Plenitude and contingency: modal concepts in nineteenth century french philosophy

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1. INTRODUCTION

At the end of his famous *Rapport sur la philosophie en France au XIX ème siècle*, Félix Ravaisson wrote:

> There are many signs that allow us to predict the proximate advent of an epoch the general character of which will be the predominance of what one might call a realistic or spiritualistic positivism, having as its generating principle the awakening of the mind to the consciousness of its own existence, from which it realizes that all other existence follows and depends upon, and which is identical with its own action.[1]

Such statements have been deemed as characteristic of what has been called "French spiritualism", a tradition that goes from Maine de Biran to Bergson and Brunschwicg. In his *Rapport*, Ravaisson showed that French philosophy up to 1867 had been the stage of a conflict between various forms of positivism and scientific materialism on the one hand and various forms of idealism and spiritualism on the other hand, and that each episode of the conflict had turned to the advantage of spiritualism. By "realistic positivism" he meant a synthesis of the two trends.[2] As many philosophers of the period, Ravaisson shows a bias toward synthesis which was also prevalent in the "eclectic school" of Cousin and his followers. Another name of positivism and materialism was "necessitarianism" or "determinism", and another name of spiritualism was "contingentism" or "indeterminism". Despite the specific biases of his own interpretation of this conflict, Ravaisson was right in saying that one of the most general questions that French philosophers set for themselves during this period (and later on, since his statement was also meant as a prospect) was: how is it possible to recon-

S. Knuuttila (ed.), Modern Modalities, 179–237.

cile the necessity of natural laws and of natural order with man's creative thinking about nature and man's freedom?[3] This is a very classical question indeed, one of the "dilemmas of pure metaphysics", as Renouvier would call it, which is not distinctive of French philosophy, let alone of philosophy at any stage of its history.[4] What is distinctive however are the particular answers that French philosophers gave to this question. Another distinctive feature, which will be our concern in the present study, is the fact that the modal concepts of necessity, possibility and contingency tended to be discussed through this general question first and not primarily in logical terms. A good example of this attitude on the "idealistic" side is the way Léon Brunschwicg discusses the problem of modality in his doctoral thesis of 1897, *La modalité du jugement*. According to Brunschwicg, one cannot examine this problem as a purely "analytic" or logical one, and it is "the activity of the mind" which settles the modality of every judgment and the metaphysical meaning of the notions of necessity and possibility.[5] On the "positivistic" side the notion of possibility tended to be discussed through the concept of probability, as a measure of physical or epistemic possibility.

Discussions of freedom and determinism cannot ignore the relationship of modality with time, and French philosophy in the nineteenth century is not an exception. If one follows Lovejoy in his analysis of the history of the "Principle of Plenitude" - the principle that no genuine possibility remains forever unrealized - in *The Great Chain of Being*, one might think that French philosophers followed the lead of the romantic thought about the principle, according to which, says Lovejoy, "The Chain of Being... came to be explicitly conceived, no longer as complete once for all and everlastingly the same in the kinds of its components, but as gradually evolving from a less to a greater degree of fullness and excellence".[6] Lovejoy considers as typical of this "temporalization" of the Principle of Plenitude - identified with the Chain of Being - "what may best be called radical or absolute evolutionism - the typically Romantic evolutionism of which Bergson's *L'Evolution créatrice* is in great part a re-editing".[7] We shall have to show that things are more complex. Bergson can be seen as a heir of romantic evolutionism, but also as a heir of what has been called contingentism in nineteenth century thought, the doctrine according

to which there exists some contingency within the natural order, by which freedom is warranted. We shall, in what follows, limit ourselves to particular moments of this history of modal concepts, without attempting to be exhaustive. Jaakko Hintikka has shown in other contexts of the history of philosophy that the Principle of Plenitude is not "a unit idea"[8]. One might guess that its rejection, explicit or implicit, by various thinkers of the period under scrutiny, is not a unit idea either. Accordingly, there are various versions of contingentism, not all of which are incompatible with versions of the Principle of Plenitude.

2. RONDELET ON MODAL SYLLOGISTIC

The fact that French philosophers of the nineteenth century paid very little attention to modal logic or modal syllogistic cannot be explained by a particular contempt for modal logic as such. This contempt was rather common at the end of the eighteenth century. Reid, for instance, remarks that modal syllogistic had fallen into "neglect, if not contempt", and follows the authorities in letting "this doctrine rest in peace, without giving the least disturbance to its ashes".[9] Reid and the Scottish school of "common sense" were widely ready by French philosophers, in particular through the work of the "Idéologues" and through the "eclectic school" of Victor Cousin.[10] But the main reason was a contempt for logic as such, which has been a distinctive feature of the French tradition in philosophy since Descartes and which has its origins, for the period concerned, in Condillac's criticism of the "langue des calculs". At the very time when Boole was writing his mathematical analysis of logic, the Idéologues were attempting to show the impossibility of any mathematization of logic.[11] After 1850, when more attention was paid to the doctrine of the syllogism (for instance by Lachelier), modal syllogistic was not even mentioned.

Within this context, Antonin Rondelet's Latin thesis, *De modalibus apud Aristotelem* (1847), which was published in French in 1861, figures as an exception. Rondelet attempts an analysis of Aristotle's modal syllogistic and a rehabilitation of the theory of modal propositions. His work is the only comprehensive contribution to the logical analysis of modalities from a

French philosopher during the nineteenth century.[12]

Rondelet first states Aristotle's thesis according to which the modal propositions are those in which the attribute is modified. It follows from this that there are as many forms of modalities as there are modifications of the attribute. The classical problem is then: why did Aristotle privilege, among the indefinite number of adverbial modifiers, those expressing necessity and possibility?[13] According to Rondelet, Aristotle failed to discern the real nature of modal propositions, as did his commentators, since they lacked a proper criterion of the nature of logic. When those commentators claim that modal propositions lie outside the scope of logic, they fail to distinguish between two different concepts of logic. As far as it is concerned with our ideas and their mutual relationships, logic is a purely *formal* discipline. When it is concerned with the adequacy of ideas to a reality, logic is a *material* or *objective* discipline.[14] Accordingly, when Aristotle takes the modality to bear on the attribute or predicate of the proposition, he follows the material criterion of logic. There are then, according to Rondelet, two kinds of propositions: the "real" modal propositions where the modality bears on the *verb* or the logical copula which links the subject to the attribute and the pseudo-modal propositions where the modality bears on the attribute[15]. Only the first propositions belong to logic in the formal sense; the second ones belong to metaphysics. Rondelet comes close to the *de re/de dicto* distinction between modal assertions. He carefully reconstructs Aristotle's modal syllogistic, pointing out many of the difficulties and inconsistencies noticed by the ancient and medieval commentators about the rules of conversion or the validity of the various modal syllogisms.[16] However, when he tries to give justifications for his analyses, he is led back to a form of psychologism. Discussing for instance the order of modalities in Aristotle, Rondelet criticizes him for deriving the other modalities from the modality of the necessary. The psychological order requires that we consider first the possible, then the necessary.[17] A discussion of Kant's table of modality leads to the same conclusion: Kant did not take into account what happens in our minds when we attribute a modality to a given proposition. Rondelet takes up Cousin's diagnosis on Kant's philosophy that he is a sceptic.[18] An analysis of the modality of judgments requires that we consider the matter, i.e.,

the "real order" of the ideas in our minds and the form of the judgment, i.e., the "abstract" relations between our ideas.[19]

Despite its correct appreciation of the importance of modal syllogisms, Rondelet's book is disappointing. He points out that the rules of categorical syllogisms are insufficient to provide a complete account of most of our reasonings and that many of them have a hidden modality. In his conclusion, he stresses the importance of the modal notions of necessity and possibility in the history of philosophy and metaphysics with Leibniz, Kant and Hegel. But he does not try to establish the link between the "logical" and the "metaphysical" modalities, since he lacks a proper criterion of both.[20] A fuller appreciation of these issues will have to await Renouvier (see below Section 8).

3. MAINE DE BIRAN AND RAVAISSON ON NECESSITY AND HABIT

Let us turn then to the metaphysical side of the analysis of modal concepts within the idealistic tradition. The starting point of this tradition, as Ravaisson himself acknowledges in his *Rapport*, is Maine de Biran's doctrine of the self as a willing power.[21] Following the Idéologues and Condillac, Biran discovers in our "sensibility" the real origin of our ideas of causality and necessary connexion:

> Let us give thanks to Hume. No philosopher has established with such a great force of persuasion that any attempt to find outside ourselves a real and firm foundation for the idea of power and force was to be renounced; from which it follows that we have to find this foundation inside ourselves, or in the feeling of our own *effort*[22], in the very fact of the inward sense (*sens intime*), the evidence of which cannot be altered despite all the clouds accumulated by scepticism.[23]

Biran, however, does not want to reduce, like the empiricists, the idea of necessary connexion to an "external sensibility". Rather it is reduced to the "internal sensibility" of the "inward sense". What matters in sensation is not the fact of sensation but the sensing subject.[24] In this sense, the notion of

necessity is not merely psychological but also metaphysical. Biran sees himself as transposing the Leibnizian ideas of substance and force within the individual self "which is aware or exists for himself only as a cause or as an acting force on an extended substance".[25] The idea of necessary connexion manifests itself as the awareness of a voluntary action, an *effort* of the self in its contact with external objects:

> We can see thus the real ground of our conviction about the invariability and constancy of what the physicists call the laws of nature; for the laws are but the most general results of the forces conceived like the self as immaterial and therefore as immutable. These notions of necessary and universal forces (a mere necessity of consciousness) inevitably interfere with all the empirical reasonings concerning the order of succession of the phenomena and with all the probability calculations where only the chances of various sensible events are believed to be expressed and numbered. A lot of illusions and errors follow: for the most learned people are also the blindest. Thus when the physicists undertake to bring back their science to what it ought to be, namely the observation of phenomena, while setting the causes aside, they boast about an impossible victory gained over a necessary law of consciousness. In order to leave causality completely out of account, one should set aside the thinking self, while one goes on to think and reason.[26]

Biran turns Hume's analysis of causation on its head: a being that would never have made any *effort* would have no idea of what a force is and therefore of what an efficient cause can be. He would only observe the succession of events.[27] Discussing Leibniz's principle of sufficient reason and the distinction between it and the idea of causality, Maine de Biran comments:

> Philosophy must justify the present distinction between the principle of *sufficient reason* and the principle of *causality*. It must also justify the parallelism between the first idea of causation and the truth of our existence. Now, how will she get into it? By only one means, without any doubt, by showing that the very same fact, the same immediate, inter-

> nal experience which manifests the existence of the *self* manifests also the existence of a cause, a force producing any movement; now this condition is precisely satisfied by the *effort* or tendency, when it goes from the virtual to the actual or when a movement, an active mode of some kind, is performed by the will.[28]

One might say that Biran transposes to the self what Leibniz attributed to God. The two points of view, however, are not identical: the first is psychological and the second is theological. But for Biran, there is no real gap between the two: what belongs to the self as a psychological subject mirrors the inner tendencies of the realm of being.[29] By this, Biran inaugurates the special relationship that French spiritualists accepted between psychology and metaphysics.

