above all, when scientists—make inductive inferences? The question therefore no longer consists in proving the resemblance of the future and the past, but in describing an existing practice (induction) so as to try to extract its implicit rules. The dissolution of the ontological problem is thus accompanied by its methodological and epistemological reformulation: instead of vainly trying to prove the necessity of observable constants, we must set ourselves the task of describing the precise rules which scientists apply, usually implicitly, when they present us with inductive inferences. Thus Goodman can consider Hume's solution of

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his own problem—that our belief in induction derives from habit and not from consequent reasoning—correct in principle, however partial it might be: because in passing from the insoluble problem of the justification of an ontological principle to that of an effective genesis in the mind, Hume had already registered the intuition that the only adequate treatment of such a problem would consist in describing the effective process by which we draw inductions, not in seeking a metaphysical foundation for it. Consequently, Goodman proposes to follow such a path, forsaking however the psychological description of the spontaneous behaviour of individuals to which Hume confined himself (*viz.*, that we believe in our inductive inferences because of our faculty of believing more and more intensely in recurrent phenomena) in favour of a description of the practices and procedures of the scientific community.

In short, the dissolution of the problem of induction comprises two phases:

- A negative phase of abandonment of the supposedly insoluble problem.
- A phase of recomposition or reformulation of the problem, which consists in passing from an ontological question—is there something like a necessary connection between events?—to a question which evacuates all ontological problems, applying itself instead to the description of effective practices by which scientific inductions are carried out.

2. PRECIPITATION OF THE PROBLEM

My proposal is as follows: to contest the dissolution of Hume's problem, that is to say the abandonment of the ontological formulation of the problem, by maintaining that the latter can be resolved in a way which has, so it would seem, been hitherto neglected. I will intervene, then, only in the first stage of dissolutory reasoning—which is presupposed by the second (the recomposition of new problems): the proposition that the ontological problem of induction must be abandoned, since it is insoluble.

To open anew the ontological problem of the necessity of laws, we must distinguish this problem from that posed by Hume, which is in fact a *particular, already oriented,* formulation of this problem taken in its full generality.

Hume's formulation of the problem is as follows: Can we prove the effective necessity of the connections observed between successive events? The presupposition made both by Hume and by Goodman is that, if we cannot, then *any* ontological treatment of what is called real necessity (that is to say, of the necessity of laws, as opposed to so-called logical necessity) is consigned to failure, and consequently must be abandoned. I believe that it is possible at once to accept the Hume-Goodman verdict of failure, and yet to dispute that it follows that every ontological approach to the problem is thereby disqualified. For the ontological question of real necessity, formulated in its full generality, is not married to the Humean formulation, but rather can be formulated as follows: Can a conclusive argument be made for the necessity *or the absence of necessity* of observable constants? Or, once again: is there any way to justify either the claim that the future must resemble the past, *or* the claim that the future might *not* resemble the past? In the latter case, it is a question of establishing, not that the observable laws must change in the future, but that it is contingent that they should remain identical. This perspective must be distinguished from any thesis affirming the necessity of the changing of laws—for such a thesis would be a variant of the solution envisaged by Hume: this changing of laws, precisely in so far as it is necessary, would suppose yet another law, in a higher sense—a

law, itself immutable, regulating the future changes of current constants. Thus it would lead straight back to the idea of a uniformity of nature, simply pushing it back one level.

On the contrary, the ontological approach I speak of would consist in affirming that it is possible rationally to envisage that the constants could effectively change *for no reason whatsoever*, and thus with no necessity whatsoever; which, as I will insist, leads us to envisage a contingency so radical that it would incorporate all conceivable futures of the present laws, *including that consisting in the absence of their modification*. It is thus a question of justifying the effective existence of a radical contingency not only of events submitted to laws, but of laws themselves, reduced to factical constants, themselves submitted to the eventuality of an ultimately chaotic becoming—that is to say, a becoming governed by no necessity whatsoever.

