The French Theory of Speculation Part II: Necessity of the Future

Elie Ayache: From the Hume-event to the 1987-event, through Cantor and Badiou

From the first part, we recall that the thought of the absolute is needed if thought is to regain its speculative capability, and yet speculative metaphysics has to be rejected because the absolute shouldn't repose on an absolute necessary being.

In this respect, the young French philosopher Quentin Meillassoux seems to offer us the best of both worlds.[1] According to him, thought can regain its speculative capacity; it can reach outside the circle of what is given to thought, that is to say, it can reach outside itself in order to establish contact with beings that have preceded it; it can reach behind the phenomena to the very place where it was decided that the world "phenomenalizes" this way and not in another way and that it "feels" this way to be thinking and not another way, but where all of this could have been decided differently; yet this reach is not really *pointed* because the absolute it is reaching for, independent as it may be of the co-relational circle,[2] is nothing other than the *re-circling* of the co-relational circle. Not its re-circling for the sake of re-expressing its essential finitude and limitation (as if the limitation of thought were to become the absolute), but of expressing its *absolute contingency*. It is a fact, not a necessity, that the co-relational circle should be what it is. However, the fact that this is a fact, this second-order fact, is absolute (see Part I).

That the absolute reach of thought should not be pointed has the fortunate consequence that it will not thereby hit upon an identifiable metaphysical being. Yet Meillassoux tells us that absolute contingency has to be projected in the thing-in-itself. It is in the thing-in-itself, and not just relatively to thought, that we shall find no reason for the world to be the way it is, and only find the necessity of contingency.

My claim is that the contingency that is really necessary and toward which we ought to turn now is the future.

The passing of the possible

But let me first come back to Hume's problem. The necessity of contingency is inscribed in the thing-in-itself and this is the prize of the new brand of speculative thought, yet it remains to explain how the world and the laws of nature are so stable (Hume's problem). How can we safely expect that the balls on the billiard table will not suddenly display erratic behavior due to a sudden change of the laws of dynamics, that the stars and planets in the heavens will not suddenly change their course due to a sudden change in gravitational law, etc.? Both Hume and Kant, of whom Meillassoux says that they never doubted the intrinsic necessity of laws and of the uniformity of the physical world,[3] as well as the opposite camp of rationalist philosophers, have traditionally relied on a probabilistic, or *frequentist*, argument in order to ground the necessity of laws. The idea is that if this were not case and if the physical laws were contingent, then, given the infinitely many things that keep happening to the world, sooner or later our laws would fail

and erratic nonuniform behavior would show up. Short of a miracle, there is no way the world could display immutable uniformity in all its innumerable trials and this uniformity not be grounded in the necessity of laws.

In order that Meillassoux may engrave the necessity of contingency in the thing-in-itself yet come clear on the manifest uniformity of the physical world, he has to refute this "necessitarian probabilistic argument." From what I said in the first part of this article, regarding the unprocessability of history and the weakness of the whole metaphysical notion of possibility and possible worlds in front of history's capacity to change history and to constantly redefine the whole ranges of possibilities that are available to our thinking and to our perception of the future (this was even the very definition of history), it should be obvious what Meillassoux's rejoinder to the necessitarian probabilistic argument will be. Or rather, it should be obvious why my attention was attracted to Meillassoux's whole line of argument and to his promotion of *non-metaphysical speculation*, in the first place.[4]

Before I expose Meillassoux's argument proper, bear in mind that the word "speculation" makes me irresistibly think of the market, that my whole philosophical investigation of the market also takes place outside metaphysics, in what I have recognized to be the domain of writing or the domain of capacity, and that the market, in my philosophy, is also predicated on the *necessity of contingency*, that is to say, on the necessity that the pricing/writing thread (which proceeds by the saturation and surpassing of possibility through replication in-context and then by the change of the whole context through the trading capacity of the derivative we are thus able to price by replication) always resurface from possibility, back up to the unending surface of pricing.