In his discussion of the physiological basis of the willed bodily movement (*effort*), Maine de Biran paid special attention to the phenomenon of habit.[30] Ravaisson drew out the ontological implication of this phenomenon in his thesis of 1838, *De l'habitude.*[31] Where there is habit, there is life, says Ravaisson. The inorganic world is the realm of bare "general necessity": in it "being is present" (as an undifferentiated mode of existence), "but there are no beings" (no individuals as organic unities)[32]. Habit supposes an elevation in the scale of being, where there are existents capable of being self-movers and centers of spontaneous reaction:

> Thus there seems to appear in the realm of nature the realm of knowledge and foresight and to dawn the first light of freedom ... The being, brought out in the origin of the fatality of the mechanical world, manifests itself, within the mechanical world, under the accomplished form of the freest activity. Now this being is ours. There begins consciousness, and within consciousness intelligence and the will burst out.[33]

Habit is neither "mechanical fatality" nor "reflexive freedom": it lies between the two as "an active as well as passive spontaneity":

> In reflexion and will, the end of the movement is an idea,

> an ideal to be carried out, something that must be, that may be, and which is not yet. It is a possibility to be realized. But as the end becomes identical with the movement and the movement with the tendency, the possibility, the ideal realizes itself in it. The *idea* becomes being, the being itself and all the being of the movement and the tendency which it determines. Habit is more and more a *substantial idea.* The obscure intelligence that follows by habit the reflexion, this immediate intelligence where subject and object are confounded, it is a *real* intuition, where the real and the ideal are confounded, being and thought.[34]

Ravaisson furthers and completes Maine de Biran: habit is not the product of an external and constrained necessity but of a necessity of "attraction and of desire". Habit is the effect of a law, the law of the limbs which is supervenient on the freedom of the mind. But this law is a "law of grace":

> It is the final cause which predominates more and more on the efficient causation and which absorbs it in itself. And then, indeed, the end and the principle, the fact and the law, merge within necessity.[35]

Habit as a psychological phenomenon is an echo of the general development of Being and Nature. When Ravaisson opposes *idea* and *being*, in order to bring them together, he opposes two kinds of possibility and necessity. On the one hand, there is the mere possibility of an intellect which sees the possibility of an event, and there is the "fatalist" necessity of mechanism. On the other hand, there is another kind of possibility, exemplified by habit which tends to existence. In it every possible is necessarily realized, and so this kind of possibility becomes a form of necessity. This is the kind of possibility that Ravaisson calls "the virtual", thus announcing the Bergsonian opposition of the virtual and the actual.[36] The actualisation of every virtuality in nature can be considered as Ravaisson's version of the Principle of Plenitude.

Ravaisson's analysis of habit contains of course many Aristotelian reminiscences, which he himself brought out in his *Essai sur la métaphysique d'Aristote*[37], but *De l'habitude* displays a strong influence of neoplatonism and of Schelling, too, as many

commentators have observed.[38] The metaphysics of habit reveals the continuity between nature and consciousness and constitutes the ground of a method which determines the inferior level of being as the result of a progressive decline of the superior level which tends to annihilate itself in it without being completely destroyed. This is the very analogue of creationism and emanationism which Lovejoy associates with the Great Chain of Being, but the direction of the Chain is reversed. Quoting Paul ("Semet ipsum exinanivit"), Ravaisson writes:

> Could not one say, *in an almost similar way*, that the very existence which is concentrated in the first cause in its immutable eternity, is unrolled, *so to say*, released and diffused in these elementary conditions of materiality which are Time and Space; that it poses thus, *in some way*, the basis of natural existence, on which, by this continuous progress which is the order of nature, degree by degree, from realm to realm, everything comes back from the material dispersion to the unity of the spirit.[39]

Every time when we contract a particular habit, we renew in us something of God's act of creation. Ravaisson has been called, rightly, the French Schelling. Lovejoy's analysis of Schelling's theory of creation, where "the originally complete and immutable Chain of Being had been converted into a becoming, in which all the genuine possibles are ... destined to realization grade after grade, yet only through a vast, slow unfolding of time"[40], can be applied to the metaphysical psychology and physiology of the French thinker.

This influence of German idealism upon French nineteenth century thought was, however, exceptional. Most French philosophers were to repudiate the obscurities of the romantic "Naturphilosophie".[41] But Ravaisson was to remain for French philosophers the father of what has been called the "school of contingency", which is largely coextensive with spiritualism. If one comes back to the passages of *De l'habitude* quoted above, one can see that the fatalistic necessity rejected by Ravaisson is the Aristotelian *Tuche*, "the empire of Destiny". The realm of nature, on the contrary, in so far as Nature is an organic unity, is the realm of *contingency*. Contingency is thus opposed to randomness, which is "blind" necessity, and it is another

name for freedom from randomness. It is compatible with what Leibniz calls "moral necessity". The whole end of the *Rapport* is placed under the invocation of Leibniz:

> Everything has its reason, said Leibniz, from which it follows that everything has its necessity, and indeed without necessity, there is no certainty; without certainty, no science. But there are two kinds of necessity: an absolute necessity which is logical necessity, and a relative necessity, which is a moral necessity, and which can be reconcilied with freedom; two kinds of reasons: a logical one, and a conformable one.[42]

According to this Leibnizian outlook, "moral necessity" would mean that the actual world is the best of all possible worlds and tends to realize the best possible states. But Ravaisson seems to mean by this phrase the process by which, after an original fall into matter, the Infinite Spirit "has suppressed something from the plenitude of its own being, in order to extract from it, through some kind of awakening and resurrection, everything that exists". This line of thought owes much more to Neoplatonism than to Leibniz.[43]

4. THE BREAKING OF THE CHAIN

Maine de Biran's and Ravaisson's reflexions on habit and effort cannot be divorced from the medical and biological thought of their time. Cabanis's physiology was a constant source of inspiration for the first, and the second derives most of his analysis of "the organic life" from Bichat's famous *Recherches physiologiques sur la vie et la mort.*[44] Ravaisson quotes Stahl, Van Helmont, and both quote Charles Bonnet.[45] Their versions of the Principle of Plenitude go hand in hand with an approval of the idea of a Great Chain of Being, even if, as we saw, Ravaisson adopts the Schellingian interpretation of it. At the time when they were writing, however, biological thinking was undergoing great changes, and the notion of the continuity of the living world came under attack. We cannot examine here the evolution of these biological ideas, although a more detailed analysis of modal concepts in nineteenth century French thought

would have to take them into account. We shall have here to limit ourselves to schematic remarks.

Cournot is one of the best witnesses of the evolution of scientific ideas during this period, and since we shall have to examine his philosophical views below, we quote his analysis of the notion of order and his discussion of the idea of the Great Chain of Being:

> To restrict ourselves, in the application of this idea, to what concerns the specific types of the organized beings, Bonnet and the naturalists ... admitted that every specific type is located between two other types, the one simpler, the other more complex: the plan of nature being a gradual ascent from the simpler being to the most perfect in the complexity of its organism... It has not been difficult to show what was arbitrary and inexact in this hypothesis of a continuous chain; and it is even evident before any discussion that there can be no continuity in the proper sense of the word, since species should be infinite in number, and would not be different by any distinctive character, which is contradictory with the very idea of an organic species... One realizes, then, perfectly *a priori*, the lacunas of a series of specific types; and one understands that there could be sudden leaps from one type to another, not only because the intermediary types have disappeared, but also because they are not possible.[46]

Besides this *a priori* argument against the notion of a continuous series of species or against the idea that every possible species can be realized, one of the most famous controversies in nineteenth century biology, the polemic between Cuvier and Geoffroy Saint Hilaire, raised explicitly the problem of the continuity of the living world. According to Geoffroy, nature follows a single plan or scheme, which is common to all species of the organic world and of the animal realm. By this he does not mean a plan common to each species, say the molluscs or the insects alone, but a general "plan of composition" for all the organisms. As Cournot points out, this idea must not be confused with the idea of a chain of beings, because there can be gaps in the visible chain of forms:

> For either one considers the improving of functions or the organic development of the types, or one admits one single primitive type or several ones: in both hypotheses, the improving, the development can happen and do happen in too many different directions to allow the expression of the relationships between the organized beings by a chain or by a linear order.[47]

One can suggest, however, that the notion of a plan of composition retains something of the continuity of the living world, and that for Geoffroy "it is still necessary to make reference to a continuity, not visible any more through the forms, but hidden at the deepest level of the living".[48] Geoffroy admits that all possible species are actualized, not in the sense of a continuous chain but in the sense of a predetermination of every possible form by the plan of composition. This plan, as Cournot says, is "a scheme of the possible organisms".[49] Cuvier, on the contrary, rejects this biological version of Principle of Plenitude. For him every biological possible is not realizable. François Jacob writes:

> Cuvier comes to break this [Geoffroy's] continuity. The plan of organization becomes in some way the place where two series of variables become articulated, the one exterior, the other interior to the living bodies ... Among all possibles, the living must stay within the limits imposed by the conditions of existence... So is broken the chain which united the totality of the living beings, as if every difference were filled up by an infinity of intermediaries.[50]

Divorced from the biological reference to the Great Chain of Being, the Principle of Plenitude did not disappear from the speculations of French thinkers during the second half of the nineteenth century. It could still be found in some manifestations of the "romantic evolutionism" which were analysed by Lovejoy. For instance, as late as 1863, Ernest Renan wrote in his letter to Marcellin Berthelot:

> There are two elements, time and the tendency to progress, which explain the universe. *Mens agitat molem... Spiritus intus alit.* Without this fecund germ of progress, time

> remains eternally sterile. Some kind of intimate spring, pushing everything towards life and to a more and more developed life, is a necessary hypothesis. One must admit in the universe what can be noticed within the plant and the animal, an intimate force which brings the germ to the fulfillment of a previously determined scheme. There is some obscure consciousness of the universe which tends to happen, a secret spring which brings the possible into existence... The universe is a sort of immense struggle where the victory belongs to what is possible, flexible, ponderate, where everything is equilibrated, bent, and balanced.[51]

In spite of this *prima facie* characteristic statement of the Principle of Plenitude, Renan remarks that being is "but a compromise between opposed solutions", like "an equation which in most of the hypotheses gives negative or imaginary solutions, but which in some cases gives the real ones". Some species have existed or tended to exist, which do not exist any more. "Some of them had only a virtual existence which, in the absence of favorable conditions, was not actualized."[52] In his poetic evocation of the idea of plenitude Renan, who had always been influenced by German romanticism, shows some unfaithfulness to the notion: some possibilities remain unactualized. Only those which found proper "conditions of existence" are bound to exist. What these hesitations show is that even when it was sympathetic to it, philosophical speculation could not rely any more on the organic continuity of the living world.

5. LAPLACE, COMTE AND COURNOT ON PROBABILITY, POSSIBILITY AND DETERMINISM

At the time when Maine de Biran attempted to derive all necessity in nature from the "effort voulu" of the self, Laplace published his famous *Essai philosophique sur les probabilités* (1814), which contains one of the most quoted passages of the history of the philosophy of science:

> We ought then to regard the present state of the universe as the effect of its anterior state and as the cause

> of the one which is to follow. Given for one an instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it - an intelligence sufficiently vast to submit these data to analysis - it would embrace in the same formula the movement of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present in its eyes. The human mind offers, in the perfection which it has been able to give to astronomy, a feeble idea of this intelligence. Its discoveries in mechanics and geometry added to that of universal gravity, have enabled it to comprehend in the same analytical expressions the past and future states of the system of the world. Applying the same method to some other objects of its knowledge, it has succeeded in referring observed phenomena to general laws and in foreseeing those which given circumstances ought to produce. All these efforts in the search for truth tend to lead it back continually to the vast intelligence which we have just mentioned, but from which it will be infinitely removed. This tendency, particular to the human race, is that which renders it superior to animals; and their progress in this respect distinguishes nations and ages and constitutes their true glory.[53]

Laplace's statement is now considered as the classical expression of universal determinism. But Laplace does not use the term, and speaks instead of the principle of sufficient reason, invoking Leibniz and his criticism of epicurean randomness.[54] Laplace uses this idea of an unlimited intelligence to introduce his notion of probability, relative to our knowledge and ignorance of the natural causes, and his no less famous definition of probability:

> The theory of chances (*hasards*) consists in the reduction of all the events of the same kind to a certain number of equally possible cases, that is, such that we are equally undecided about their existence; and in the determination of the number of the cases which are favourable to the event the probability of which we are seeking. The ratio of this number to the number of all the possible cases is the

> measure of this probability which is thus nothing but a fraction the numerator of which is the number of favourable cases, and the denominator the number of all the possible cases.[55]

It is not doubtful, then, that Laplace's definition of possibility and probability is an epistemic one, although Hacking has shown that in some cases, Laplace was ready to acknowledge a *de re* sense of possibility.[56]

If one excepts Maine de Biran's allusion to the scientist's "probability calculations" quoted above, the philosophical reaction to Laplace's theory of probabilities and equipossibility was rather slow. The most famous reaction was Comte's unequivocal rejection of the applications of the calculus of probability to physics and to the social sciences. First, Comte rejected any cosmological hypothesis which would try to give conjectures of the origins of the whole universe, our solar system excepted. Such hypotheses would be unscientific, in that they could not lead to laws comparable to those obtaining in celestial mechanics, where "from the geometrical study of the planetary movements, one could trace back, with an absolute certainty, their dynamical conception, according to the general laws of motion, which indicated exactly such and such mechanism, by necessary exclusion of any other."[57] Such attempts seem to Comte "childish" and "misplaced" when they use the probability calculations, "as if our intelligence needed such an arithmetical authorization before undertaking to explain legitimately any well-observed phenomenon, it sees that it is possible."[58] According to Comte, then, the very notion of probability is misleading and "susceptible to lead to utterly absurd consequences", such as the rejection as numerically unlikely of events which are bound to happen.