Let us be sure to grasp the significance of such a position, and what it involves. The problem of induction, as soon as it is formulated as the problem of the effective necessity of laws, issues in an avowal of the defeat of reason, because nothing contradictory can be detected in the contrary hypothesis of a changing of constants. For reason does not seem to be capable of prohibiting *a priori* that which goes against the purely logical necessity of non-contradiction. But in that case, a world governed by the imperatives of reason, would be governed only by such logical imperatives. Now, this would mean that anything non-contradictory *could* (but not *must*) come to pass, implying precisely the *refusal* of all causal necessity: for causality, on the contrary, asserts that amongst different, equally conceivable events certain of them must come to pass rather than others. This being so, we would indeed have to agree that *in a rational world everything would be devoid of any reason to be as it is*. A world which was entirely governed by logic, would in fact be governed *only* by logic, and consequently would be a world where nothing has a reason to be as it is rather than otherwise, since nothing contradictory can be perceived in the possibility of such a being-otherwise. Every determination in this world would therefore be susceptible to modification: but no ultimate reason could be given for such modifications, since in that case a prior cause would have to be supposed, which it would not be possible to legitimate in preference to another, equally thinkable. But what would such a world be? To speak in Leibnizian terms, it would be a world *emancipated from the Principle of Sufficient Reason*—a world discharged of that principle according to which everything must have a reason to be as it is rather than otherwise: a world in which the logical exigency of consistency would remain, but not the metaphysical exigency of persistence.

Hume's discovery, according to our account, is thus that *an entirely rational world would be by that very token entirely chaotic*: such a world is one from which the irrational belief in the necessity of laws has been extirpated, since the latter is opposed in its very content to what constitutes the essence of rationality. If, contrary to our hypothesis, one were to *supplement* logical necessity with real necessity, if one were to doubly limit the possible both by non-contradiction and by actual constants, one would then create an artificial riddle irresoluble by reason, since such an hypothesis would amount to the explicit, wholesale fabrication of a necessity foreign to all logic. *The Principle of Sufficient Reason is thus another name for the irrational*—and the refusal of this principle, far from being a way of doing away with reason, is in my opinion the very condition of its philosophical reactualization. The refusal of the Principle of Sufficient Reason is not the refusal of reason, but the discovery of the power of chaos harboured by its fundamental principle (non-contradiction), as soon as the latter is no longer supplemented

by anything else—the very expression 'rational chaos' from that moment on becoming a pleonasm.

But such a point of view also provides us with a new understanding of the 'end of metaphysics'. If metaphysics is essentially linked to the postulation—whether explicit or not—of the Principle of Sufficient Reason, the former cannot be understood, in Heideggerian fashion, as the final accomplishment of reason, but as the final accomplishment of real necessity, or again of what I call the reification of rational necessity. From this point of view, I understand by metaphysics, any postulation of a real necessity: so that it would constitute a metaphysical postulation that all or certain given determinate situations in this world are necessary (a determination being definable as a trait capable of differentiating one situation from another, equally thinkable situation). A metaphysics would thus affirm that it is possible, and moreover that it is the very task of reason, to establish why things must be thus rather than otherwise (why some particular individuals, law(s), God(s), *etc.*, rather than other individuals, laws, etc.)

3. ONTOLOGICAL REFORMULATION

The question now is as follows: in accepting the possibility of a change in natural constants, have we not suppressed the problem of induction itself? In other words: once the idea of a necessary constancy of laws is refused, can Hume's question still be posed in the form of a *problem* to be resolved, and more precisely as an ontological problem? It certainly can.

I would affirm that, indeed, there is no reason for phenomenal constants to be constant. I maintain, then, that these laws could change. One thereby circumvents what, in induction, usually gives rise to the problem: the proof, on the basis of past experience, of the future constancy of laws. But one encounters another difficulty, which appears at least as redoubtable: if laws have no reason to be constant, *why do they not change at each and every instant*? If a law is what it is purely contingently, it could change at any moment. The persistence of the laws of the universe seems consequently to break all laws of probability: for if the laws are effectively contingent, it seems that they must frequently manifest such contingency. If the duration of laws does not rest upon any necessity, it must be a function of successive 'dice rolls', falling each time in favour of their continuation or their abolition. From this point of view, their manifest perenniality becomes a probabilistic aberration—and it is precisely because we never observe such modifications that such a hypothesis has seemed, to those who tackled the problem of induction, too absurd to be seriously envisaged.

Consequently, the strategy of the reactualization of the ontological problem of induction will be as follows:

1. We affirm that there exists an ontological path which has not been seriously explored: that consisting in establishing, not the uniformity of nature, but the contrary possibility of every constant being submitted to change in the same way as any factual event in this world—and this without any superior reason presiding over such changes.

2. We maintain that the refusal to envisage such an option for the resolution of the problem is based on an implicit probabilistic argument consisting in affirming that every contingency of laws must manifest itself in experience; which amounts to identifying the contingency of laws with their frequent modification.

