Pascal Engel

PLENITUDE AND CONTINGENCY: MODAL CONCEPTS IN NINETEENTH CENTURY FRENCH PHILOSOPHY

1. INTRODUCTION

At the end of his famous Rapport sur la philosophie en France au XIXème siècle, Félix Ravaissón 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 Male de Biran to Bergson and Brunschvicg. In his Rapport, Ravaissón 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, Ravaissón 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, Ravaissón 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-
cile the necessity of natural laws and of natural order with man's creative thinking about nature and man's freedom. 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. 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 Brunschvicg discusses the problem of modality in his doctoral thesis of 1897, *La modalité du jugement*. According to Brunschvicg, 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. 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". 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". 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". 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". 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. 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 matematization of logic. After 1850, when more attention was paid to the doctrine of the syllogism (for instance by Lachêlier), 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 Aristotel'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.  

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? 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. 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. 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. 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. 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 skeptic. 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.

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. A fuller appreciation of these issues will have to await Renouvier (see below Section 8).

3. MAINE DE BIRAN AND R AvaISSON 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 Ravaissin himself acknowledges in his Rapport, is Maine de Biran's doctrine of the self as a willing power. 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, in the very fact of the inward sense (sens intime), the evidence of which cannot be altered despite all the clouds accumulated by scepticism.

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. 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." 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-

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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

Ravaissant 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 Ravaissant 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 Ravaissant 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 Ravaissant's version of the Principle of Plenitude.

Ravaissant's analysis of habit contains of course many Aristotelian reminiscences, which he himself brought out in his Essai sur la métaphysique d'Aristote37, 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 ("Simet ipsum exinanitivut"), Ravaissant 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. Ravaissant 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", 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".40 But Ravaissant 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 Ravaissant 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 reconciled 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 Ravaissous 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 Ravaissous'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.\(^ {44}\) Ravaissous 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, Ravaissous 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.\textsuperscript{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".\textsuperscript{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".\textsuperscript{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.\textsuperscript{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 Loveloy. 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. \textit{Mens agitat molem... Spiritus intus alti.} Without this secund 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.\textsuperscript{51}

In spite of this \textit{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."\textsuperscript{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 \textit{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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 equipollence 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."\textsuperscript{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."\textsuperscript{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 "positivist 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 de-
voled 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 con-
tingency 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 pre-
tended that the bodies could be known in themselves, inde-
dependently 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 positivis-
tic philosophers, the only primitive basis of our concep-
tions.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. Ac-
cording 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 zo-
ologist Blainville, is "nothing but the direct and general con-
ception 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 taxonomies
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 the-
ological 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 Lap-
lace 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, en-
tirely untidy, which would not even show any law of uni-
versal 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 re-
lative 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 necessitarian, 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, 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 data of science into philosophy". Cournot himself seldom uses the word "contingency". His key concept is the concept of randomness (hasgard), which he takes as central for his analysis of probability. 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. Physical possibility, which Cournot sometimes calls de facto possibility, 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. 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 solidarity 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 them mutual independen
tee, 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.

Cournot's definition of randomness as a meeting of independent series of causes is by no means new. 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 real-
thities, 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 acceptations 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.

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 other. 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, 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 favorable 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." 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." 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. 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. 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. 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." 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 analysis 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.

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. 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. 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. 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 dependent on another series. 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 independent of each other, every fact is necessarily linked to the previous ones in its own series, and completely determined by its antecedents.

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. 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.

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. 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.

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. Scientific data can only show that these various orders can coexist and that their continuity is but a regulative ideal. 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.
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.  

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 Ravanillon'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) and by Lachelier in Psychologie et métaphysique. 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. 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 assumptions:

a) **phenomenism**: knowledge consists in nothing but representations or phenomena, and being is nothing but representation.

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.

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.

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.

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. 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.\textsuperscript{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."\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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: \( p \rightarrow \neg \neg p \). 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.\textsuperscript{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 Rordelet.

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.\textsuperscript{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-right 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.\textsuperscript{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-
A page of text is shown, which appears to be a continuation of a philosophical discussion. The text is dense and appears to involve complex ideas related to modal logic and metaphysics. The text is not fully legible due to the angle and quality of the image. However, some key points can be discerned:

- The text discusses the concept of modalities and their role in determining the possibility of certain events.
- It refers to Renan’s work, indicating a historical reference to a philosophical tradition.
- The text touches on the idea of freedom and its relationship with determinism.
- There is a mention of Renan’s “absolute” view, contrasting it with Renan’s own position.
- The discussion seems to be about the nature of events and their predictability.

Due to the quality of the image, a more detailed transcription or analysis cannot be provided.
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. 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 exist simultaneously 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 possibilities 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.

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 innumerable 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.

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.

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. 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.

