

**The following is the first three sections of Alain Badiou's first theoretical book *Le Concept de modèle: introduction à une épistémologie matérialiste des mathématiques*. Paris: Maspero, 1968. p. 7-17 and is an original translation by Taylor Adkins [10/17/07].**

Editor's Advertisement:

The beginning of this text continues a talk given on April 29, 1968 by Alain Badiou within the framework of the "Course of philosophy for scientists" given to the National university.

This continuation should have been the subject of a second exposition on May 13, 1968. This day, it is known, the popular masses mobilized against the middle-class Gaullist dictatorship affirming in all the country their determination, and enticing the process that led to a confrontation of classes on a great scale, upsetting the political economic situation, and causing effects whose continuation will not be made to wait.

It is often imagined that in this storm, the intervention on the philosophical front had to pass to a second plan.

This very day, the somewhat "theoretical" accents of this text return to a surpassed economic situation. The struggle, also ideological, requires a totally different style of labor and a just and lucid political combativeness. It is no longer a question of aiming at a target without reaching it.

One will see in this text not only a document and a benchmark but also fortunately an interrupted patience.

But it can be another thing: keeping in mind of course the sense of the proportions as to the historical significance of the crisis, and more still as to quality the actors, one will remember that Lenin, shortly after the failure of 1905, granted for a moment an exceptional importance to the philosophical struggle against the empirio-criticists.

These are the apparent failures of practical politics, the erroneous diagnoses of "reflux," the discouragement of the petty bourgeois, always nourishing a race of liquidators, idealists and revisionists, who, failing to instantaneously change the world, even their "life," comfort themselves while undertaking simply "to change" Marxism-Leninism.

We do not maintain any illusion: the area of this work (doctrines of science) is not only very limited, and very indirect, but it can also be dangerous, if one mistakes the sense of its limitation. We believe it is nevertheless useful to recall which theoretical shift, in this field, in our opinion and from our point of view, can continue or consolidate the revival of "Dialectic Materialism."

Theory, December 1968

## 1. *Some preliminaries concerning ideology*

We suppose here the known [1] description of an ideological particular formation, distributing the discourse of science according to a presupposed difference: the difference of empirical reality and theoretical form.

It is pointed out that this difference orders an image of science, defined, approximately, as a formal representation of its given object. In this configuration, the element that holds dominance can be considered the effective presence of the object. In this case, one confirms the designer as empiricism; but predominance can also return to the anteriority of formal devices, with a mathematical code in which the present object is represented. One then indicates the configuration as a formalism.

It is quite clear that empiricism and formalism have here nothing but the function to be the terms of the couple that they form. What constitutes bourgeois epistemology is neither empiricism, nor formalism, but the whole of the notions by which one indicates, initially their difference, and afterwards their correlation.

This is exactly how logical positivism, the dominant epistemology in the Anglo-Saxon countries for more than twenty years, poses the problem of the unity of science.

In a canonical article of 1938 titled “The Logical Foundations of the Unity of Science,” Rudolf Carnap proceeds in the following way:

a) He explicitly poses the constitutive difference of which we are a part: “The first distinction that we have to make,” he writes, “is the distinction between formal science and empirical science.”

b) He tries to find rules of reduction which can make it possible to convert the terms of an empirical science into those of another. He thus shows that the terms of biology are convertible into terms of physics: physics is a “base of reduction” sufficient for biology. The use of the operators of reduction makes it possible for Carnap to affirm the unity of the *language* of science, in the sense that a “physicalist” language is the basis of a universal reduction for the empirical sciences.

c) He poses the problem of the relationship between this single language and the artificial languages of the first group of sciences, formal sciences. All of Carnap’s semantic analysis culminates in this question, why the course is constricted through the distinction of the two types of science.

Concepts like: empirical sciences, reducibility, analyses of sense etc, and their refined development, articulate the stages of the position and the deposition of the initial difference.

This articulation is elaborate, special. It is not, in its discursive existence, immediately reducible to the generality of the ideology of the given. For the remainder, Carnap explicitly opposes it to other *variants*, for example to that of Quine the logician, who erases from the start the distinction between truth in fact and logical truth. For Quine indeed, to admit variables in a logical calculation is also to make necessary the constants which are values of these variables. However, these constants are fixed only in so far as they have to be able to indicate concrete objects. Reciprocally, what “exists” empirically is nothing other

than what is assignable by a constant. Finally, as Quine writes, “being, means to be the value of a variable;” the empirical is a dimension of the formal, or the reverse.