3. Thereby, we have at our disposal the means to reformulate Hume's problem

without abandoning the ontological perspective in favour of the epistemic perspective largely dominant today. Beginning to resolve the problem of induction comes down to *delegitimating the probabilistic reasoning at the origin of the refusal of the contingency of laws.* More precisely, it is a matter of showing what is fallacious in the inference from the contingency of laws to the frequency (and thus the observability) of their changing. This amounts to refusing the application of probability to the contingency of laws, thereby producing *a valuable conceptual distinction* between contingency understood in this radical sense and the usual concept of contingency conceived as chance subject to the laws of probability. Given such a distinction, it is no longer legitimate to maintain that the phenomenal stability of laws compels us to suppose their necessity. This permits us to demonstrate that, without serious consequence, real necessity can be left behind, and with it the various supposedly insoluble enigmas it occasioned.

In short, Hume's problem becomes the problem of the difference between chance and contingency.

4. PRINCIPLE OF THE DISTINCTION CHANGE/CONTINGENCY

To demonstrate why laws, if they can change, have not done so frequently, thus comes down to disqualifying the legitimacy of probabilistic reasoning when the latter is applied to the laws of nature themselves, rather than to events subject to those laws. Here is how such a distinction can, in my opinion, be effectively made: to apply a probabilistic chain of reasoning to a particular phenomenon supposes as given the universe of possible cases in which the numerical calculation can take place. Such a set of cases, for example, is given to a supposedly symmetrical and homogeneous object, a die or a coin. If the die or the coin to which such a calculative procedure is applied always falls on the same face, one concludes by affirming that it has become highly improbable that this phenomenon is truly contingent: the coin or die is most likely loaded, that is to say, it obeys a law—for example the law of gravitation applied to the ball of lead hidden within. And an analogous chain of reasoning is applied in favour of the necessity of laws: identifying the laws with the different faces of a universal Die—faces representing the set of possible worlds—it is said, as in the precedent case, that if these laws are contingent, we would have been present at the frequent changing of the 'face'; that is to say, the physical world would have changed frequently. Since the 'result' is, on the contrary, always the same, the result must be 'loaded' by the presence of some hidden necessity, at the origin of the constancy of observable laws. In short, we begin by giving ourselves a set of possible cases, each one representing a conceivable world having as much chance as the others of being chosen in the end, and conclude from this that it is infinitely improbable that our own universe should constantly be drawn by chance from such a set, unless a hidden necessity presided secretly over the result.[3]

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3. It was through reading Jean-René Vernes' *Critique de la raison aléatoire*, Paris, Aubier, 1981, that I first grasped the probabilistic nature of the belief in the necessity of laws. Vernes proposes to prove by such an argument the existence of a reality external to the representations of the Cogito, since it alone would be capable of giving a reason for a continuity of experience which cannot be established through thought alone. As I have remarked elsewhere, I believe that an equally mathematical—more specifically, probabilistic—argument underlies the Kantian transcendental deduction of the categories in the *Critique of Pure Reason*. Kant's argument—as elaborate as it might be in its detail—seems to me to be in perfect continuity with what we might call the argument of 'good sense' against the contingency of natural laws. I argue that Kant's deduction consists simply in exacerbating the 'probabilistic sophism' critiqued in the present article, to the point where the following is argued: if laws were contingent, they would change so frequently, so frenetically, that

Now, if this reasoning cannot be justified, it is because there does not truly exist any means to construct a set of possible universes within which the notion of probability could still be employed. The only two means for determining a universe of cases are recourse to experience, or recourse to a mathematical construction capable of justifying unaided the cardinality (the 'size') of the set of possible worlds. Now, both of these paths are equally blocked here. As for the empirical approach, obviously no one—unless perhaps Leibniz's God—has ever been at leisure to survey the entire set of possible worlds. But the theoretical approach is equally impossible: for what would be attempted here would be to affirm that there is an infinity of possible worlds, that is to say of logically thinkable worlds, which could only reinforce the conviction that the constancy of just one of them is extraordinarily improbable. But it is precisely on this point that the unacceptable postulate of our 'probabilist sophism' hinges, for I ask then: of which infinity are we speaking here? We know, since Cantor, that infinities are multiple, that is to say, are of different cardinalities—more or less 'large', like the discrete and continuous infinities—and above all that these infinities constitute a multiplicity it is impossible to foreclose, since a set of all sets cannot be supposed without contradiction. The Cantorian revolution consists in having demonstrated that infinities can be differentiated, that is, that one can think the equality or inequality of two infinities: two infinite sets are equal when there exists between them a biunivocal correspondence, that is, a bijective function which makes each element of the first correspond with one, and only one, of the other. They are unequal if such a correspondence does not exist. Further still, it is possible to demonstrate that, whatever infinity is considered, an infinity of superior cardinality (a 'larger' infinity) necessarily exists. One need only construct (something that is always possible) the set of the parts of this infinity. From this perspective, it becomes impossible to think a last infinity that no other could exceed.[4]