In some passages Comte seems to imply that "positivistic philosophy" is a form of necessitarianism. All the phenomena of physics, for instance, have a character of "rigorous generality, necessarily inherent" to them, which is a consequence of the necessity of the laws of nature, conceived as the "laws of phenomena":

> Since man has discovered, for instance, the universality of gravitation, can we still consider it as a contingent prop-

> erty, that is conceive bodies which would be really devoided of it? Similarly, is it really open to us to have a representation of a substance without any temperature, or without any sound effect, or without any luminous action, or even without any electric action? In one word, from the point of view of positive philosophy, there is indeed an incompatibility between the idea of a rigorous generality and the notion of contingency, which could only belong to properties the absence of which would be observed in some real cases.[59]

Necessity, then, for Comte, belongs to properties which can be observed in *all* real cases, whereas possibility belongs to properties which can be observed in *some* real cases. The notion of "necessity" which Comte has in mind here corresponds to the "statistical" interpretation of modal notions. Modality can only refer to states of affairs exemplified in the actual history of the world.[60] It would be contrary to the very spirit of positivism to conclude that natural laws are necessary in any stronger sense than this statistical one. Necessity or contingency for Comte belong to the vocabulary of scholasticism and thus to the "metaphysical stage" which is superseded by the "positivistic stage" of knowledge and civilisation:

> It is then most vainly that, in the usual manner of conceiving physics, one believes it useful to distinguish between the different properties with which it deals, according to whether their universality is necessary or contingent... Such a scholastic subtility rests of course only on the remains of the influence of the metaphysical spirit, when it was pretended that the bodies could be known in themselves, independently of the phenomena that they show to us, and which were still envisaged as essentially fortuitous, while they are really, on the contrary, according to the positivistic philosophers, the only primitive basis of our conceptions.[61]

So one must not confound "the subordination of any event to invariable laws with their irresistible necessary happening"[62]. The order of the world is neither necessary nor contingent. According to Comte, the fatalistic necessity of the metaphysical

stage must be replaced by the "principle of the conditions of existence". This principle, which Comte borrows from the zoologist Blainville, is "nothing but the direct and general conception of the necessary harmony" between the static and the dynamic analysis of any subject.[63] We cannot enter here this fundamental thesis of Comte's philosophy, and the taxinomies that go with it. It is enough to notice that the principle of the conditions of existence establishes an order within nature, which Comte repeatedly calls "inevitable" or "indispensable". He insists, however, one the fact that the principle is opposed to any doctrine of final causation.[64] The order of the world is an analogue, in the positivistic stage, of the "fatality" of the theological stage, and of the "necessity" of the metaphysical stage. But this fatality, says Comte, is "modifiable". The constancy of the natural laws is a "constancy in variety". In a passage of the *Système de politique positive*, which seems to answer Laplace directly, Comte admits that the order of nature

> could become so irregular that even brains superior to our own would fail to grasp it. There is nothing that prevents us from imagining, outside our solar system, some worlds that would always be left to an inorganic agitation, entirely untidy, which would not even show any law of universal gravitation.[65]

Comte says elsewhere that "the exterior relations are much more contingent than it can be conceived by our blind instinct of a universal connexion."[66] If one keeps in mind the particular sense which is given by Comte to the notion of contingency - failure to be observed in some real cases - it is only in a relative sense that the laws of nature can be said for him to be contingent. It does not mean that the laws of nature could be different from what they actually are, but that they could be *changed*. This is a view very different from the conception of the "contingency of natural laws" which we shall examine below (Section 7). But although most of his contemporaries took him for a materialist and a necessitarianist, such a conception could clear the way for a more radical theory of the contingency of natural laws.[67]

Cournot's philosophy was an important step towards the "contingentist turn of mind" which was said to permeate French

philosophy during the second half of the nineteenth century[68], although Cournot himself did not belong to the spiritualist tradition initiated by Ravaisson. His main work belongs to what he calls "philosophical critique" (*critique philosophique*), and is an "attempt to introduce the datas of science into philosophy". Cournot himself seldom uses the word "contingency". His key concept is the concept of randomness (*hasard*), which he takes as central for his analysis of probability.[69] Through this analysis, Cournot introduces various modal notions.

Cournot first distinguished two kinds of possibility: possibility in the "mathematical or metaphysical sense" on the one hand, and "physical" possibility on the other hand. An event is possible in the first sense if it does not imply any contradiction or if its happening is consistent with mathematical calculations. For instance, it is mathematically possible that a weighty cone can be put in equilibrium on its point, although it is physically impossible.[70] Physical possibility, which Cournot sometimes calls *de facto* possibility[71], corresponds to the happening of actual physical events. It is therefore to be taken in the *de re* sense. In order to understand Cournot's concept of physical possibility, it is necessary to give an outline of his account of the physical world. Cournot operates within a deterministic framework: every event must have a cause, and is therefore the outcome of a series of causes. But the concept of *cause* is to be distinguished from the concept of a *reason*, or of an explanation of things. For instance, says Cournot, when one tosses a coin which is biased, the reason for the inequality of chances for the coming out of tails is the asymmetrical physical structure of the coin. But the cause of the outcome of tails on one trial is specific: it depends for instance on the way the coin is tossed, and on the circumstances of the tossing.[72] In so far as the causes of an event are specific, one can say that it is a product of an objective chance. But chance is not the absence of a cause. It depends, according to Cournot, on the degree of "solidarity" or of "independence" of the various series of causes. Some series of causes are solidary because they influence each other. Some series are independent of each other. These correspond to the events which we call accidental or fortuitous and to our notion of randomness:

This idea is that of the actual independence of the acci-

> dental meetings of various chains or series of causes: either one can find, by moving upwards in the chain, the common link where they are bound together and from which they depart from each other, or one supposes (for this can only be an hypothesis) that they would keep they mutual independence, even if they moved the further upwards. A tile falls from the roof, whether I am going along the street or not; there is not connexion, no solidarity, no dependency between the causes which bring the fall of the tile and those by which I was induced to get out of my house to mail my letter. The tile falls on my head, and here is the old logician out of order for good and all: this is a fortuitous event or one that happens by chance.[73]

Cournot's definition of randomness as a meeting of independent series of causes is by no means new.[74] What is original, however, is his use of this definition to introduce the theory of chances and probabilities as a theory of fortuitous events belonging to the nature of things and not as a feature of our ignorance of causes. We do not say that some events happen by chance because we find them surprising; rather, they are surprising because they are brought out by an objective chance.

This notion of an objective chance in nature is associated, for Cournot, with the objective interpretation of probability statements. Probability is a measure of physical possibility:

> In the rigorous language which is suitable to the abstract and absolute truths of mathematics and metaphysics, a thing is possible or not: there are no degrees of possibility and impossibility. But in the order of facts and phenomenal realities, when two contrary phenomena are likely to happen and do happen according to the fortuitous combinations of some variable causes with other causes or constant data, it is natural to regard a phenomenon as endowed with an ability to happen which is greater or which is more possible, in fact or physically, as it is reproduced more often and in a greater number of trials. The mathematical probability then becomes the measure of the *physical possibility*, and one of these phrases can be taken for the other. Moreover, it is only a definition of words. The advantage of the term *possibility*... is that it designates clearly the experience of a

> relation which subsists between the things in themselves, and which does not come from the way we judge or feel, variable from one individual to another, according to the circumstances in which they are placed and the amount of their knowledge; finally, the term *possibility*, to use the technical language of the schoolmen, is taken in the objective sense, whereas the term of *probability* implies in its usual acceptions a *subjective* sense, which deceived a lot of wits, and has been the cause of a lot of ambiguities, and has altered the idea which one should have of the theory of chances and of mathematical probabilities.[75]

An event is physically possible if it is the outcome of various independent series of causes. These series may be more or less independent of each others. Although Cournot is not very clear on this point, and does not offer any precise criterion for the identification of the independent series of causes[76], it seems that he intends the notion of probability to be a measure of the degree of dependence of the series of causes which bring out an event. This is made clearer by Cournot's use of the notion of *physical impossibility* to explain the notion of a random event. An event which is physically impossible is "an event which has only one favourable chance to happen for an infinity of contrary chances", that is an event "the mathematical probability of which is infinitely small, or falls below any fraction, however small."[77] It is, for example, the event of the extraction of a white ball from an urn by a blind agent, when this urn contains an infinity of black balls. The event is impossible not only because it does not happen, but because "it would be unreasonable to expect it on the basis of a finite number of tests and trials, that is when one stays within the limits of practical conditions of possible experience."[78] This principle of the negligible quantities has sometimes been called "Cournot's principle" or "Cournot's rule" by historians of the theory of probability, and Cournot's position has been compared with the frequentist position.[79] There is, however, an important difference, in that, for Cournot, the events which are said to be impossible are not realized in one trial or in a fixed number of trials.[80] The Bernoulli-Laplace theorem or "law of large numbers" is then interpreted by Cournot in an equally objective way: if the same trial is repeated a large number of times,

whatever the probability of the event *A*, the ratio of the number of trials that bring about *A* and the number of trials must differ very slightly from the probability of *A*. In other words, if the number of trials is indefinitely increased, the probability that the difference between the two ratios exceeds a given fraction will decrease indefinitely[81]. One might ask whether there are, for Cournot, physical *necessities*. Although he does not use this phrase, he defines an event which is physically *certain* as "an event the contrary of which is physically impossible, or an event the mathematical probability of which does not differ from the unity by any fraction, however small."[82] Mathematical certainty, on the other hand, is the feature of events which are possible under all combinations.

In the passages we have quoted Cournot seems to imply that the notion of probability as physical possibility is an *analysans* for the notion of an independent series of causes. The two notions are distinct, but linked. The independence of a series of causes is explained by the measure of the physical possibility or probability of an event. But in other texts, Cournot separates the two notions of probability and of independence of the series of causes, by using his distinction between the reasons and the causes of an event: the reason of an event is the factor responsible for its probability and its frequency, whereas the causes are the variable factors from one trial to another[83]. An important difficulty of his conception is that he does not explain on what grounds we might separate the two notions.

Placing randomness in nature amounts to acknowledging the status of probability as an additional metaphysical modality[84]. For Cournot, a consequence of his objective view of science is that Laplace's demon himself would have to use the theory of probability. A superior intelligence would make a better use of this theory, but would not be exempted from using it.[85] But the fact that Cournot privileges the objective concept of probability does not mean that he is ready to give up the subjective theory altogether. He only wants to contrast it with the questions of possibility, which he, as we saw, always takes in an objective sense.[86] Two main features of this objective conception of chance are to be stressed.