As a matter of fact, Meillassoux's argument also consists in the surpassing and disparagement of possibility, as it is implied in our expectation that the laws of nature shall change. He remarks that our feeling that erratic behavior would have sooner or later showed up, had the laws of nature been contingent, is in fact based on the *totalizing* vision of the possible worlds that would be hiding behind the scenes, and waiting only for necessity to release its hold over the laws of nature to jump to the front stage and display their erratic and highly unusual patterns. Only if the alternatives to our present uniform world are enclosed in a surveyable totality are we able to *expect* them to show up sooner or later, absent a pronouncement on the necessity of their never showing up and given the sole, indifferent, passage of time.

From Cantor's set theory to Badiou's "Being and Event"

So the challenge facing Meillassoux is to block the availability of a totalizing vision of the Chaos and its possibilities. It is in mathematics, more specifically in Cantor's notion of the transfinite, that he will find the specific positive condition guaranteeing the manifest stability of the Chaos.

Indeed, Cantor's theorem establishes what Meillassoux calls the "unclosed pluralisation of the infinite quantities" (142): if a set is countable then the set composed of its parts is uncountable, so on and so forth in a hierarchy of infinite sets, whose transfinite cardinals Cantor calls "alephs." And the observation here is that this series of alephs cannot be totalized. This "quantity of all quantities" is not just too big to be grasped by thought, it simply doesn't *exist*, Meillassoux explains. (Here lies the ontological implication.) And now Meillassoux's observation is that, even though the thing-in-itself – this Chaos which has the necessity of contingency written on it – is thinkable (i.e. it exists and it is non contradictory, as Kant has willed and as Meillassoux has established by derivation), the hope is that its possibilities shall be un-totalized and that their un-totalization shall be the mathematically valid thing, that is to say, the *absolutely thinkable* thing.

But how could the thing-in-itself, on which Meillassoux has managed to impose the minimal "structure" of existence and non-contradiction only after an elaborate and almost exhausting working out of the concept of of contingency and the meaning of its necessity (see Part I), be even remotely sensitive to a theorem obtaining within the confines of mathematics?

It is here that Alain Badiou's ontology lends Meillassoux the support he needs. "One of Badiou's essential theses," writes Meillassoux, "is the one in which he affirms the ontological scope of Cantor's theorem, in order to unveil the mathematical thinkability of the un-totalization of being-*qua*-being" (141). There is no such thing as detached and intrinsic philosophical thinking, according to Badiou, a thinking that would independently ask and answer ontological questions. Philosophy just circulates among other domains, and takes advantage of historic events (such as Cantor's set theory, in the present case) to *condition* itself by their *logos*. "Philosophy," writes Badiou, "is not centred on ontology – which exists as a separate and exact discipline – rather, it *circulates* between this ontology (thus, mathematics), the modern theories of the subject and its own history."[5] But when it comes to being-*qua*-being (Badiou's word for ontology), "philosophy must designate the genealogy of the discourse on being – and the reflection on its possible essence – in Cantor, Gödel and Cohen."[6] It is mathematics that "writes that which, of being itself, is pronounceable in the field of a pure theory of the Multiple."[7]

In order, however, that Meillassoux's thesis be *fully speculative*,the un-totalization of possible worlds has to be *derived* from this world, or rather from its absolute, in the same fashion that the existence of the thing-in-itself and its non contradictory nature were derived from the necessity of its contingency. "No doubt this derivation can only be more complex than the one establishing consistency [i.e. existence and non-contradiction]," Meillassoux recognizes, "even more *adventurous*, because it consists, this time, in establishing a specific mathematical theorem as absolute condition of contingency, and not a general rule of the logos" (152-153, my emphasis). The word "adventurous" holds my attention because of its obvious risky connotation and the faint suggestion that the missing speculative piece might not be found in the world or in its past but *in its future*, in a sense that I will presently elaborate.

Derivatives world

My world will solely consist of the future. Since the future can only be human, I shall first consider men instead of things; not only as my first chronological stage but as my working condition: my world shall be the result of the doings of men.

And the first thing that men do, in my world, is to exchange goods (this means there is also money to be made in my world[8]). To be even more detached from any reminiscence of the past, they won't exchange just *any* goods, but derivative contracts, which offer precisely the advantage of not being *physical*.