But in that case, since there is no reason, whether empirical or theoretical, to choose one infinity rather than another, and since we can no longer rely on reason to constitute an absolute totality of all possible cases, and since we cannot give any particular reason upon which to ground the existence of such a universe of cases, we cannot legitimately construct any set within which the foregoing probabilistic reasoning could make sense. This then means that it is indeed incorrect to infer from the contingency of laws the necessary frequency of their changing. So it is not absurd to suppose that

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we would never be able to grasp anything whatsoever, because none of the conditions for the stable representation of objects would ever obtain. In short, if causal connection were contingent, we would know it so well that we would no longer know anything. As can be seen, this argument can only pass from the notion of contingency to the notion of frequency given the presupposition that it is extraordinarily improbable that the laws should remain constant rather than being modified in every conceivable way at every moment. ('Temps et surgissement ex nihilo', presentation in the seminar series *Positions et arguments* at the École Normale Supérieure, April 2006. See http://www.diffusion.ens.fr/index.php? res=conf&idconf=701).

4. The set of parts of a set is the set of subsets of that set, that is to say the set of all possible regroupings of its elements. Take, for example, the finite set comprising three elements: (1, 2, 3). The set of its parts comprises (apart from the empty set, which is a part of every set): (1), (2) and (3) (the 'minimal' parts composed from its elements alone), (1,2), (1,3), (2,3), and (1,2,3)—this last part (1,2,3) being considered as the maximal part of the set, identical to it. It is clear that this second set is larger (possesses more elements) than the first. It can be proved that this is always the case, the case of an infinite set included. It is thus possible, for every infinite set, to construct a set of superior cardinality: the infinity which comprises the set of its parts. But this construction can equally be carried out on this new infinity, and so on indefinitely. For a clear introduction to axiomatic set theory, see Laurent Schwarz, *Analyse I*, Paris, Hermann, 1991. The reference work on the philosophical importance of set-theory remains for me Alain Badiou's *L'être et l'événement*, Paris, Seuil, 1988, translated by Oliver Feltham as *Being and Event*, London, Continuum, 2006.

the current constants might remain the same whilst being devoid of necessity, since the notion of possible change—and even chaotic change, change devoid of all reason—can be separated from that of frequent change: *laws which are contingent, but stable beyond all probability, thereby become conceivable.*

We must add, however, that there are two possible versions of such a strategy of resolution:

- A 'weak version'—a critical version, let us say—that would consist in limiting the application of aleatory reasoning to cases already submitted to laws (to observable events governed by the constants determining the universe where the calculation is carried out) but not to the laws themselves. Thereby, one would not be able to demonstrate positively the absence of real necessity, but only that its presupposition is of no use in giving an account of the stability of the world. One would content oneself with emphasizing the theoretical possibility of contingent but indefinitely stable laws, by disqualifying the probabilist reasoning which concludes that such an hypothesis is aberrant. The two terms of the alternative—real necessity, or the contingency of laws—being equally non-demonstrable, the heuristic advantage of choosing the second hypothesis is invoked, by showing that it would obviate certain classical speculative enigmas linked to the unchallenged belief in the uniformity of nature.

- A 'strong', that is to say, speculative, version of the response to Hume's problem, would consist in maintaining positively the contingency of laws. Such an approach would incorporate the assets of the argument from heuristics in the above approach to its profit, but would go further, claiming to effectuate the consequences of the Cantorian intotalization.