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 possibilities 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 presc-

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 Lachélier seemed to advocate a similar position.133 In Boutroix contingency is not only introduced into the world by the free act of consciousness but it is also an innate property of being itself. Despite the important differences already noted, Renouvier's version can be called Kantian, whereas Boutroix's version can be called "Cartesian".

Boutroix'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), Boutroix transposes this property of the Cartesian God to the whole realm of being, so that even the "eternal truths" are contingent. Boutroix 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 $\Box p \rightarrow \Box p$ (where 'p' stands for a law of nature). For Boutroix 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. Boutoux 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 conceivable 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 premises? 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 possible have an equal pretention to being, and there is no reason, in this sense, for a possible to be realized instead of another. 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 Boutoux's "doctrine of contingency", then, implies an implicit rejection of the Principle of Plenitude.

Boutoux 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 determinism: 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 supersensible 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 Ravaissonnian 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 "contingentialism", 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 Ravaissonn'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 no-
tion 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
linesOX and OY, which describe the directions the action
might take. 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 pathOX, no directionOY. 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." 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 fea-
tures, of all eternity, in the state of possibility. In some ac-
tual or virtual intelligence. If one examines further this il-
lusion, 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 ap-
parition 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 asser-
tion we thus attribute a retroactive effect; or rather we
impress it in 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 pos-
sibility 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.

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 rhythm; the former give a rhythm 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.

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." But if the potentiality is abstract and unrealized, it is because there is no such potentiality, no real possibility.

9. BRUNSchWIG 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 étan vital. In a sense one can find a similar purpose in Brunschwig's La modalité du jugement (1897), with respect to the modal notions only.

Brunschwig'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.

Therefore, a judgment which fails, 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 Brunschwig, who quotes the German logicians. 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. 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. Brunschwig 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. In his systematic discussions, Brunschwig 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. Brunschwig 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." 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 Brunschwig, quoting Bradley, between the what and the that. Brunschwig 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 because 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 adapting the real to them progressively; to construct, in a word, the universe of external perception and of science.

Intelligibility is but an ideal form. Therefore, says Brunschwig, 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."

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."
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.

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 *Logique* 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. Lachêlier's *Études sur le syllogisme* are not concerned by modal syllogistic and Brunschvicg's Latin thesis, *Qua ratione Aristoteles metaphysicam vim syllogismos inesse demonstraverit*, which serves as a complement of his *La modalité du jugement*, does not mention it either.

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 premises 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 premise, another assertoric, p. 231, with two contingent premises, 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 Paulyus).
17 *Ibidem*, p. 87.
18 *Ibidem*, p. 76.
19 *Ibidem*, p. 75.
20 *Ibidem*, p. 265 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.
26 'Réponse à Staptfer', in H. Gouhier (ed.), *Oeuvres choisies de Maine de Biran*.
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 Ravaissot, *De l'habitude* (1838).
33 *Ibidem*, p. 16.
34 *Ibidem*, p. 37.
36 See below, Section 8.
37 *Essai sur la métaphysique d'Aristote*, 2 vol., 1837 - 1846.
38 See J. Baruzzi's introduction to *De l'habitude*, Alcan 1927, pp. I - VI. Ravaissot attended Schelling's courses in 1835 - 1836 and left among his papers some notes from these courses. See also J. Beaufret, *Notes sur la philosophie de France au XIXème siècle*, pp. 23 - 25.
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39 'Métaphysique et morale', Revue de métaphysique et de morale, 1893, p. 20 quoted by Beaujart, ibidem, p. 22.


41 Maine de Biran suspects the German philosophers who get lost in their "ontological excursions towards the absolute" (Journal intime, 1823, quoted by Beaujart, 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 "ardic speculations" of the German metaphysicians of his century.

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

44 Ravaission, De l'habitude, pp. 10, 12, 45. Bichat's Recerches were published in 1800.


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 XIXème 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 contingency. 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."


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 Knutttila, 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, I, 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 second dispositions are all the more modifiable that the effects are more complicated."
67 See below on Boutroux. In particular Comte’s insistence 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.
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.
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 Place. 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. Vulliemin (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, Nécessité, 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, 1, 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.
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).

88 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". Brunschvicg, 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'expérience 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 probabilités 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 insistence 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'œuvre de Cournot', in Études pour le centenaire...

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


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 XIXème 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 "infinitism") 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 criticized 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 "nominallism" (*Collected Papers*, VI, 505, 511).


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


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").


112 *Ibidem*, p. 139.

113 *Ibidem*, p. 127.

114 *Ibidem*, p. 131.


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


119 *Ibidem*, pp. 116 - 121.

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


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*.


127 Dilemmes, p. 274.


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 veritatis aeternis apud cartesium, 1874, French translation, Alcan 1927.
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 Hame- lin'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 réel', 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 réel', 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 bergsonisme, pp. 96 - 115.
159 La modalité du jugement, p. 2.
160 Ibidem, p. 28.
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 Brunschvicg "reality" is what has always been called "possibility" (p. 280).
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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