Derivatives are not underlain by any concrete form of economy or any concrete entity (the way stocks are underlain by the value of the firm issuing them and by its business prospects; or bonds are underlain by the credit of the borrower, etc.), but only by the mathematical stochastic process of their underlying. Usually, the underlying process is the price process of a stock, or a bond, or a currency (expressed in another currency). As such, it totally screens off the real underlying economical factors, and replaces their possible states and possible worlds with the pure numerical possibilities of the price process.

How the totalization of possibilities in my world brings about events of such gravity as to constantly defeat the totalization and thereby make un-totalization a true *ontological absolutization* (as Meillassoux requires in his last speculative passage) is through the following sequence.

The mere sight (or thought) of a stochastic process governing the price of some underlying stock, or bond, etc., makes it irresistible to conceive of derivatives written on that underlying. Derivatives are mere mathematical functions, or payoffs, written on the underlying. Whoever holds a derivative contract is entitled to receiving a predetermined amount of cash $F(Path(S))$, called the payoff of the derivative, at some expiration date T, also called the maturity of the derivative. $Path(S)$ is the entire trajectory of the price process of the underlying stock S, from inception of the derivative contract until its maturity T. Derivative payoffs are generally path-dependent and they may even get extinguished (i.e. you get nothing) if the underlying crosses certain levels at certain times. Thus conceived, the derivative contract is only the formalization of a possibility. It is only a frivolous conception. To become an event (and thus deserve, as we shall see, the full status of being in my world), it needs the intervention of man, that is to say, *it needs to be traded*.

The event of trading the derivative

To trade the derivative, traders need to value it; they need to project *its* possibilities. To value it, they take advantage of the only thing they can do already, i.e. the only thing they can trade without projecting *its* possibilities (since it is itself the variable that defines the possibilities): the underlying price process. What they do is totalize all the possible paths that the underlying process may realize and observe that there exists a self-financing dynamic trading strategy, involving solely the underlying, that they may adapt to each possible path in such way that the payoff of the derivative is tracked as closely as possible by the proceeds of this strategy. This strategy is called the dynamic replication of the derivative. The present value of the derivative is then identified with the cost of putting in place its replication strategy. Since the strategy is self-financing, its cost is equal to its initial cost, and thus the value $V(S,t)$ of the derivative will depend only on the current underlying price and time, that is to say, on the time and place at which anyone can elect to value the derivative and to set up its replication strategy.

If the fate and destination of the derivative were to end here, there would be no event and no intervention concerning it. Its price would be equal to $V(S,t)$and any automat would be able to compute it and to trade it. Derivative traders and, ultimately, derivative markets wouldn't be needed. Another way to express this is to say that if derivatives prices were fated to be no more than deterministic functions of the underlying price and time, there would be no point in trading them and inventing them. Only if the derivative is traded *at variance* with its theoretical value $V(S,t)$ does it really exist and create an event. Only then can its *value* become its *price* and can the ability to value it become the capacity to trade it.

What can *vary* in $V(S,t)$ is not the logic of the dynamic replication strategy, or the different paths that the underlying may realize. This logic is implacable and the paths have been totalized. What varies is the probability distribution over the different paths. Assigning a different probability weighting to the possible (possibly discontinuous) paths indeed changes $V(S,t)$. Therefore, to trade the derivative at variance with its value $V(S,t)$ is to enact the fact that the probability distribution could have been different, which is to say that the probabilistic law of evolution of the underlying could have been different. This *is not* the same as the observation that the law *has* changed somewhere along the path. It is not the same because the derivative was intended for trading *from the start*. It is from the start that the invention of the derivative and its trading fate and destination commit us to the thought that the probabilistic law could, therefore should, be varied. The event of the derivative's trading (when it is decided by the subject) retroacts on the decision as to what the initial possibilities should have been in the first place.
The trading event is a *grave* event, in the sense of *bringing about the possibilities that will have led to it*. Therefore the possibilities were not totalized after all. What should have been totalized is not only the different paths of the underlying but all the different possible probability weightings they can be assigned. We have to totalize all the different probabilistic laws, that is to say, all the alternative worlds in which the underlying evolves according to some fixed probabilistic law.