My overall project is to not limit myself to the critico-heuristic path, but to reactivate a speculative path (claiming to speak for the things themselves, despite the critical proscription), without ever reactivating metaphysics (that is to say, the absolutization of a real necessity). Since it is impossible to give the full details of such an approach here, I will content myself with isolating the principal aspects of the critico-heuristic path.[5]

5. ONTOLOGICAL CONSEQUENCES OF THE NON-ALL

We will adopt the following perspective: we suppose the ontological effectivity of the intotalization of cases, in order to draw the consequences of such a hypothesis upon the notion of becoming, and to envisage its speculative advantages over the inverse hypothesis of the pertinence of real necessity. In order to do this, let us reconsider the notion of the contingency of laws by restricting the notion of law to what constitutes its minimal condition, if not its complete definition: namely a determinate set, finite or infinite, of possible cases—a law, deterministic or aleatory, always comes down to a specific set of indexed cases.[6] We will try to determine the sense of a becoming within which laws

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5. For further indications as to the exigency of this reactivation, see my *Après la Finitude: Essai sur la nécessité de la contingence*, Paris, Seuil, 2006. I lay out the possible principles of the speculative approach in a forthcoming paper to be published by Éditions Ellipses (proceedings of Francis Wolff's Nanterre 2001 seminar series Positions et arguments).

6. I obviously do not claim that a law can be reduced to a set of possible cases, but that a condition of every law consists in the supposition that a determinate set of possible 'reals' can be discriminated amongst mere logical possibilities. I am thus adopting an argument a minima: I challenge the idea that one can even consider that there exists a set such that it would permit make of laws themselves cases of a Universe of laws (of a set of possible worlds determined by different laws). Since even this minimal condition of every law which is the definition of a determinate set of cases is not respected, this disqualifies a fortiori every attempt

themselves would be contingent, by comparing such a conception with the traditional vision according to which becoming is only thinkable as governed by immutable laws.

Every postulation of a legality, whether determinist or aleatory, identifies the world with a universe of possible cases indexable in principle, that is to say, pre-existing their ultimate discovery, and thereby constituting the potentialities of that universe. Whether a supposed law is considered probabilistic or deterministic, it posits in any case a pre-given set of possible cases which no becoming is supposed to modify. The affirmation of a fundamental hazard governing becoming thus does not challenge, but on the contrary presupposes, the essential fixity of such a becoming, since chance can only operate on the presupposition of a universe of cases determined once and for all. Chance allows time the possibility of a 'caged freedom', that is to say the possibility of the advent without reason of one of those cases permitted by the initial universe; but not the freedom of extracting itself from such a universe to bring forth cases which do not belong to the set thus defined. One cannot, within the aleatory vision of the world, deduce in univocal fashion the succession of events permitted by the law, but one can in principle *index* these events in their totality—even if, in fact, their apparent infinity prohibits for all time the definitive foreclosure of their recollection. In our terminology, such a belief in the aleatory legality of the world would constitute a *metaphysics of chance*, in so far as chance supposes the postulation of a law which would prescribe the fixed set of events within which time finds itself free to oscillate without any determined order. The belief in chance is inevitably a metaphysical belief, since it incorporates the belief in the factual necessity of determinate probabilistic laws, which it is no longer possible to account for except via the necessity of supposed deterministic laws.

In the guise of a radical evolution, it seems that since the Greeks, one conception, and one only, of becoming, has always imposed itself upon us: time is only the actualization of an eternal set of possibles, the actualization of Ideal Cases, themselves inaccessible to becoming—this latter's only 'power' (or rather 'impotence') being that of distributing them in a disordered manner. If modernity is traditionally envisaged, as in Koyré's expression, as the passage from the closed world to the infinite universe, it remains no less true that modernity does not break with Greek metaphysics on one essential point: finite or infinite, the world remains governed by the law—that is, by the All, whose essential signification consists in the subordination of time to a set of possibles which it can only effectuate, but not modify.

Now, it is such a decision, common to the Greeks and to the moderns, from which we believe to have extracted ourselves, *by detotalizing the possible*, and as a result liberating time from all legal subordination. In supposing the ontological legitimacy of the Cantorian conception of the infinite, we distinguish the infinite from the All, since the infinity of the possible cannot be equated with its exhaustion (every infinite set has a determinate cardinality, which another infinity is capable of exceeding). From this decision results the possibility of clearly distinguishing between the notions of contingency and chance, and indeed between the notions of potentiality and virtuality. *Potentialities* are the non-actualized cases of an indexed set of possibilities under the condition of a given law (whether aleatory or not). *Chance* is every actualization of a potentiality for which there is no univocal instance of determination on the basis of the initial given

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to think such laws in the same way as an event submitted to a law. To review the most important contemporary discussions of the notion of law, cf. A. Barberousse, P. Ludwig, M. Kistler, *La Philosophie des sciences au XXè siècle*, Paris, Flammarion, 2000, chs. 4 and 5.

conditions. Therefore I will call *contingency* the property of an indexed set of cases (not of a case belonging to an indexed set) of not itself being a case of a set of sets of cases; and *virtuality* the property of every set of cases of emerging within a becoming which is not dominated by any pre-constituted totality of possibles.