Nevertheless, the oppositions between Carnap and Quine are interior to the same problems. Quine, indeed, defines the characteristic of his enterprise (the originality of its subject matter) by the justified negation of a difference that Carnap, for his part, undertakes to reduce. If Carnap’s discourse has as its essence this reduction, then it is important that in Quine only the justification of what is not reduces what is convenient to deny. The difference in question—of the “fact” and of logical forms—is the common engine of these two discourses.

Or more exactly: the instability of this difference, its perpetual rebirth represents the constraint of the lure of ideological discourses, and consequently deprived of any access to their own cause. These characteristics are in the principle of a discursive *agitation* which moves the primarily empty place ad infinitum when it should mark the impracticable Science of science.

It should here be understood that what separates two ideological discourses is not of comparable nature only with that which separates, for example, the science of ideology (epistemological cut), or a science of another. Because the rule of this separation is precisely also the ultimate form of the *unity* of the two discourses.

We will compare this with the musical variations of a theme: different, they are, but of a difference which brings them back one to the other as variations of the same topic. The (infinite) system of the differences between variations is the effect of the (unique) difference between the theme and what, not being it, is referred to it nevertheless: that is to say the field of the possible variations, variational space. Variation is only what comes in this space, with which variation merely justifies, because it is the place where, canceling itself in the unity, proves to be the differences. The ideological lure resides in that which one allots to the variations themselves as the causal capacity of the systematic unity of their differences, thus confusing the course of the system and the law of its *production*, since the latter is only the lack of *the theme* to which it should be attached.

It has been shown [2] that to speak about *the* science was an ideological symptom. To tell the truth, this also goes for speaking of ideology in the singular. Science and Ideology are plural. But their type of multiplicity is different: sciences form a discrete system of articulated differences; ideologies are a continuous combination of variations. We hold this assertion as a thesis. And let us propose the following *definition*:

Being given an ideological formation, characterized by a couple of terms, one calls the *variant* any system dependent on notions that make it possible to postpone the question of the unity of the terms of the couple, and, if required, to answer it.

I say to postpone, since the unity of the couple is always already the condition of the existence of the ideological discourse considered. Therefore, the question of that unity is a pure and simple repetition. Marx says—with little to add—: man poses only the problems that he can solve. Here it is necessary to say: one raises only the questions whose answer is the condition already given in the question itself. However, it is the rule of this repetition to be unperceived by its operator. And this invisibility precisely develops in the artifice of the variants. To take again the musical metaphor: these discourses are

variations on a theme *which is not given* (which appears among the variations, neither at the front, nor elsewhere), so that each variation can only be for itself an image, taken as its presence, of the theme itself. Hence, any variant dogmatizes over its own precedence.

The proliferation of methodologies, in these pseudo-sciences that are the so-called “social sciences,” reflects an infinite variational principle, as its ignorance.

## 2. *Theses that remain to be justified*

We call *notions* the units of ideological discourse: *concepts* those of scientific discourse; *categories*, of philosophical discourse.

Philosophy being essentially an ideological recovery of science, a category indicates “non-existent” objects where the work of the concept and notional repetition combine. For example, the Platonic category of the “ideal number” indicates, in a “non-existent” arrangement, concepts of theoretical arithmetic and hierarchical notions of a politico-moral origin; the Kantian categories of time and space owe a debt to the notions relating to the human faculties of the concepts of Newtonian physics; the Sartrean category of History combines Marxist concepts and metaphysico-moral notions, like that of temporality, or freedom, etc.

Saying this, we formulate the following theses:

Thesis 1: There exist two epistemological instances of the word “model.” One is a descriptive notion of scientific activity; the other a concept of mathematical logic.

Thesis 2: When the second instance is used as a support for the first, there is an ideological recovery of science i.e. a philosophical category, the category of the model.

Thesis 3: The actual task of philosophy is to distinguish, in the uses of the category of the model, a *subdued* use, which is only a variant, and a positive use, invested in the theory of the history of the sciences.

## 3. *On certain uses of models that are not in question here*

The first part of Thesis 1 is illustrated perfectly in a well known methodological text of Lévi-Strauss, at the end of his book *Structural Anthropology*. The couple empiricism/formalism is redressed there in the form of the opposition between the neutrality of the observation of facts and the active production of a model. In other words, science is thought here with respect to a real object, into which one must inquire (ethnography), and of an artificial object intended to reproduce, to imitate in the law of its effects, the real object (ethnology).