In this much bigger state space, a path is no longer a path through the prices of the underlying alone. The path may now traverse alternative realizations of the probability distribution of the underlying (as we are now in effect saying – thanks to our "new" totalizing knowledge – that the probability distribution will *as a matter of fact* change along the path). The derivative price function $V(S,t)$ now effectively becomes stochastic as a whole. As different probability distributions result in different price functions $V(S,t)$ for the first-generation derivatives, we may index those price functions by the probability distribution they correspond to: $V_{Prob}(S,t)$, in order to express this stochastic dependence. We thus realize that the enlargement of the state space amounts to considering now as given states of the world not only the prices of the underlying but of its derivatives as well. This is simply acknowledging the fact that to trade the derivative is to let its price be given by the market and not by some algorithm (what Badiou calls the 'encyclopaedia of knowledge').

It remains to decide the fate of our "previous" knowledge, that is to say, of the dynamic replication strategy. What to make of it, now that we know that is was *fated* not to give the derivative's price? Was it a mistake? Notice that it was needed in order that the subject may first evaluate the derivative. Only by valuing it was he able to trade it and to create its market, i.e. its price. More importantly, dynamic replication cannot be a mistake because it has triggered the derivative's market. Indeed, the Black-Scholes-Merton model was the trigger of the explosion of derivatives markets. It qualifies as knowledge, and for this reason it can only produce a repetition, or a replica, but it cannot be dismissed from the ontology.

And now you can see why totalization cannot stop at totalizing the combined paths of underlying price and its probability distributions either (or the paths of different realizations of underlying *and* derivatives prices). Simply, new derivatives can be invented whose payoffs are now written as functions of the underlying price *and* of the price of the first-generation derivatives: derivatives on derivatives. They can be replicated and valued by dynamic strategies involving the underlying and the first-generation derivatives, based on the higher-order probability distribution that the frivolity of possibility has *already* beaten us to imposing on the combined paths of underlying and derivative price realizations. Yet they, too, are meant to be traded. And now, the higher-order probability distribution must be considered in all its alternative worlds *in its turn*. That is to say, the prices of the derivatives of derivatives must now be considered as given. So on and so forth.

The market as the process of history

Why not then simply consider that there are no laws and no knowledge and that all the prices of all the derivatives that have been or will have ever been are given by the market, from the start? Why not just assume this hyper-chaotic actual infinity? Because traders do not just *trade* derivatives indifferently. They trade them *inasmuch* as they replicate them and they replicate them inasmuch as they project probabilistic laws. Most derivatives markets were born, or anyway experienced their phenomenal growth, *after* the argument of replication of the corresponding derivatives by the existing stock of derivatives was established.[9] The market is the inseparable combination of possibility and trading, of knowledge (or anticipation) and the disruptive event – which is not an accident that happens to knowledge, but the very reason why we go to the market in the first place, as armed with our knowledge and anticipation as we may be.

Only because of possibility is the derivative first imagined; only thanks to possibility is its valuation envisaged; only through trading of the underlying (replication) is it subsequently carried out; yet the derivative is in the end (that is to say, from the start) intended for trading. We may thus say that the trading of derivatives wouldn't be possible without possibility (in the sense of cause); and that it wouldn't be possible (it would be unthinkable) without the event: what I have called the im-possibility, or the variance of possibility. As derivatives are only another word for the market, I may thus venture the following thought: To trade, to engage in a market, is to project possibilities but to only get events (of the serious kind that bring about their own possibilities). The market is the surest translator of possibilities into events. It is the very process of history.

Arche-exchange

The advent of derivatives is the advent of dynamic replication. It is dynamic replication that first introduces the trader to the derivative market, not the will to buy or sell derivatives. He gets implicated in the derivative *pricing process*.

Replicating the derivative, we may say, is the surest way of *implicating* the derivative trader. The exchange takes place when the pricing process of the derivative turns into a *price process*, that is to say, when the result of the procedure of knowledge and replication turns into a market given.

The trader doesn't produce the derivative price in the void; he produces it in the market and he expects the validation of his result in return. He expects his price to be accepted and assimilated by the market. However, the market has a strange way of assimilating things. *It assimilates a price only insofar as it gives the price*. To price something and be-in-the-market is to know that the price might as well have been given by the market. We may say that the pricing procedure gives the (right) derivative price *only insofar* as the price is imperceptibly given by the market. Your pricing/trading formula gives the price only insofar as the market gives it *in return*. The market is the place of this arche-exchange.