In short: I posit that the law can be related to a universe of determinate cases; I posit that there is no Universe of universes of cases; I posit that time can bring forth any non-contradictory set of possibilities. As a result, I accord to time the capacity to bring forth new laws which were not 'potentially' contained in some fixed set of possibles; I accord to time the capacity to bring forth situations *which were not at all contained in precedent situations* : of creating new cases, rather than merely actualizing potentialities that eternally pre-exist their fulguration. If we maintain that becoming is not only capable of bringing forth cases on the basis of a pre-given universe of cases, we must then understand that it follows that such cases irrupt, properly speaking, *from nothing*, since no structure contains them as eternal potentialities before their emergence: *we thus make irruption* ex nihilo *the very concept of a temporality delivered to its pure immanence.*

This merits further explanation. If one thinks becoming in the mode of a temporality which does not supervene upon any determinate law, that is to say, any fixed set of possibles, and if one makes of laws themselves temporal events, without subordinating the possible passage from one law to another to a higher-level law which would determine its modalities, time thus conceived is not governed by any non-temporal principle—it is delivered to the pure immanence of its chaos, its illegality. But this is just another way to emphasize—something Hume was the first to maintain—that from a determinate situation, one can never infer *a priori* the ensuing situation, an indefinite multiplicity of different futures being envisageable without contradiction. Grafting the Humean thesis onto that of Cantorian intotality, we see emerging a time capable of bringing forth, outside all necessity and all probability, situations which are not at all pre-contained in their precedents, since according to such a perspective, the present is never pregnant with the future. The paradigmatic example of such an emergence, to which we shall return, is obviously that of the appearance of a life furnished with sensibility directly from a matter within which one cannot, short of sheer fantasy, foresee the germs of this sensibility, an apparition which can only be thought as an supplement irreducible to the conditions of its advent.

As it emerges according to the model of intotality, time might either, for no reason, maintain a universe of cases, a configuration of natural laws, within which it is possible to index a determinate set of recurrent situations constituting its 'potentialities'—or might, equally without reason, cancel the old universe, or supplement it with a universe of cases which were not at all pre-contained in the precedents, nor in any other Substrate wherein the possibilities of being would be ranged for all eternity. We must thus grasp the fact that the inexistence of a pre-constituted All of possibles makes of the emergence of a possible anticipated by nothing in the preceding situation, the very manifestation of a time underwritten by no superior order: every emergence of a supplement irreducible to its premises, far from manifesting the intervention of a transcendent order in rational becoming, becomes the rigorous inverse: a manifestation of a becoming which nothing transcends.[7]

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7. To be more precise, we must say that the distinction potentiality/virtuality is gnoseological rather than ontological, in so far as it designates essentially a difference in our cognitive relation with temporality. The perpetuation of a Universe of already-known cases (the constancy of laws) itself also escapes all consideration in terms of potentiality. For if one can determine potentialities within a determinate set of possibles, the

Thus, for 'potentialism' (the doctrine that sees in each possibility only a potentiality), time can only be the medium by which what was already a possible case, becomes a real case. Time, then, is the throw with which the die offers us one of its faces: but in order for the faces to be presented to us, it must be the case that they preexisted the throw. The throw manifests the faces, but does not engrave them. According to our perspective, on the contrary, time is not the putting-in-movement of possibles, as the throw is the putting-in-movement of the faces of the die: time creates the possible at the very moment it makes it come to pass, it brings forth the possible as it does the real, it inserts itself in the very throw of the die, to bring forth a seventh case, in principle unforeseeable, which breaks with the fixity of potentialities. Time throws the die, but only to shatter it, to multiply its faces, beyond any calculus of possibilities. Actual events cease to be doubled by phantomatic possibilities which prefigure them before they occur, to be conceived instead as pure emergences, which before being are nothing, or, once again, which do not pre-exist their existence.

In other words, the notion of virtuality, supported by the rationality of the Cantorian decision of intotalising the thinkable, makes of irruption *ex nihilo* the central concept of an immanent, non-metaphysical rationality. Immanent, in that irruption *ex nihilo* presupposes, against the usually religious vision of such a concept, that there is no principle (divine or otherwise) superior to the pure power of the chaos of becoming; non-metaphysical in that the radical rejection of all real necessity assures us of breaking with the inaugural decision of the Principle of Sufficient Reason.