The first concerns the consequences of this conception for determinism. The existence of an objective chance does not contradict determinism: chance is the product of the meeting of

causal chains, but it is not the product of a lack of causality. The principle which Cournot rejects is not the principle of causality, but the principle of internal relations, or the idea that any series of events must be dependant on another series[87]. Absolute determinism, on the other hand, does not exclude chance:

> In general in all phenomena can be observed the contrast between *law* and *fact*, between what is *essential* or *necessary* according to a law... and what results *accidentally* or *fortuitously* from some initial dispositions or from some meetings which we do not admit as necessary according to any law; although in each series which are fortuitously met, because they are independant of each other, every fact is necessarily linked to the previous ones in its own series, and completely determined by its antecedents.[88]

Cournot's position, then, is a compromise between Laplace's strict determinism and what was called by Renouvier "the doctrine of absolute beginnings", that is the doctrine according to which there are some *creationes ex nihilo*, or some effects without causes.[89] His version of "contingentism" implies that chance is not "a substantial cause", but, as he argues repeatedly, an *idea*, the idea of a combination between several systems of facts and causes growing out from each other.[90]

The second feature is the extension of the notion of chance from the realm of nature and of the physical world to the rational order in general. This includes the intelligible world of mathematics as well. For instance Cournot claims that the succession of numerals within the decimal series of the ratio of the circumference and the diameter of the circle is as "fortuitous" as the random extraction of a series of numerals in a lottery.[91] This remark is again extended to the status of the laws of nature. Even if our knowledge of the laws of nature were almost perfect, there would still be a seed of randomness in it, not within the determination of the laws themselves, but in their mutual independence:

> One could grant, with Laplace, that the immutable laws by which the world is governed *are in small number*; but it would be enough that there be *two* of them, perfectly inde-

> pendent from each other, to acknowledge the part played by chance in the government of things.[92]

Chance is then a reason of things, not a cause. Cournot does not hold the contingency of natural laws, but his thesis is almost as radical, for the logical and ontological independence of the laws means that reason, the "science of order", is bound to be pluralistic: there cannot be any reduction of one form to another.[93] Scientific datas can only show that these various orders can coexist and that their continuity is but a regulative ideal.[94] The very notion of a rational order is not a substantive but a critical notion, and reason itself cannot reach certainty. The counterpart of the notion of an objective chance within the rational order is for Cournot the application of probability to the criticism of our knowledge. Besides mathematical and physical probability, there is another species of probability, which he calls "philosophical probability": in philosophy we cannot find absolute conclusions, and we have to rely on inductions, analogies and similarities. We can only perceive some fragments of what we believe to be a general order of things. But this general order must not be mistaken for a constitutive idea, for its status is only regulative:

> When only a few remains of a vast edifice are left, the architect who attempts to restore it can easily be mistaken in his inductions about the general plan of the edifice. He will build a wall through a number of boundary marks, the alignment of which will not appear to him as a product of fortuitous meetings; whereas, if some other remains come to be discovered, the plan of the original restoration will have to be changed, and it will be admitted that the alignment was a result of chance; this is not to say that the extant remains were not always part of a system or of a regular scheme, but that the details of the plan were not coordinated in view of the observed alignment. The observed fragments were like the extremities of many chains, attached to a common link, but lacking any immediate link between themselves, and which have then to be considered as independent from each other in every respect in which they are not necessary consequences of the links which attach them to the common link.[95]

Cournot agrees with Kant that the role of philosophy is critical, and he calls his own inquiries into the impact of science on philosophy a "philosophical critique". Kant's critique, however, is only negative, whereas the application of philosophical probability is able to produce positive results, even though these are only probable. In this sense reason can attain the order of things, and in this Cournot is more Leibnizian than Kantian.[96]

6. RENOUVIER ON FREEDOM, POSSIBILITY AND FUTURE CONTINGENTS

In fact this oscillation between Kant and Leibniz is one of the characteristics of French philosophy in the nineteenth century. We have seen that Ravaisson's compatibilism rested on the Leibnizian opposition between moral necessity and absolute necessity. The question which was put forward by Maine de Biran and the followers of the Scottish school of common sense (such as Jouffroy) was: how is it possible to reach metaphysical conclusions on the basis of a purely psychological investigation? The "Kantian" reaction of such thinkers of the second part of the nineteenth century as Cournot, Lachelier and Renouvier was that no knowledge of things in themselves can be attained by any kind of psychological, introspective, or intuitive experience. This was argued by Cournot against Jouffroy (and Cousin)[97], and by Lachelier in *Psychologie et métaphysique*.[98] These philosophers were then led to a Kantian solution of the problem of the compatibility of freedom and determinism. In the same vein, they argued that the concepts of possibility and necessity could not be applied to things in themselves but were only features of our representation.[99] Cournot however, as we just saw, was not ready to renounce the idea of an objective order of things. And Renouvier, although he could not withdraw his claim that the dilemma between freedom and necessity had no solution within the realm of phenomena, attempted to legitimate our belief in freedom by our experience of it and proposed that his system should be called a "new monadology". "Neo-criticism", as Renouvier would call it, was not Kantian without reluctance.

Renouvier's "neo-criticism", as it is exposed in his *Essais de critique générale* (1854 - 1864), rests on three main assump-

tions:

a) *phenomenism*: knowledge consists in nothing but representations or phenomena, and being is nothing but representation[100]
b) *relativism*: every representation is relative to another representation, and being is but a relative representation; therefore everything is relative and there is nothing absolute[101]
c) *finitism*: the number of representations, and therefore of things, is necessarily finite; every infinite actual totality implies contradiction; this is what Renouvier calls the "principle" or the "law" of number.[102]

Renouvier's argument for the reduction of things to representations involves these three principles. Every representation and every represented thing is a relation between representations. If we set the thing in itself apart from any relation whatsoever, it will have nothing in common with the representation and therefore it cannot be the thing in itself, for the representation can only objectify something through relations in the objects. If, on the contrary, we set the relations in the thing itself, it becomes unknowable, since we do not know the thing but only its relations. For there is no relation without any supposed representation. Why? Because if there were any relations between things in themselves, these things would have to compose a whole (otherwise one could not say that they bear relations to each other). But any whole must be finite, for a whole that would be infinite could not be represented. An infinite space, and infinite time or an infinite motion would be violations of the principle of contradiction. Therefore there cannot be any relations within anything, unless there is a correlative representation. The thing in itself does not exist but is relative to a representation.[103]

Philosophy is a "general critique" which analyses the most general data of representations. There is no need to make distinctions between the various kinds of representations; we only have to account for their forms. For instance there is no distinction between intuitions, concepts, and ideas, nor between the faculties: sensibility, understanding, reason.[104] Even less Kantian is Renouvier's doctrine of categories: these are not concepts but laws of representation, the most general of which is relation. The other categories organize the contents of possible

experience. Beside relation, causality and quality, space, time, number, becoming, finality and personality take place within the list.[105]

These oddities - from a Kantian point of view - notwithstanding, the Kantian category of modality is excluded from the list. Modality, explains Renouvier, adds nothing to what is expressed by a categorical judgment. It only says that the relationship between a subject and a predicate is possible or necessary. A categorical proposition is necessary if it is true. A proposition is possible if there is no contradiction in a state of affairs which it represents, or if it belongs to the set of the results of the "ambiguous power of several phenomena which exclude each other."[106] In the first case, possibility is mere *logical* possibility, freedom from contradiction. In the second case it is causal or real, or *physical* possibility, the power of being or not being. But in neither case is modality a category distinct from the more general categories of quality and causality, and therefore of relation.[107]

This analysis is taken up again with more details in the second *Essai de Critique générale*, when Renouvier, having reviewed all the categories of his system, deals with the notions of possibility, necessity and probability.[108]

> Necessity is a form attached to any actuality given in representation... what is, when it is, cannot fail to exist; the relation which is established is established, and not suppressed, that is, cannot fail to be established, as far as it is established. The actual is thus also the necessary, and necessity is another name of the principle of contradiction, at least in this sense.[109]

A generic statement which is truly uttered now, cannot be false, for there is no more a real possibility for it to become false. If it is true, it is necessarily true: $p \rightarrow \Box p$. It should be recalled that Renouvier's definition pertains to a form of representation and not to a necessity *in re*. This definition applies to analytic judgments, which relate actual datas linked by definition, in virtue of the meaning of words. Logical as well as physical necessities are features of our representation and derive from either the absence of contradiction or the constancy of certain laws relating phenomena.[110] We should strongly

separate the logical analysis of modalities from the question of the real necessity or possibility *in rebus*, and resist the temptation to use the ambiguities of modal statements to establish ontological conclusions. To achieve this, Renouvier gives a careful analysis of the meaning of modalities, which is by far the most extensive treatment of the subject since Rondelet.

First, Renouvier proposes a general strategy of reducing propositions in the future tense to "actual assertions". Thus "A will be" becomes "A is to be", and "A will be B" becomes "A is to be B". The advantage of this reformulation, according to Renouvier, is that it does not presuppose the truth or the falsity of a proposition expressed in the future tense. The contradictory of "A is to be B" is not "A is to be not B", but "A is not to be B":

> When one uses the forms "A will be, A will not be", the mind, instead of focusing its attention on the actual value of the two statements, goes to the supposed moment when it would be known by experience that now *A is*, or that *A is not*; that the event the possibility of which was anticipated has happened or has not happened. At this moment, it is indeed certain that A is or is not, and that the principle of contradiction holds simply and absolutely. From this comes the illusion which leads us to say in the same sense: A will be or will not be, so that we confound the point of view of the ambiguous future and the point of view of the future that has happened - the past - and we introduce surreptitiously the principle of determinism.[111]

Renouvier says that he agrees with Aristotle's solution of the problem of future contingents in *De interpretatione, IX*, but he accuses Aristotle of falling back into the trap when he asks whether there *will be* or *will not be* a see-fight tomorrow. According to Renouvier, such statements as "A is to be" and "A is not to be" refer to ambiguous futures if they are true. Therefore they are both true at the present moment, and the question of their truth at a future time, which Renouvier attributes to Aristotle, has to be postponed.[112]

Modal propositions are reformulated accordingly, so that possibility and necessity become modifications of actual assertions. A "purely possible proposition" is defined as a hypothetical prop-

osition, "such that none of the conditions relative to it and which could determine it is given."[113] The necessary, the simple, or the absolute "are but the names of the thesis properly so called, or taken as constant"[114]. Renouvier, like Rondelet, considers the sense of the modality of an assertion when it modifies not the whole assertion, but the attribute. But unlike Rondelet, who claimed that the "real" modality (in the *de re* sense) bears on the copula or the verb, Renouvier believes that it is indifferent whether the modification bears on the attribute or on the verb, because the two kinds of statements are equivalent: we can pass from *The man who walks is necessarily moving* to *The motion of a walking man is necessary*. Moreover, Rondelet went wrong when he saw a distinction between such modal adverbs as *necessarily* or *possibly*, and other kinds of adverbial modifiers, such as *fast* or *slowly*.[115] The point of these remarks is that there is no genuine *de re* modality (of the "real" kind) and all such modalities can be reduced to *de dicto* ones. Renouvier then proceeds to show that the Aristotelian laws of modal syllogistic hold readily for this reformulation of modal statements.[116]

Because Renouvier attempts to eliminate the category of modality from the list of his basic categories, he does not attempt to discuss the philosophical questions which lie behind the analysis of modal notions. These questions are nevertheless central for his philosophy. One of the most important of these questions receives the following formulation in the *Essais de critique générale*:

> Should we take any phenomenon, envisaged as future, as predetermined, pre-existing in its causes, and in some way pre-actual, or on the contrary as uncertain and ambiguous, either in totality or in part? This is the question of the possibles and of contingency. We shall deal with it from the point of view of the categories.[117]

But "from the point of view of the categories", there is no definite answer. The category of causality (or of force, which is equivalent) provides us with the representation of an act, in which everything is determined or necessary, and of a power, or potency, in which everything is underdetermined, but it gives us no representation of the limits within which the act takes

place. If we turn then to the category of becoming, we should have to go back indefinitely in the series of causes, which would imply, according to Renouvier, a violation of the "law of number". If, on the contrary, we take side for "absolute beginnings", we should have to violate the law of succession involved in the category of causality.[118] There is, however, what Renouvier at this stage of his argument takes as a possible escape from the dilemma between the hypothesis of determined future events and the hypothesis of their absolute indetermination. The notion of probability involves the idea of possibles which are equally bound to happen or not to happen, and which therefore can be taken as genuinely ambiguous futures. According to Renouvier, the law of large numbers constitutes an indirect verification of the thesis of contingency. It establishes an indefinitely increasing probability of the subordination of the events to their own probabilities. The fact that it is a law supports the hypothesis that the happening of possible events is an effect of the necessary connexion between all phenomena. But it supports as well the hypothesis that their advent is the product of chance.[119] In other words:

> The experimental verification of the law of large numbers proves that, if freedom is real, there is a class of facts which have their origin in the existence of freedom and which are subject to this unique, singular law, which allows and even requires that they are rigorously unpredetermined; and that, if freedom is only apparent and if all the possible facts are predetermined, then universal necessity imposes to a subclass of these the same law as the one they would follow if they did not admit of any previous determination.[120]

Renouvier's analysis here is strongly influenced by Cournot's theory of chance and probability, which he discusses at length. But he objects to the definition of chance as meeting of independant causal series: first, we cannot identify precisely the regularities which underly the various instances of the meetings of causal series, so that we can never be sure that the chance events defined in this way are not the mere products of our ignorance, and secondly, the supposition that the independent series have no necessary conjunctions is arbitrary. Renouvier

thus rejects the objective conception of chance, and goes back to Laplace's definition of probability as a feature of our ignorance. In particular, contingency is not be assimilated to chance.[121] The dilemma therefore remains.