Soon, the trader finds himself using his pricing formula in reverse. (He *finds* himself, that is to say, he has first lost himself: he *forgets* what replication and even knowledge as a whole were designed for.) He no longer assumes a certain probability distribution in order to replicate the derivative and produce its price. He now takes the derivative price as given; from it, he reverse-engineers the probability distribution (calibration); and all he ends up computing is the replication strategy. At this point, the law, the fiction, the replication strategy, etc., all those pieces of knowledge are no longer strictly true or false. They are certainly not true because their theoretical result, the derivative price, is now given by the market; that is to say, it is anything. But they are certainly not false because they are what the trader needs in order to compute the replication strategy and because the replication cord is what attaches him now to both the price processes of underlying and derivative. Replication is his raison d'être: his right of being there. It localizes him in the market. No wonder market-makers are called "locals."

The absolute is in the inversion

The act of inverting the pricing formula or algorithm against the given market prices of derivatives, is where the absolute lies. According to Meillassoux, the absolute is what's independent of the co-relational circle. Mathematical statements about the world are the archetype of absolute truths in that they present thought with the opportunity to think things independently of thought, and even to think them in a world where there is no thought. They are what Meillassoux calls ex-centred thoughts: thoughts whose circle falls completely outside the co-relational circle.

In view of all this, the first reaction, concerning the market, should be to wonder how the thought of the absolute could ever concern it or be formed in it when it is all so definitely man-

made and so completely dependent on the existence of men and thought. Isn't the market the perfect embodiment of the co-relational circle? And what mathematical statement could ever hold of the market, when, by its own lights, no fixed law is supposed to be valid or to hold independently of the specific projection episode where the subject is seen to fictionalize the possibilities and the probabilistic law for the sole purpose of pricing and replicating the derivative all the more subjectively?

Yet if the pricing formula was no more than relative to the subjective decision to assume a certain totality of states of the world and to exercise the replication ability across them, then why would the trader, at the precise moment when he takes the derivative price as empirically given by the market and no longer forces it as result of his pricing formula, that is to say, at the precise moment when he recognizes and enacts the failure of the theory and of the knowledge and of the formula, why would he elect to keep the formula (only use it in reverse) instead of discarding it altogether? The Black-Scholes-Merton model, the paradigmatic derivative pricing model, is still widely used despite its simplicity, and almost always used in reverse. I even hold that it is widely used *because* people use it in reverse. The Black-Scholes-Merton model assumes the underlying price follows Brownian motion and traders everywhere invert it against the derivative market price in order to infer the coefficient of the Brownian diffusion, what they call "implied volatility." The current phrase is that this is the "market forecast of volatility." So a quick rejoinder to the subjectivist's objection might just be that the mathematical model is here absolutized, because the market – an entity everyone supposes is independent of the human beings composing it – is itself producing that volatility number.

I don't think the absolute should be decreed that way, or that a certain pricing model, or a certain instance of knowledge, should be absolutized under the pretext that it now acts as a sensor or probe of the "mind-independent reality known as the market." When you invert a certain model against the derivatives market, the answer will be a certain mathematical constant, or bunch of constants: the implied volatility in the BSM model, a larger collection of parameters in models of greater complexity, even the full extent of the probability distribution in non-parametric models. However, this shouldn't be absolutized the same way that the Young's modulus of a certain material is, for example, absolutized when the equations of elasticity theory are inverted against the results of stressing this material.

Of course, elasticity theory might be falsified one day, and then the statements and measurements of the succeeding theory would be absolutized in turn. It is not specific content that matters, or whether a given scientific theory is *de facto* verified or falsified; what matters, writes Meillassoux, is the *de jure* question concerning the status of a discourse that makes sense of the verification or refutation of such statements (156). However, the situation is quite different in the market in that we *know* that the probabilistic laws it assumes don't hold true by the very fact (or should I say, by the very right) of existence, and persistence, of the market.