The most effective way to grasp properly the sense of the thesis proposed here is perhaps, as mentioned, to subtract it from the heuristic interest. This separation can be carried out through a series of elucidations permitted by such a model—elucidations of problems generally held to be insoluble, and thus sterile.

Firstly, as we have already said, such a model permits us to dissociate the notion of the stability of the empirical world from that of real necessity. The reprise of the problem of induction sought to show that it is possible to abandon the idea of a necessary constancy of laws, without this abandonment leading to the opposite idea of a *necessarily* disordered world. For the disqualification of the probabilist reasoning which implicitly founds the refusal of a contingency of laws suffices to demonstrate that the possible changing of constants of this world does not indicate their necessary continual upheaval: by affirming that the world could really submit its laws to its own becoming, one posits the concept of a contingency superior to all necessity, *one whose actualization is therefore subject to no constraint*—and above all not that of a frequential law supposed to render more and more improbable the noneffectuation of certain possibilities. For to affirm that the changing of laws, if it *could* happen, *must* happen, is to subordinate anew the contingency of becoming to the necessity of a law, according to which every possible must eventually be actualized. An entirely chaotic world—submitting every law to the power of time—could thus in principle be phenomenally *indiscernible* from a world

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maintenance across time of a determinate law itself cannot be evaluated in terms of potentiality (one possible case in a set of others). Even if the case which comes to pass is already indexed, it is only foreseen upon condition—an unforeseeable and improbabilizable condition—of the maintenance of the old set of possibles. Ultimately, the Universe can be identified with the factual re-emergence of the same Universe on the ground of non-totality. But the virtualizing power of time, its insubordination to any superior order, lets itself be known, or is phenomenalized, when there emerges a novelty that defeats all continuity between the past and the present. Every 'miracle' thus becomes the manifestation of the inexistence of God, in so far as every radical rupture of the present in relation to the past becomes the manifestation of the absence of any order capable of overseeing the chaotic power of becoming.

subject to necessary laws, since a world capable of everything must *also* be able *not* to effect all that it is capable of. Thus it becomes possible to justify the postulate of all natural science—namely the reproducibility of experimental procedures, supposing a general stability of phenomena—whilst assuming the effective absence of a principle of uniformity of nature, and by the same token abandoning the canonical enigmas linked to the hypothesis of a necessity of laws. But this abandonment does not proceed, as in Goodman, from a simple refusal to think the problem, a refusal justified by its supposed insolubility: it proceeds from the conviction that one can think the contingency of constants compatibly with their manifest stability.

The critique of the probabilistic sophism given above can also be extended to its application in various analogous arguments, which generally seek to restore a certain form of finalism. I will content myself here with mentioning one example of such an extension of the critical analysis, that of anthropism.

The thesis of anthropism—more precisely, of what is known as the Strong Anthropic Principle—rests fundamentally upon the following hypothesis:[8] one imagines oneself able to vary in an arbitrary fashion the initial givens of a universe in expansion, such as the numbers which specify the fundamental laws of contemporary physics (that is to say the relations and constants involved in these laws). One is then in a position to determine the evolution of these artificial universes, and one notes, in almost all cases, that these latter are incapable of evolving towards the production of the components indispensable for the emergence of life and, a fortiori, of intelligence. This result, which emphasizes the extreme rarity of universes capable of producing consciousness, is then presented as deserving of astonishment—astonishment before the remarkable coincidence of the contingent givens of our universe (contingent in so far as there is no means to deduce their determinations—they can only be observed within experience) with the extremely restrictive physical conditions presiding over the appearance of conscious life: how is it that our universe should be so precisely furnished with the necessary characteristics for our appearance, whereas these characteristics prove to be of such rarity on the level of possible universes? Such an astonishment thus rests upon reasoning that is clearly probabilistic, relating the number of possible universes to the number of universes capable of life. The anthropist begins by being surprised by a coincidence too strong to be imputed to chance alone, and then infers the idea of an enigmatic finality having predetermined our universe to comprise the initial constants and givens which render possible the emergence of man. Anthropism thus reactivates a classical topos of finalist thought: the remarking of the existence of a highly-ordered reality (inherent to the organized and thinking being) whose cause cannot reasonably be imputed to chance alone, and which consequently imposes the hypothesis of a hidden finality.