There are two stages in the solution of the dilemma of freedom and determinism in Renouvier's philosophy. The first stage consists in what might seem *prima facie* to be a version of compatibilism:

> Some events can be undetermined because freedom exists, while the order and the laws of the world subsist concurrently with these and envelop it, enclose it on all sides without affecting its essence ... Under these various points of view, determinism is everywhere, and this is the way there exists a universal order from which no phenomenon is excepted. Nevertheless, if the act of the will is free, its existence is undetermined and *a priori*, as well as all the consequences which it can have. The *modes of existing* are prearranged and necessary: every possible is necessary with respect to a multitude of forms of its realization, if it realizes itself: but the *existing* itself is not prearranged, and some possibles can fail to be actualized. There is no contradiction here, and it can be seen that the order and the most complete determination of things which are, as they are, are compatible with the pure indetermination of certain data of the future.[122]

According to Renouvier, freedom of the will does not require any total indetermination of some future events, even of those which are directly dependent upon it. He uses a mathematical comparison to substantiate this point. Let us suppose a function given with as many variables as we want, each of which representing some concrete order. Some of these variables will receive possible values of any kind, arbitrarily determined, and are called *independent*. The arbitrariness does not extend, however, to the admission of determinations which would be different from those that affect the form of number. The function can be non continuous and determine a law which relates an expected phenomenon to another already known. A necessary relation will still exist, even though the independent variables are not predetermined. The law of the world can then be conceived

as a complex function of functions, some continuous, some others discontinuous:

> The function, the total law determining the facts with relation to time, would only express the possible world, or rather it would be the enormous system of the purely possible worlds, subjected to general common conditions. The *a priori* trajectory of events would be composed of an incalculable number of hypothetical trajectories, crossing in thousand ways, all endowed with common characteristics and properties. The real trajectory could never be determined from all points, except *after the event*, and when freedom would have realized such and such parts of the course of one of the possible trajectories, leaving aside all the others which came up for the same interval of time.[123]

On this compatibilist version of the dilemma, the Principle of Plenitude is explicitly rejected: some possibilities are never realized, even if the general order and number of possibilities is determined. Renouvier calls "necessitarian monomaniac" the thinker who believes that every possibility is actualized and "libertarian monomaniac" the one who believes that there is no determination whatsoever in the realization of possibilities.[124]

But this compatibilist solution is purely "logical": neither freedom nor determinism can be thus demonstrated. The second step towards a solution of the dilemma consists in allowing that the choice between thesis and antithesis is an act of rational faith. Here Renouvier relies on Lequier's meditations on the problem of freedom.[125] In his situation of uncertainty between the two logical theses, the thinker who wants to ground his knowledge of some first truths must choose the side of freedom. The "proof" of freedom against determinism is that we decide to believe in freedom. Going indefinitely backwards in the chain of reasons for the certainty of knowledge would amount to an acceptance of necessitarianism, and necessitarianism is for Renouvier a version of infinitism.[126] Since we cannot go indefinitely backwards in the chain of reasons, we would have, on this hypothesis, to deem the laws of the phenomenal world as unknowable, and would have to renounce thus any knowledge of the world. This hypothesis has therefore to be rejected. The only alternative left is a decision in favour of freedom:

> The condition of conditions is Consciousness, considered in its supreme expression, that is in the most perfect conceivable reality of personality, of its attributes, and of its functions. In it only, in the idea that we reach by sublimizing our own powers, we understand what is understandable in being and in origin: God by the world and the world by God, intelligence by intelligence and the will by the will, since these are irreducible facts of consciousness. The idea of creation is attained through the idea of freedom, principle of beginning, and by the feeling of life and by love, principle of the ends. These are the intelligible forms of the first Relation.[127]

This doctrine, which Renouvier calls "personalism" or "idealism", implies that we give to the human person all the characteristics included in the theses of contingency in the order of the world. Freedom becomes a principle of practical instead of theoretical reason. But it would be a mistake to dwell upon the Kantian echoes of this thesis. "Freedom imposes itself as a theoretical principle, with all the consequences which are attached to its real presence in the world."[128] In other words, contingency, as a condition of consciousness, makes knowledge and experience possible.

Jaakko Hintikka and Heikki Kannisto have shown how Kant's rejection of the Principle of Plenitude in 1770 was a consequence of the extension of possibilities beyond the range of "possible experience" and how the limitation of the possible to "possible experience" in the first *Critique* amounted to a readmission of this Principle in the doctrine of transcendental idealism.[129] For Renouvier, on the contrary, Kant's subjection of possible experience to the category of causality amounts to an acceptance of determinism in transcendental guise.[130] In his approach, the range of possible experience is subjected to the existence of a free consciousness for which a number of possibles exist, which cannot be all realized. The doctrine of contingency, and with it the rejection of the Principle of Plenitude, becomes a condition of knowledge, if not *the* only condition of knowledge. We then move back from Kant to Leibniz: the world is but a collection of monads within a "new monadology", in which Leibniz's necessitarianism and substantialism have been replaced by the contingency of the monads and where the prees-

tablished harmony becomes the harmony of free rational souls.[131]

7. BOUTROUX ON THE CONTINGENCY OF THE LAWS OF NATURE

With Renouvier the "doctrine of contingency", as it was to be called, became firmly established among French philosophers[132]. Renouvier's version of the doctrine, however, implied that freedom could not be proved by phenomenal experience nor by psychological observation, and Lachelier seemed to advocate a similar position.[133] In Boutroux contingency is not only introduced into the world by the free act of consciousness but it is also an intimate property of being itself. Despite the important differences already noted, Renouvier's version can be called Kantian, whereas Boutroux's version can be called "Cartesian".

Boutroux's starting point is Descartes's thesis of the free creation of eternal truths by God, to which his Latin thesis was devoted.[134] The essences and eternal truths, which are for us necessary, are for God contingent creatures. Because of his perfection, God has excluded absolute contradictions. The range of eternal truths could be unrealized although the range of natural possibilities is realized. The Principle of Plenitude does not apply to God.[135]

In his main thesis, *De la contingence des lois de la nature* (1874), Boutroux transposes this property of the Cartesian God to the whole realm of being, so that even the "eternal truths" are contingent. Boutroux understands the contingency of natural laws both in the weak sense that the laws are changeable and in the strong sense of the Cartesian thesis of the free creation of eternal truths. Therefore he rejects the S4 modal principle according to which $\Box p \rightarrow \Box\Box p$ (where 'p' stands for a law of nature). For Boutroux the universe consists in several worlds, organized into what can be considered *prima facie* as a hierarchy going from the inferior to the superior level: the world of necessity, the world of causes, the world of notions, the mathematical world, the physical world, and finally the thinking world[136]. Each of these worlds seem to depend on the one which is inferior, so that "fatalistic necessity" seems to reign at each level, although when we move upwards, necessity seems

to vanish and contingency seems to appear. Boutroux then proceeds to show that this hierarchy is only apparent. There is no necessary dependence of the superior realms on the inferior ones, and even at the lowest degree of being, some contingency comes in:

> The beings of the given world are not in an absolute dependence with respect to their own nature. It is not unconceivable that, in the very bottom of their nature, they stay eternally similar to themselves and that the order of their manifestations leaves more or less room to contingency. This indetermination allows the grafting of the superior realms on the inferior ones, by putting those realms in the conditions required for the opening of a new germ.[137]

The only real instance of necessity in the world is the analytic necessity of the principle of identity, A = A, or the necessity of the syllogism. But it is purely formal. As soon as "being" or "fact" comes is, a "germ" of contingency is here:

> And first, can being be deduced from the possible, like the conclusion of a syllogism is deduced from the premisses? Does the possible contain everything required for the realization of being? ... Without doubt, in a sense, there is nothing more in being than what is possible, since everything that was possible was before being real. The possible is the very matter of being. But being reduced to the possible remains purely ideal; and to get the real being, one must allow a new element. In themselves indeed, all the possibles have an equal pretention to being, and there is no reason, in this sense, for a possible to be realized instead of any other. No fact is possible without its contrary being possible too. Now if the possible is left to itself, everything will float eternally between being and not being, and nothing will pass from power to act. Thus, far from being contained in the possible, being itself contains the possible and something more: the realization of a contrary rather than another one, the act in itself. Being is the synthesis of these two terms, and this synthesis is irreducible.[138]

Although experience shows us that one of two contrary possible events has to be realized, a number of possibles have to remain unrealized:

> The elements of being involve an indetermination which prevents us from seeing in the one (the possible) the cause of the other (the actual). It is not contrary to reason to admit that the possible will never be actualized or that the actual will exist of all eternity... Experience cannot induce us to attribute to this passage a factual necessity, since we see a number of things which have existed, and which therefore are possible in themselves and susceptible of being actualized, and that stay in a state of pure possibles, and of which we are not allowed to think that they can be realized again.[139]

We have to reject the doctrine according to which all the possible events are eternally actual, as well as the doctrine that every possible event has to be realized.[140] Boutroux's "doctrine of contingency", then, implies an implicit rejection of the Principle of Plenitude.

Boutroux applies the same reasoning at each stage of his hierarchy of being. Being is given to us through *genera* or laws, but these laws involve always some contingency:

> The facts are particular cases of general laws, the world is intelligible; and then science does not present to us ideal possibilities but reality itself in a systematic picture. But stability does not reign absolutely. At the very heart of its empire there appears, as a primitive original element, the action of a principle of absolute change, of creation properly so called; and it is impossible to establish a boundary between these two domains.[141]

It is legitimate, then, to say that the domain of natural laws is the domain of necessity. But this physical necessity does not imply determination: every actual law could logically have been otherwise. Necessitarianism does not imply determinism. Determinism is only a limit of scientific inquiry.[142]

Could we then reconcile necessity and freedom in the "Kantian" way?

> Would it be enough, to leave some room to freedom, without renouncing the necessity of natural laws, to consider the world given in our experience as a pure phenomenon, where being would not be involved to any degree?[143]

This conciliation would amount to saying that only the creation of our character is free, that freedom consists in only one act, and that every other event is determined by this initial choice:

> Strange doctrine, according to which the change of life, improvement or perversion, repentance, victories over oneself, fights between the good and the evil, would only be the necessary vicissitudes of a drama the outcome of which is already fixed! ...
>
> Such is not the consequence of the doctrine of contingency. It does not content itself with the opening, before freedom, of an infinite field, but empty of any object which it could attain. It undermines the postulate which renders the intervention of freedom in the course of phenomena inconceivable, the maxim according to which nothing is lost and nothing is created. It discovers, in the very details of the world, some marks of creation and of change. It lends itself to the conception of a freedom which would come down from the suprasensible regions to be melted to phenomena, and to lead them into unpredicted paths.[144]

Man is free as a real being, and his freedom is not phenomenal. We can conceive it in analogy with God's freedom:

> God is the creator of the essence and of the existence of beings. Moreover, it is through his own action, his incessant providence, that superior forms can use the inferior forms as instruments... By this doctrine of divine freedom, the contingency presented by the hierarchy of forms and of general laws of the world is explained... Human nature, the superior form of the creature, is not without analogy with the divine nature... The entire world seems to be a sketch of an imitation of the divine being, although it is a symbolic imitation, according to the essence of the finite world.[145]

There is not only a Cartesian inspiration in these passages. Boutroux's doctrine of contingency has strong affinities with the Ravaissonian picture of the emergence of the spiritual through the various stages of necessity. The end of the book is an invocation of habit, "this divine grace", which permits the transition from passive to active spontaneity.[146]

With Boutroux then, it seems that French contingentism has come back to its "pre-critical" origin. Later on, when French philosophers had to make reference to it, they would prefer to allude to Boutroux's version rather than to Renouvier's more "critical" one.[147]

8. BERGSON ON THE ILLUSION OF POSSIBILITY

The doctrine of contingency, or "contingentism", which French philosophers opposed to "necessitarianism" (whether or not they made a distinction between this doctrine and determinism - causal determinism), was the doctrine according to which *real* unactualized possibilities have an existence, so that the domain of the possible is neither coextensive with the domain of the actual nor the domain of the necessary. Renouvier and Boutroux identify contingentism in this sense with the reality of freedom. As Renouvier puts it:

> Phenomena which are the effect of freedom are represented, before the act, in ambiguous relations, and the consciousness of free will is precisely the consciousness of the *possibles* which this ambiguity creates and considered as such. They are real, not only in their given representation, but in *rerum natura*, equally realizable, so that the other one is excluded.[148]

But there are two different versions of this contingentism. The one - which is Ravaisson's, as we saw above in Section 3 - is compatible with the Principle of Plenitude, while the other - Boutroux's and Renouvier's - denies it.