There is no *physics* of the market; there is no extant data generating process (no matter whether you think it is stable, or changing, or even inscrutable); there is no physical law. Everybody knows it is just a figure of speech to speak of the "market forecast" of volatility. When I say the market is the technology of the future, I never meant it in the sense that the future would be here for us to absolutely read from the market!

What should be absolutized, I think, is the act of inverting the model *whatever the model may be*, not the mathematical content of the model. The primary reason why the dynamic derivative trader inverts a given model against the derivatives market is to compute the replication strategy, or the hedging ratio of the derivative. The numerical value he gets is inconsequential. It will indeed depend on the particular model. What is important and, to my mind, absolute, is *that* the trader will use that hedging ratio or ratios, whatever they may be, in order to execute, in the market, the hedging strategy (buying and selling amounts of the hedging instruments in proportions given by the ratios) and *that* this hedging or replicating strategy is what attaches him to both the price processes of underlying and derivative.

The implied volatility smile is the absolute truth

So the event in which lies, to my mind, the completed absolutization of the mathematics of derivative pricing is the 1987-event. It is precisely the event that has established the inversion. The market October crash established the inversion all the better that it consisted in breaking the validity of the given instance of the model (BSM at that time: through the emergence of the implied volatility smile) yet in maintaining the nerve of the model, i.e. dynamic replication, theoretically inconsistent as this state of affairs may be. The concept of implied volatility really came to existence in October 1987, and it did so in all the greater relief that each individual option now deserved its implied volatility (the smile).

My claim is that *we wouldn't be computing implied volatility if it wasn't for dynamic replication*. For, in computing implied volatility we are deliberately clinging to an invalid model (it is performatively invalidated by the very act of inverting BSM against the market option price, as this is the enactment that volatility will no longer be constant), and this, therefore, can only point to the reason why we are still holding on it: to the only thing that hasn't moved but still acts as the hinge of all this, to our attachment to the price processes by the replication strategy, in other words, it points to our implication.

Implied volatility is the *completed* result of dynamic replication, and by this I mean that dynamic replication was "returned" to the trader as the very concept of his implication.

Traditionally, derivatives experts have regarded the implied volatility smile as the failure of the BSM model and as the reason why it should be abandoned. Yet they are unable to explain why an entire technology has emerged, based on BSM, and why this technology was never disturbed by the news of the theoretical failure of the model. Contrary to sociology, or economics, or game theory, derivative pricing has produced an *industry* whose technological components are the wealth of computer programs and software companies dedicated to the pricing of derivatives and to their risk management, on the one hand, and the structuring and manufacturing of derivative instruments them-

selves conceived as technology as well as the organization of their exchange in specified marketplaces, on the other hand. In thinking BSM in terms of its failure, those experts in fact look at the market from outside, as if there was a truth to be discovered about options prices and the implied volatility smile was evidence that BSM isn't that truth. Whereas I hold that if indeed a truth must be revealed, even an absolute one, it is the truth of travelling the bridge of dynamic replication in one direction, from the market-maker's ability to replicate the derivative to pricing it, and of travelling it at once in the opposite direction, from the derivative's market price to implying volatility in order to *reassert* the dynamic replication. Now it certainly is the case that models more evolved than BSM might be needed in special technological circumstances, however, BSM already holds the truth in the sense that I have said, and so we might as well stop there. The volatility smile is not *evidence* of something other, of something different than we had expected, of something to be further chased and pursued in the market. It is the market. It is the absolute truth.

The market as the last absolute

Thus the market emerges both as our absolute and as our best guarantee against metaphysics, against necessary beings, and against the dogmatisms looming behind them. Recall that implication, itself a consequence of dynamic replication, was crucial in finding this absolute. Also, it is by following the thread of replication that possibility can be *saturated* in derivatives markets and that the trading of derivatives can emerge as a true historical process – as the series of events that have the quality, the seriousness and the gravity of *contingency*. The trading of derivatives – once it is shown that possibility can do nothing for them except replicate them – is consequently seen to *exceed* possibility and to induce the necessity of contingency in my world, or in other words, the necessity of the future.