Now, we can see in what way the critique of the probabilist sophism permits us to challenge such a *topos* in a new way. For such reasoning is only legitimate if we suppose the existence of a determinate set (whether finite or infinite) of possible universes, obtained through the antecedent variation of the givens and constants of the observable universe. Now, it appears that there are no legitimate means of constituting the universe of possibles within which such reasoning could make sense, since this means, once more, could be neither experimental nor simply theoretically: as soon as one frees oneself from the imperatives of experience, in the name of what principle can one lim-

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8. For a definition of the various versions of the Anthropic Principle, See J.D. Barrow and F.J. Tipler, *The Anthropic Cosmological Principle*, Oxford, Oxford University Press, 1986, Introduction and Section 1.2.

it, as the Anthropic Principle implicitly does, the set of possible worlds to those obtained solely by the linear variation of constants and variables found in the currently observable universe, and in whose name do we limit such a set of worlds to a determinate infinity? In truth, once the possible is envisaged in its generality, every totality becomes unthinkable, and with it the aleatory construction within which our astonishment finds its source. The rational attitude is not, in actual fact, to seek an explanation capable of responding to our astonishment, but to trace the inferential genealogy of the latter so as to show it to be the consequence of an application of probabilities outside the sole legitimate field of their application.

Finally, the abandonment of real necessity permits one last elucidation, this time concerning the emergence of new situations, whose qualitative content is such that it seems impossible to detect, without absurdity, its anticipated presence in anterior situations. So that the problem appears in all clarity, let us take the classical example of the emergence of life, understood here not merely as the fact of organization but as subjective existence. From Diderot's hylozoism, to Hans Jonas' neo-finalism,[9] the same argumentative strategies are reproduced time and time again in philosophical polemics on the possibility of life emerging from inanimate matter. Since life manifestly supposes, at least at a certain degree of its evolution, the existence of a set of affective and perceptive contents, either one decides that matter already contained such subjectivity in some manner, in too weak a degree for it to be detected, or that these affections of the living being did not pre-exist in any way within matter, thus finding oneself constrained to admit their irruption *ex nihilo* from that matter—which seems to lead to the acceptance of an intervention transcending the power of nature. Either a 'continuism', a philosophy of immanence—a variant of hylozoism—which would have it that all matter is alive to some degree; or the belief in a transcendence exceeding the rational comprehension of natural processes. But such a division of positions can once more be called into question once irruption *ex nihilo* becomes thinkable within the very framework of an immanent temporality. We can then challenge both the necessity of the preformation of life within matter itself, and the irrationalism that typically accompanies the affirmation of a novelty irreducible to the elements of the situation within which it occurs, since such an emergence becomes, on the contrary, the correlate of the rational unthinkability of the All. The notion of virtuality permits us, then, to reverse the signs, making of every radical irruption the manifestation, not of a transcendent principle of becoming (a miracle, the sign of a Creator), but of a time that nothing subtends (an emergence, the sign of the non-All). We can then grasp what is signified by the impossibility of tracing a genealogy of novelties directly to a time before their emergence: not the incapacity of reason to discern hidden potentialities, but, quite on the contrary, the capacity of reason to accede to the ineffectivity of an All of potentialities which would pre-exist their emergence. In every radical novelty, time makes manifest that it does not actualize a germ of the past, but that it brings forth a virtuality which did not pre-exist in any way, in any totality inaccessible to time, its own advent.[10]

9. See for example Hans Jonas, *The Imperative of Responsibility*, Chicago, University of Chicago, 1985, ch. 3, 4, 3b: 'The Monist Theory of Emergence'.

10. It might be objected that in the preceding arguments I tend to conflate potentialism—which makes of every possible a potentiality—and a continuism which claims to discern for every present novelty a past situation wherein all the elements of such a novelty already existed, if at a lesser degree. It will be objected that one might at once claim that the world is subject to immutable laws, and refuse the actualism of pre-formationism, which sees the world as a set of Russian dolls where everything is already effective before

We thus glimpse if all-too-briefly, the outlines of a philosophy emancipated from the Principle of Sufficient Reason, and endeavouring, in this very recommencement, to maintain the double exigency inherent to the classical form of rationalism: the ontology of that which is given to experience, and the critique of representation.

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being manifest. I respond that I certainly do not conflate the two theses, but that potentialism and preformationism, having in common the refusal of virtuality, are equally incapable of thinking a pure novelty: potentialism, in particular, if it claims that sensation is a potentiality of matter which was not actualised by it before its emergence in the living, would accumulate disadvantages, since it would be constrained to combine the mystery of real necessity (matter is ruled by laws which give birth to sensitive contents under determinate conditions) and that of irruption *ex nihilo* (these contents are in no way contained in the conditions that make them emerge).