When Bergson wrote his *Essai sur les données immédiates de la conscience* in 1888, he considered himself as a heir of the French tradition of contingentism, and he attempted to defend the existence of freedom against determinism (which he

identified with psychological determinism). But he did so in a very peculiar way, since his identification of contingency with the existence of duration (*durée*) implied a rejection of the notion of possibility itself and therefore of Renouvier's reasoning quoted above. A consequence of this was that he came back to Ravaisson's version.

According to Bergson, the supporter of determinism reasons on the supposition that, for a number of given antecedents, there corresponds only one possible act. The supporters of free will, on the contrary, suppose that the same series of causes could have led to several different acts, all equally possible. But both rely on the same notion of possibility, because they use the fictitious representation of action by using the model of a single line MO, at the point O, so that there will be the lines OX and OY, which describe the directions the action might take.[149] But this is, says Bergson, meaningless, because it projects the necessary unfolding of action within time and real duration (*durée réelle*) onto a spatial representation:

> Do not ask me whether the self, having gone through the path MO, and having decided for X, could or could not choose Y: I would answer that the question is meaningless, because there is no such line as MO, no point such as O, no path OX, no direction OY. To ask such a question is to admit the possibility of representing adequately time by space, and succession by simultaneity.[150]

Adversaries and defenders of free will both admit that any action is a kind of "mechanical oscillation" in space, although it is in fact a "dynamical progress where the self and the motives themselves are in a continuous process of becoming, like real living things."[151] The very notion of possibility is responsible for this misrepresentation. A free action is neither the product of deliberation which would result in the choice of a possible course of events nor the outcome of a narrowing of the range of possibilities by an actual series of causes:

> The self, free by its own light, feels free and declares itself to be free, but as soon as it tries to explain his own freedom, it can only be aware of itself through some kind of refraction through space.[152]

Freedom then is undefinable because it belongs to the very nature of action to be free, as soon as it is unfolded within duration. Every proof or disproof of freedom falls into the mirage of possibility.[153]

> Always the conviction persists that, even if (some state of the universe) had not been conceived before it happened, it *could* have been conceived, and that in this sense, it features, of all eternity, in the state of possibility, in some actual or virtual intelligence. If one examines further this illusion, it will be found that it belongs to the very essence of our understanding. Things and events happen at various determinate moments; the judgment which reports the apparition of the thing or of the event can only come after them; thus it is dated. But this date vanishes immediately, in virtue of the principle, anchored within our intelligence, that every truth is eternal. If the judgment is true now, it must, at least so it seems to us, always have been true. Even though it was not yet formulated, it had a right to be posed, before it was posed in fact. To every true assertion we thus attribute a retroactive effect; or rather we impress in it a retrograde motion. As if the judgment could have preexisted to the terms of which it is composed! As if these terms did not date from the apparition of the objects which they represent! As if the thing and the idea of the thing, its reality and its possibility, were not created at the same time when a really new form is at hand, invented by art or by nature.[154]

Our use of the concept of possibility is responsible for this "retrograde motion of the true" which projects the mirage of the present into the past. What is, then, possibility? It is only the illusion created by this psychological act of projection. Possibility, like not-being, nothingness, or disorder, belongs to what Bergson calls "negative concepts" which are fictions of the mind misunderstanding its own relation to duration.[155]

Possibility, according to Bergson, is not to be assimilated to reality itself, however. The rejection of the category of possibility does not imply that everything is real but rather that we have to find another opposition to account for the nature of change and duration. This opposition is, for Bergson, the op-

position of the "virtual" and the "actual". The best instance of this process of "actualization" of virtualities is biological evolution. But we should not understand the virtualities as limitations of possibilities. The actualization of virtualities creates its own lines of existence. In this sense the "virtual", unlike the possible, is real. It is not the shadow of a reality which we project onto the past but the very essence of time as a creation of differences.[156]

We can say, thus, that there is a necessary plenitude of being in the sense that being is the actualization of all the virtualities in time. It can be doubted whether Bergson admits the Principle of Plenitude, since he rejects the very category of possibility. But the necessary actualization of virtualities comes very near the expression of the Principle. We cannot say that all possibilities are realized in time, because there are no possibilities. But if it is the process of time which creates its own "virtualities", we can reverse the Great Chain of Being by conceiving time as an infinite creation instead of conceiving it as the actualization of preexistent possibilities:

> The ancients imagined a Soul of the World which would secure the continuity of existence of the material universe. Leaving aside the mythical aspect in this conception, I would say that the inorganic world is a series of repetitions or of quasi repetitions infinitely rapid which produce visible and predictable changes. I would compare them with the oscillations of the balance wheel of a clock coupled with the continuous unbending of a spring which links them to each other and to which they communicate their rythm; the former give a rythm to conscious beings and measure their duration. Thus the living being has an eternal duration; it has a duration because it elaborates continuously what is new and because there is no elaboration without a research, no research without some groping. Time is this very hesitation or it is nothing at all.[157]

Here Lovejoy's analysis seems to be justified: "there is more in the effect than was contained, except as an abstract unrealized potentiality, in the cause."[158] But if the potentiality is abstract and unrealized, it is because there is no such potentiality, no *real* possibility.

9. BRUNSCHWICG ON THE MODALITY OF JUDGMENT

Bergson's attempt to keep away from the traditional modal notions was congenial with his attempt to dismiss all the traditional philosophical concepts and to replace them by new ones, more suited to his general conception of duration and of *élan vital*. In a sense one can find a similar purpose in Brunschwicg's *La modalité du jugement* (1897), with respect to the modal notions only.

Brunschwicg's outlook may be described as idealistic in a strong sense:

> Knowledge constitutes a world which for us is the world. Beyond the knowledge there is nothing: something which would be beyond knowledge would by definition be the inaccessible, the indeterminable, that is, it would amount for us to nothingness.[159]

Therefore, a judgment which falls, according to the traditional criteria, within the category of modal judgments only expresses an act of the mind which considers its own activity, *Beurteilung* and not *Urteil*, says Brunschwicg, who quotes the German logicians.[160] Furthermore, the notions of possibility and necessity applied to judgments have no precise sense and there is no general criterion to determine when an assertion is possible or necessary.[161] In fact there is no "modality of judgment" in the usual sense and the "analytical" or "logical" investigations of modality make no sense, because the logical problem of modality implies the metaphysical problem of determining what is necessary, possible, or contingent.[162] Brunschwicg attempts to show this by reviewing the different ways by which philosophers dealt with modal notions, but his account is very imprecise, since he refuses at the outset to give any definition, even provisional, of the modal notions themselves.[163] In his systematic discussions, Brunschwicg means by "modality of judgment" modes of the act of judgments. He thinks that the question can be reduced to the question of the meanings of the verb *to be* in judgments. These are products of thought only.[164] Brunschwicg draws a distinction between three kinds of "affirmations of being". The first form of judgment is a "form of interiority", where the mind "interiorizes" the ideas

expressed by a subject and a predicate. The mind does not assert anything *about* anything: every idea is intimately tied to other ideas, and to an intelligible world: "Ideality is the only modality."[165] The second form of "modality" is exteriority: the mind asserts something about the external world. The third form is "mixed": being and thought are asserted together and the mind cannot settle which is which, it is hesitating, says Brunschwicg, quoting Bradley, between the *what* and the *that*.[166] Brunschwicg then attempts to find, among the various possible forms of judgments (theoretical as well as practical) a confirmation of his doctrine of "spiritual activity". The product of his inquiry is what one might call a typical sample of French idealistic and dialectical synthesis:

> Finally, spiritual activity consists in two opposite motions: an attempt at a fixation of being as it is first given in the form of a shock which is elusive since it is undeterminable, and at building an harmonious system with these incoherent shocks; on the other hand a fulfillment of the empty frameworks of intelligibility which manifest our internal power of thought, by adaptating the real to them progressively; to construct, in a word, the universe of external perception and of science.[167]

Intelligibility is but an ideal form. Therefore, says Brunschwicg, there is no real necessity, and there is no absolute reality at all, since there is only the mind. "Every human assertion is enclosed within the domain of the possible." We are left, then, with a possibility without reality, by which the mind can only set its own existence. Modality collapses as an "impossible realm beyond the mind".[168]

10. CONCLUSION

When French spiritualism is considered from the point of view of these celebrations of the almighty power of the Mind, it can be doubted whether there can be any room for an account of modal concepts. "The world, said Lagneau, is really for us at every instant what the spirit, blowing where it wishes to blow, wishes at that moment for it to be."[169]

We have tried to show, however, that this tradition owes its originality to the common "doctrine of contingency", which, despite their individual differences, French philosophers attempted to articulate. The contingentism of nineteenth century French philosophy can be characterized as the conjunction of the following theses:

1) Real (and not only logical) possibilities exist, as states in which the world might have been;
2) Contingency reigns at the very bottom of nature, either because there is an objective chance in the universe (Cournot), or because the laws of nature are contingent (Boutroux), or because it is a precondition of our knowledge of the world (Renouvier), or as a feature of duration (Bergson);
3) Freedom is real, either as the outcome of a rational belief, or as an objective fact of man's nature.

Philosophers disagreed on how the theory of freedom and contingency could be reconcilied with determinism, and the various versions of the doctrine are compatible with the adoption or the rejection of the Principle of Plenitude. Far from being a "unit idea", the Principle of Plenitude is a valuable tool for sorting out the differences between the philosophical theories which have been brought together under the common heading of spiritualism.[170]

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NOTES

1 *Rapport sur la philosophie en France au XIX ème siècle*, p. 258.

2 For instance, Comte's positivism had become an exaltation of the "Great Being" of humanity, Claude Bernard's determinism had opened the way for a new form of vitalism and for a theory of final causes, etc. *ibidem*, p. 85, p. 127 sq.

3 *Ibidem*, p. 253.

4 In several books, Renouvier himself gave a reconstruction of the history of the problem of freedom and determinism. See for instance, *Les dilemmes de la métaphysique pure*, ch. IV, and below.

5 *La modalité du jugement*, p. 39.

6 *The Great Chain of Being*, p. 316.

7 *Ibidem*, p. 317.

8 See in particular, J. Hintikka, 'Gaps in the Great Chain of Being: an exercise in the methodology of the history of ideas', in S. Knuuttila, *Reforging the Great Chain of Being*, pp. 1 - 17.

9 'Brief Account of Aristotle's Logic', in *The Philosophical Works of Thomas Reid*, volume II, p. 703. Reid's judgment is quoted by Rondelet, *Théorie logique des propositions modales*, p. 122.

10 Théodore Jouffroy translated Reid's works in 1836.

11 The main reason was that algebra is an incomplete language, unable to represent all the operations of thought. See S. Auroux, 'Idéologie et langue des calculs', who quotes Dégérando (*Des signes et de l'art de penser dans leurs rapports mutuels*, Paris, 1800), Maine de Biran, *Note sur les rapports de l'idéologie et des mathématiques*, Destutt de Tracy's *Logic* contains no analysis of modal concepts, and the very few books on the history of logic, such as Adolphe Franck's *Histoire de la logique*, hardly mention Aristotle's modal syllogistic. Lachelier's *Etudes sur le syllogisme* are not concerned by modal syllogistic and Brunschwicg's Latin thesis, *Qua ratione Aristoteles metaphysicam vim syllogismo inesse demonstraverit*, which serves as a complement of his *La modalité du jugement*, does not mention it either.

12 Antonin Rondelet, *De modalibus apud Aristotelem*, 1847, *Théorie logique des propositions modales*, 1861.

13 *Théorie logique des propositions modales*, pp. 40 - 43.