By contrast, a derivatives market without replication is a Chaos without the structure that Meillassoux has shown to be the consequence of the necessity of contingency. Meillassoux's principle of factuality is missing from such a market, and speculation therein can only be of the dogmatic kind. Anyone who believes that un-replicable derivatives can durably trade and prosper in a market that endures by its own necessity has no other ground for such a belief than sheer dogmatic faith. It suffices that he loses the faith for his market to collapse and disappear. *This is exactly what happened in the CDO market.*

For this reason, the CDO market is the place of speculation of the worst kind, both in the financial and philosophical senses of the term, and I read the French President as condemning it specifically,[10] when he says he condemns speculation. Factual speculation – or speculation that is at once non dogmatic and non metaphysical, speculation such as Meillassoux professes – is to be retained, on the contrary.

While Meillassoux has enumerated all the reasons why a modern materialism should cling to factual speculation as the only viable absolute in our world (for fear that dogmatism or fideism corrupt and alienate our claim to reason), my exploration of the world of replicable derivatives and of their market has merely introduced us to an alternative *model world*. A world so well adapted to factual speculation and to the implications of the necessity of contingency as our sole absolute that it suffices that dogma and necessary being come back as pretenders to the absolute for the entire world to automatically disappear.

ENDNOTES

1. Cf. Quentin Meillassoux, *Après la Finitude: Essai sur la Nécessité de la Contingence* (Paris: Editions du Seuil, 2006). English translation, *After Finitude* (trans. R. Brassier) (London: Continuum, forthcoming 2008). All numbers between brackets, in my text, will refer to the pagination of Meillassoux's book in the French edition.
2. Co-relationism is the tendency in contemporary philosophy according to which the thing-in-itself cannot be known, even cannot be thought, therefore primacy should be given to the "relation between thought and its correlate over the metaphysical hypostatization or representationalist reification of either term of the relation" (Ray Brassier, "The Enigma of Realism: On Quentin Meillassoux's *After Finitude*", Collapse, Vol. II, (Oxford: Urbanomic, 2007): 15-54). A thing should always be conceived as a thing-for-us or a thing-for-thought. See part I.
3. Hume only denied that we should ever be able to prove this necessity rationally, i.e. he denied metaphysical speculation; and Kant gave it the transcendental turn consisting in conditioning it on the possibility of our representation, itself an undeniable fact. In other words, both Hume's and Kant's philosophical critiques were epistemological, not ontological.
4. As a matter of fact, it is a Web conference, which Meillassoux gave at *Ecole Normale Supérieure* about Hume's problem, that started me thinking about the similarity of our topics. When he said that the laws of logic in no way restrain the laws of nature from changing without reason all of a sudden, or without any higher-order law ruling this change (i.e., the very formulation of Hume's problem), Meillassoux characterized this phenomenon as "laws of nature that would change historically."
5. Cf. Alain Badiou, *Being and Event*, trans. Oliver Feltham (London and New York: Continuum, 2006), 3, originally published in French as *L'Être et l'évenement* (Paris: Editions du Seuil, 1988). Page numbers henceforth refer to the English edition.
6. Cf. Alain Badiou, *op. cit.*, 10.
7. Cf. Alain Badiou, *op. cit.*, 5
8. They don't exchange goods against other goods (*troc*), but they buy them and sell them against spending money or receiving money. They can sell goods they don't own (selling short) on the assumption that they borrow the goods and promise they will return it to its owner after covering their shorts. Buying and selling, in my world, should really be seen as bets on future price evolutions (hence the substitution of the category of exchange for the category of knowledge) not as intentions of holding something or getting rid of something.
9. I have in mind the FX barrier options markets or the variance derivatives markets. CDO markets are a counter-example: they have grown and exploded without even the hint of a replication strategy. But then, they never strictly qualified as derivatives in my dictionary, and it is not even sure that they still qualify as a "market." Indeed, their market seems to be quite extinguished nowadays. They no longer are the future, but the past.
10. See Part I. I am referring to Nicolas Sarkozy's speech to the US Congress, on November 7, 2007: "Those who are fond of America for the reason that it is, among other nations, the one which has best shown to the world the virtues of free enterprise expect it to be the first to expose the excesses and deviancies of a financial capitalism which, today, licenses speculation all too much. They expect America to commit itself resolutely to establishing the necessary rules and restraints. The America I love is the one that encourages entrepreneurs, not speculators."