14 *Ibidem*, pp. 53 - 56.

15 *Ibidem*, p. 65. This classical problem is summarized by Kneale 1962, p. 91: "If modal words modify predicates, there is no need for a special theory of *modal* syllogisms. For these are only ordinary assertoric syllogisms of which the two premisses have particular predicates. On the other hand, if modal words modify the whole statements to which they are attached, there is no need for a special *syllogistic*...".

16 *Ibidem*, pp. 114 - 116, on the rules of conversion, and ch. IV on the various kinds of modal syllogisms (with one necessary premiss, another assertoric, p. 231, with two contingent premisses, p. 235, with one contingent and the other assertoric, pp. 250 - 251). Rondelet shows a good knowledge of the ancient and medieval commentators on these points (p. 233 on Theophrastus and Eudemus; p. 250 on Pacius).

17 *Ibidem*, p. 87.

18 *Ibidem*, p. 76.

19 *Ibidem*, p. 75.

20 *Ibidem*, p. 265 sq.

21 Ravaisson, *Rapport...*, p. 14 sq.

22 The proper English translation would be "willed bodily movement".

23 *Essai sur les fondements de la psychologie*, p. 267.

24 "Simple sensation is not a fact", *ibidem*, p. 36.

25 Léon Brunschwicg, *L'expérience humaine et la causalité physique*, p. 18. Maine de Biran, *Rapports des Sciences Naturelles avec la psychologie*, p. 163.

26 'Rêsponse à Staptfer', in H. Gouhier (ed.), *Oeuvres choisies de Maine de Biran*.

27 *Oeuvres de Maine de Biran*, 'Exposition de la doctrine philosophique de Leibniz', vol. XI, p. 478.

28 'Exposition de la doctrine philosophique de Leibniz', p. 475.

29 *Ibidem*, p. 489.

30 Maine de Biran, *De l'influence de l'habitude sur la faculté de penser*, in *Oeuvres de Maine de Biran*, tome II.

31 Félix Ravaisson, *De l'habitude* (1838).

32 *Ibidem*, p. 6.

33 *Ibidem*, p. 16.

34 *Ibidem*, p. 37.

35 *Ibidem*, pp. 38 - 39.

36 See below, Section 8.

37 *Essai sur la métaphysique d'Aristote*, 2 vol., 1837 - 1846.

38 See J. Baruzi's introduction to *De l'habitude*, Alcan 1927, pp. I - VI. Ravaisson attended Schelling's courses in 1835 - 1836 and left among his papers some notes from this courses. See also J. Beaufret, *Notes sur la philosophie de France au XIX ème siècle*, pp. 23 - 25.

39 'Métaphysique et morale', *Revue de métaphysique et de morale*, 1893, p. 20 quoted by Beaufret, *ibidem*, p. 22.

40 Lovejoy, *The Great Chain of Being*, p. 317.

41 Maine de Biran suspects the German philosophers who get lost in their "ontological excursions towards the absolute" (*Journal intime*, 1823, quoted by Beaufret, *op. cit.*, p. 14). In his *Considérations sur la marche des idées et des événements dans les temps modernes*, pp. 404 - 405, Cournot rejects strongly the "arid speculations" of the German metaphysicians of his century.

42 Ravaisson, *Rapport...*, p. 251. See also another characteristic passage of *De l'habitude*: "The whole sequence of beings is but the continuous progression of the successive powers of one single principle, which unfold each other in the hierarchy of the forms of life, which develop themselves in the inverse direction in the progress of habit. The inferior limit is necessity, Destiny, if one wants, but in the spontaneity of Nature; the superior limit, the freedom of the understanding. Habit goes down from the one to the other; it brings the contraries together and by bringing them together, it reveals its intimate essence and its necessary connexion." (p. 51).

43 Ravaisson, *Rapport*, *ibidem*. See the comments by Bergson in 'La vie et l'oeuvre de Ravaisson', *La pensée et le mouvant*, Paris 1934 (P.U.F. 1965, p. 275).

44 Ravaisson, *De l'habitude*, pp. 10, 12, 45. Bichat's *Recherches* were published in 1800.

45 Ravaisson, *ibidem*, pp. 13, 15, 41 - 43, p. 35 (on Bonnet). Maine de Biran quotes favorably Bonnet's *Palingénésie philosophique* and his concept of the chain of being in *Exposition de la doctrine philosophique de Leibniz*, *Oeuvres*, XI, p. 470 and p. 457.

46 Cournot, *Essai sur les fondements de nos connaissances et les caractères de la critique philosophique*, in *Oeuvres Complètes*, vol. 1, pp. 289 - 290.

47 Cournot, *Traité de l'enchaînement des idées fondamentales dans les sciences et dans l'histoire*, *Oeuvres Complètes*, vol. III, p. 215.

48 François Jacob, *La logique du vivant*, p. 123.

49 Cournot, *Traité...*, p. 216.

50 François Jacob, *La logique du vivant*, p. 125. On the history of biology and the great chain of being in the XIXth

century, see Bernard Balan, *L'ordre et le temps, l'anatomie comparée et l'histoire des vivants au XIX ème siècle.*

51 Ernest Renan, 'Lettre à Marcellin Berthelot', in *Dialogues et Fragments philosophiques*, pp. 177 - 178.

52 *Ibidem*, p. 178.

53 *Essai philosophique sur les probabilités*, pp. 2 - 3.

54 *Essai*, p. 2. The word "determinism" was not in common use, until Claude Bernard introduced it in his *Introduction à la médecine expérimentale* in 1865. As Bernard acknowledges, the usual term was "fatalism". Only in the second half of the XIXth century the word "determinism" has been employed, by opposition to freedom, indeterminism and contingentism. See Lalande, *Vocabulaire technique de la philosophie*, pp. 222 - 223, and below.

55 *Essai*, p. 4.

56 Hacking, *The emergence of probability*, pp. 132 - 133: "Laplace himself is equivocal. When he needs a word to refer to an unknown physical characteristic, he picks on "possibility" using it in the old *de re* sense... When he wants to emphasize the epistemological concept which finally captivated him, he uses "possibility" in what he makes clear is the *de dicto*, epistemological sense. But even in those introductory chapters, the *de dicto* equally possible cases are ones which we know to be equal because we think of them as being *de re* possible, that is equal in physical characteristics."

57 Comte, *Cours de philosophie positive*, vol. II, 27th lesson, p. 191.

58 *Ibidem*, p. 192, and the note pp. 192 - 193: "It is the notion of an evaluated probability which seems to me irrational and even sophistical: I take it as essentially unfit to any regulation of our conduct, if only in the chance games. It would lead us ordinarily, in practice, to reject as numerically unplausible events that are nevertheless to happen. The problem is brought up by the replacement of the suspension of judgment, which is necessary in so many occasions. The useful applications which seem to belong to it have always been indicated before by simple common sense, the insights of which this doctrine has falsified."

59 *Cours*, vol. II, 28th lesson, p. 205.

60 See Knuuttila, 1981, pp. vii - ix.

61 *Cours, loc. cit.*

62 *Cours*, vol. III, 40th lesson.

63 *Cours*, vol. III, 40th lesson, p. 244. See also vol. I, First lesson, p. 18.

64 *Cours*, III, pp. 241 - 242.

65 *Système de politique positive*, II, p. 30.

66 *Ibidem*, I, p. 588. See also, on the invariability of laws, *Discours sur l'esprit positif*, §16, and on their modifiability, *Système de politique positive*, I, p. 55: "If, for all phenomena, natural order is unmodifiable in its principal dispositions, for all, except those of the sky, its secondary dispositions are all the more modifiable that the effects are more complicated."

67 See below on Boutroux. In particular Comte's insistance on the constancy of natural laws for the more simple phenomena and on their "modifiability" for the more complex, will be one of the inspirations for Boutroux's philosophy. See L. Dauriac, *Contingence et rationalisme*, p. XVIII.

68 L. Dauriac, *Contingence et rationalisme*, pp. IX - XXI. For a comparison between Cournot's philosophy and the "school of contingency" (Ravaisson, Boutroux, Renouvier, Lachelier) see M. Capek, 'La causalité et la contingence dans la philosophie de Cournot', in *Etudes pour le centenaire de la mort de Cournot*, pp. 186 - 193.

69 The passages where Cournot identifies contingency and randomness are very scarce. See for instance, *Matérialisme, vitalisme, rationalisme*, p. 9.

70 *Exposition de la théorie des chances et des probabilités*, p. 57; *Essai sur les fondements de nos connaissances*, p. 38.

71 *Exposition...*, p. 58.

72 *Essai...*, pp. 37 - 38.

73 *Matérialisme, vitalisme, rationalisme*, p. 175; see also *Exposition...*, p. 55, *Essai*, p. 34 sq., *Traité de l'enchaînement des idées fondamentales dans les sciences et dans l'histoire*, p. 60 sq.

74 Cournot refers to Aquinas, to Boethius, and to Jean de la Placette. Boethius's passage referred to in *Essai*, p. 37, is based on the classical Aristotelian example of "coincidence" (a man digs a field and finds a treasure). See the editorial notes by B. Bru, in *Exposition*, p. 306. As J. Vuillemin (*Nécessité ou contingence*, p. 168, note 27) points out, Cournot's definition of randomness and chance differs from Aristotle's, since chance is for the former a coincidence between two independent series of

efficient causes, whereas it is a series of teleological causes for the latter. Cournot's standard examples are somewhat mixed in this respect (a man takes a trip by train, and the train has an accident; an illiterate person forms the word "amitié" with characters taken at random; the generals Desaix and Kleber happen to die on the same day, the one fighting at the North boarder, the other in the Alps, etc.). On Aristotle's treatment of coincidences and accidental happenings, see R. Sorabji, *Necessity, Cause, and Blame*, pp. 3 - 25, Duckworth, London 1980.

75 *Exposition*, p. 39. An almost identical passage can be found in the *Essai*, p. 40, which reproduces the content of the fourth chapter of the *Exposition*.

76 See for instance, Keynes, *A Treatise on Probability*, VIII,2; Darbon, *Le concept du hasard dans la philosophie de Cournot*, p. 38; J. Largeault, *Hasards, probabilités, inductions*, p. 53.

77 *Exposition*, p. 58; *Essai*, p. 40.

78 *Essai*, p. 39.

79 See for example, J. de la Harpe, *De l'ordre et du hasard, le réalisme critique d'A. Cournot*, p. 103; Keynes, *op. cit. ibidem*; and the references given by B. Bru in his edition of the *Exposition*, p. 309. For a statement of "Cournot's principle", see B. de Finetti, *Theory of Probability*, I, 1974, Wiley, p. 181, and Bru's note, p. 308.

80 See B. Bru's note, p. 308. J.C. Pariente, in his edition of the *Essai*, seems to favour a frequentist interpretation (p. 494).

81 *Essai*, p. 40.

82 *Essai*, p. 59.

83 *Essai*, p. 41, and J.C. Pariente's note, p. 493.

84 As Patrick Suppes puts it in his *Probabilistic Metaphysics*, Blackwell, Oxford 1984, p. 29.

85 "A being superior to man would only differ from him in this respect that he would err less often than he, or even, if one likes, would never err in the use of this datum of reason. He would not be bound to consider as independent some series which would have a real influence on each other, or, contrariwise, to imagine some links between really independent causes. He would make, more reliably, or even with a rigorous exactness, allowance for chance in the successive development of phenomena. He would be able to assign *a priori* the results of

the coincidence of independent causes in cases where we have to appeal to experience, because of the imperfection of our theories and scientific instruments... In a word, he would go further than we, and would give better applications to the theory of these mathematical ratios, all linked to the idea of chance..." (*Essai*, p. 36; *Exposition*, p. 60).

86 Cournot alludes to *a posteriori* probabilities in *Essai*, p. 41. The problem of the "probability of causes" and the "Bayesian theory" are dealt with in *Exposition*, ch. 8. Cournot is hard on Bayes' rule which, according to him, is "the source of a number of misinterpretations". He prefers to interpret all the results deduced from Bayes' rule "in an objective sense" and believes that in the ignorance of the "real" conditions of a random trial, it is unnecessary to try to compute them after a small number of observations. See A. Fagot, 'Analyse d'une procédure bayésienne', in *Médecine et probabilités*, pp. 66 - 68, for an analysis of Cournot's reaction to Bayesian probabilities.

87 J. Largeault, *Hasards, probabilités, inductions*, p. 52.

88 *Matérialisme, vitalisme, rationalisme*, p. 41.

89 On Renouvier, see below. Darbon (*op. cit.*, p. 27) for instance remarks that Cournot's doctrine "would be very clear if he accepted that some series of phenomena follow from an initial contingent act, or, in other terms, that there are absolute beginnings". Brunschwicg, on the contrary, fails to see any difference between Cournot's theory and determinism in the strict sense: "Cournot says *chance* where one has no right, rigorously speaking, to talk about anything else than *synchronism*. And then, withdrawing any anthropomorphic hidden motive, one is confronted to the following notion: every series of phenomena, obeying a law which indicates their necessary unfolding, brings inevitably at one determinate moment such and such an ending; if, then, the mind is perspicuous enough to be able to consider, not only each series in isolation, but the totality of the series, the result of their meeting at the envisaged moment will appear as a result, as necessarily and therefore as rationally as it can be the case with an arithmetical sum." (*L'experience humaine et la causalité physique*, pp. 515 - 516). See also M. Capek, 'La causalité et la contingence dans la pensée de Cournot', pp. 188 - 189.

90 *Exposition*, p. 60; *Essai*, p. 41; *Matérialisme...*, p. 175.

91 *Matérialisme...*, p. 177 sq. This point has been stressed

by Dubarle, 'De Laplace à Cournot, philosophie des probabilitiés et philosophie du hasard', pp. 114 - 118.

92 *Matérialisme*, p. 179.

93 In this sense, Cournot insists, like Comte, on the impossibility of a reduction of biological laws to physical laws and to chemical laws. See for instance, *Matérialisme*, p. 52.

94 *Matérialisme*, p. 207. Of course this insistance on discontinuities within the rational order has its counterpart in the admission of discontinuities within the biological order, which, as we saw earlier, cannot be thought on the model of a continuous chain. Cournot allows, however, the notion of a "code of nature" which he derives mostly from Geoffroy Saint Hilaire. See Y. Conry, 'Le "code de la nature", métaphore accidentelle ou signe théorique dans l'oeuvre de Cournot', in *Etudes pour le centenaire...*

95 On philosophical probability and Cournot's "probabilism", see *Exposition*, pp. 275 - 289; *Essai*, pp. 46 - 63 (passage quoted here).

96 See for instance, *Essai*, pp. 468 - 474, *Considérations*, pp. 207 - 218.

97 *Essai*, p. 109.

98 "The domain of psychology is our knowledge through sensation; it can only know the light which comes from the thought, and which is shed on sensation; the science of thought in itself, of light in its source, is metaphysics." (p. 219).

99 In a 'Note on Pascal's wager' ('Note sur le pari de Pascal', pp. 39 - 56), Lachelier shows that eternal life according to Pascal is a possibility but not a *real* possibility in Kant's sense. Pascal transposes the conditions of his wager from the realm of logical possibility to the realm of real possibility. See the comments by J. Beaufret, *Notes sur la philosophie française au XIX ème siècle*, pp. 40 - 41. Lachelier allows, however, a course of thought in which the thinker chooses to believe in God and where reason is superseded by faith. We shall notice a similar move in Renouvier's thought. Lack of space does not allow us a more complete examination of Lachelier's doctrines, although they were influential during the last quarter of the XIXth century in France.

100 Renouvier, *Essais de critique générale, Essai I, Traité de logique générale et de logique formelle*, volume 1, p. 26, pp. 59 - 60.

101 *Ibidem*, p. 89.

102 *Ibidem*, p. 34, and pp. 162 - 182. Renouvier gives arguments for "the law of number" (on which rests all his opposition to "infinism") based on the rejection of the actual infinite in mathematics and on the principle of contradiction (pp. 30 - 31, pp. 162 - 183). These arguments have been critized severely by Peirce (*Letter to William James*, April 1897, in *The New Elements of Mathematics*, vol. III, pp. 788 - 800). As Peirce says: "From every point of view of logic, then, Renouvier's razor will cut no ice." (p. 791). On the other hand Peirce manifests some sympathy for Renouvier's doctrine of contingency, which he himself calls "tychism", although he rejects Renouvier's "nominalism" (*Collected Papers*, VI, 505, 511).

103 Renouvier, *ibidem*, pp. 56 - 57.

104 *Ibidem*, p. 134.

105 *Ibidem*, pp. 115 - 123 (against Kant's categories).

106 *Ibidem*, p. 132, p. 138.

107 *Ibidem*, pp. 140 - 141.

108 *Premier Essai de critique générale, Traité de logique générale et de logique formelle*, volume 2, p. 108 (§XXXVIII, "Du nécessaire et du possible").

109 *Premier Essai*, vol. 2, p. 109.

110 *Premier Essai*, vol. 2, pp. 109 - 111.

111 *Ibidem*, p. 125.

112 *Ibidem*, p. 139.

113 *Ibidem*, p. 127.

114 *Ibidem*, p. 131.

115 *Ibidem*, pp. 134 - 135.

116 *Ibidem*, pp. 126 - 140; on some points, which we cannot examine here, Renouvier disagrees with Rondelet and with Aristotle.

117 *Ibidem*, p. 111.

118 *Ibidem*, p. 114.

119 *Ibidem*, pp. 116 - 121.

120 *Deuxième essai de critique générale, Psychologie rationnelle*, volume 2, p. 341.

121 *Premier Essai*, vol. 2, pp. 141 - 162; see also *Deuxième Essai, Psychologie rationnelle*, vol. 1, pp. 331 - 338.

122 *Deuxième essai de critique générale, Psychologie rationnelle*, vol. 2, p. 85.

123 *Ibidem*, p. 88.

124 *Ibidem*, pp. 89 - 90. This idea of the world as a "complex function of functions" is exploited by Renouvier in a very curious book which he published in 1876, *Uchronie*. This book is subtitled: "Utopia in history, an apocryphal sketch of the development of the European civilisation such as it never was, and such as it would have been." In this "utopian" history of the nine first centuries of our era, Renouvier puts into practice his doctrine of the reality and indeterminacy of the possibles. The events are considered such as they would have been if their agents had taken other decisions than those that they did in fact take, and an account is given of the possible consequences which would have followed. Every possible course of events, as it is explained in the appendix of the book, is susceptible of having taken a different line of possibility, and the lines of possibility themselves are subdivided in sublines, the realization of which is still in suspense. Renouvier developed this anti-Hegelian philosophy of history in his *Philosophie analytique de l'histoire*.

125 Renouvier gave as an appendix to his discussion of freedom in the *Second essai*, vol. 1, pp. 369 - 393, some fragments of his former fellow student in the Ecole Polytechnique, Jules Lequier, called *La recherche d'une première vérité*. Lequier committed suicide in 1862.

126 *Deuxième essai, psychologie rationnelle*, vol. 2, pp. 350 - 369; *Les dilemmes de la métaphysique pure*, pp. 272 - 275.

127 *Dilemmes*, p. 274.

128 *Ibidem*, p. 277.

129 J. Hintikka and H. Kannisto, 'Kant on the "Great Chain of Being" or the eventual realization of all possibilities, a comparative study', in Knuuttila 1981, pp. 287 - 308.

130 For instance, *Histoire et solution des problèmes métaphysiques*, p. 444.

131 *Dilemmes*, p. 278; *Histoire et solution...*, pp. 462 - 463; *La nouvelle monadologie*, pp. 1 - 44.

132 See for instance Lachelier, *Le fondement de l'induction*, *Oeuvres* I, p. 81: "It is not universal necessity but rather universal contingency which is the real definition of existence, the soul of nature and the last word of thought... Everything that is must be, and nevertheless could, at a pinch, fail to be: other possibles, according to Leibniz, had an equal pretention to existence, and were not realized, for they were not perfect

enough; things exist both because they aspire to it and because they deserve it."

133 See the remarks on Pascal's wager, already quoted in note 95, *supra*.

134 *De veritatibus aeternis apud cartesium, 1874*, French translation, Alcan 1927.

135 Hintikka and Kannisto, *op. cit.*, p. 306.

136 *De la contingence des lois de la nature*, p. 132.

137 *Ibidem*, p. 137.

138 *Ibidem*, pp. 15 - 16.

139 *Ibidem*, p. 18.

140 *Ibidem*, pp. 18 - 19.

141 *Ibidem*, p. 139.

142 *L'idée de loi naturelle*, p. 141.

143 *De la contingence...*, p. 146.

144 *Ibidem*, p. 147, p. 149. Here, as Beaufret comments (*op. cit.*, pp. 48 - 49), Lachelier seems to be Boutroux's target, although one can recognize Renouvier's or Kant's position. Renouvier, however dedicated one of his books (*Dilemmes...*) to Boutroux.

145 *De la contingence*, p. 157.

146 *Ibidem*, p. 170; see also Beaufret, *op. cit.*, pp. 51 - 56, who draws a comparison between Boutroux and Schelling. Boutroux's doctrine of the irreducibility of the superior to the inferior is also much indebted to Comte, and Ravaisson praised Comte's maxim as a touchstone of spiritualism in his *Rapport*.

147 For another statement of the "doctrine of contingency" inspired by Boutroux, see for instance Brochard, *De l'erreur*, 1879, where Brochard shows that the "metaphysical condition" of error is freedom and contingency, and where one finds a typical statement of the doctrine of contingency and its rejection of the Principle of Plenitude: "To say that error is a positive thing is to attribute some existence to not-being, some reality to the possible. These propositions are not self-contradictory. They mean that there does not exist any being which would be the only real being under the diversity of the appearances, but that there are distinct and multiple beings every one of which is a not-being compared to the others. They mean that everything that is really possible has not been realized." (p. 272) Contingentism was also an important element of Hamelin's idealism, although we cannot undertake to study it here.

Hamelin, following Renouvier, always paid a great attention to the problem of the future contingents, to which he devoted a number of his lectures. See *Sur le De fato*, which is still one of the best works on these issues from the point of view of the history of philosophy.

148 Renouvier, *Dilemmes*, pp. 268 - 269.

149 *Essai sur les données immédiates de la conscience*, pp. 131 - 137. We limit ourselves to the famous analyses of the *Essai*, although Bergson deals with the problem in various other works.

150 *Ibidem*, p. 135.

151 *Ibidem*, p. 137.

152 *Ibidem*, p. 137.

153 'Le possible et le rêel', in *La pensée et le mouvant*, pp. 99 - 116.

154 'La pensée et le mouvant', in *La pensée et le mouvant*, p. 14. Quoting this passage, J. Vuillemin remarks that by his substantial conception of duration, Bergson conflicts with all the Greek thinkers, although he justifies this conception by his rejection of the retrogradation of truth, which is precisely for Aristotle equivalent to a refusal to attribute a truth value to contingent futures (*Nécessité ou contingence*, p. 166, note 25).

155 'Le possible et le rêel', pp. 104 - 110.

156 This is one of the main themes of *L'évolution créatrice* (Paris, 1907). On the notion of virtuality as opposed to the notion of possibility, see the comments by G. Deleuze, *Le bergsonnisme*, pp. 96 - 115.

157 'Le possible et le rêel', p. 101.

158 Lovejoy, *The Great Chain of Being*, p. 317.

159 *La modalité du jugement*, p. 2.

160 *Ibidem*, p. 28.

161 *Ibidem*, pp. 27 - 40.

162 *Ibidem*, p. 40.

163 *Ibidem*, pp. 40 - 76.

164 *Ibidem*, p. 76.

165 *Ibidem*, p. 87.

166 *Ibidem*, p. 170.

167 *Ibidem*, p. 171.

168 *Ibidem*, p. 172. Brochard, reporting on the thesis, remarked justly that what is called by Brunschwicg "reality" is what has always been called "possibility" (p. 280).

169 Jules Lagneau, 'Cours sur Dieu', in *Célèbres leçons et fragments*, p. 354.

170 I would like to thank Anne Fagot, François Heidsieck, Jean Largeault and Jules Vuillemin for their helpful remarks and suggestions. I owe a special debt to Simo Knuuttila for his stimulating comments and patient discussion of this paper.

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