As an artificial object (Levi-Strauss says precisely: “constructed”), the model is controllable. One can “envisage how the model will react in the event of the modification of one of its elements.” This forecast, in which the theoretical transparency of the model resides, is bound to the fact that it is completely assembled (Lévi-Strauss would say readily: arranged [*bricolé*]), so that opacity is ascribable

to a reality that is absent. From this point of view, the model is not a practical transformation of reality, of its reality: it belongs to the register of pure invention, it is equipped with a formal “unreality.”

Thus characterized, models recover a broad class of objects. For the convenience of this exposition, I will divide this class into two groups: “abstract” models and material assemblages.

The first group comprises what one can call the scriptural objects, i.e. the properly theoretical or mathematical models. The question in fact is of a bundle of hypotheses, presumed complete relative to the studied field, and of which coherence, then the deductive development, are guaranteed by a generally mathematical coding.

A ground of election for these models is Cosmology. In his book *Cosmologies du xx siecle*, Jacques Merleau-Ponty studies systematically, without exceeding the simple chronicle of science, the models of the universe: in fact, the Whole never being susceptible to an experimental inscription, cosmology is bound to the idealism of the model. These deductive constructions were born from a convergence: there were on the one hand the theoretical developments of Relativity, on the other hand astronomical experimentation, culminating in the discovery of the red shift in the spectrum of nebulae. The model is a body of statements thanks to what this historical convergence has integrated in a single discourse. Naturally, these integrations are varied, and none through force of law. This is because models are not intra-scientific constructions. As the child begins to overcome, in the deception of the mirror, the horror of its divided body, the models reflect according to the premature ideal of the text unifying the instantaneous disorder of the production of knowledge. The model relates to securing the meta-theory of a conjuncture.

In the second group, one finds material assemblages, whose destination is triple:

1) To present in space, in a synthetic way, the non-spatial processes: graphs, diagrams etc.

For example, the information given by the national census allows the construction of a graph animated by five headings: administrations, households, goods and services, companies, and financial market. Mobile flows between the headings manifest the structure of the exchanges, graph theory making it possible to refine the speed and the dimension of the flows.

This is the occasion to indicate that generally, bourgeois political economy is achieved in the construction of models of expansion in equilibrium: there still, the model avoids the capitalist “disorder” not by the knowledge of its cause (either the Marxist science of social formations and intelligence of the class struggle), but by *the technical image* integrated in the interests of the middle-class. “Expansion,” presented as a progressive standard, is actually the inescapable effect of the structures where it is generated, with the asymptotic fall of its rate, profit. “Equilibrium” is the rule of security against the exacerbation of contradictions and the political risk of a rise to the extremes of the class struggle. The models of expansion in equilibrium, under the cover of thinking their object (the economy of the alleged “industrial society”), *objectify objectives of class*. A nation’s economy expanding in equilibrium represents the *motivation* satisfied with the state’s interventions in the name of “the general interest.” Portable image, the model externally unifies an economic policy, legitimates it, and disguises its cause as its rule.

It is of primary importance to show how econometric control and the increasing use of the alleged “mathematical models” in economy are one of the clearest forms of revisionism, that is to say of dividing Marxism down the middle even in its best constituted part, and an inevitable alignment according to the objectives of the middle-class.

2) Always in the second group, other models tend to carry out formal structures, i.e. to transfer the scriptural materiality to another “region” from the experimental inscription. The traditional book of Cundy and Rollett, *Mathematical Models*, exposes for example how to construct indeed, out of cardboard or wood, the five convex regular polyhedrons; how to manufacture a machine to trace the lemniscate of Bernoulli; but, just as easily, how to present a logical connector in the shape of a simple electrical circuit.

3) Lastly, a final class of models aims at imitating behaviors: it is the vast domain of automata.

Of course, the only question for the epistemologist will be that of denying the existence of these devices, none of which are similar, as in cosmology, their “regulative” importance in the history of a science, or, as in cybernetics or in economy, their techno-political importance.

We will restrict ourselves by noting that the model, technical moment or ideal figure, takes place, as well as possible, in the environment of scientific practice. It will be noted that as a transient adjunct, it is intended only for its own dismantling, and that the scientific process, far from fixing it, deconstructs it. Bachelard [3] shows well how the “planetary” model of Bohr delivered a useful image of the atom only at a time when microphysics stressed the obliteration of the orbits, the jamming of their layout, and finally the renouncement of the image itself to the benefit of a statistical model. Who could not know renouncing the model means renouncing the knowledge attributed to it: any stop on the model makes an epistemological obstacle. This is to say, to what point the model remains within the margins of the production of knowledge. But finally, at this point, it is not challengeable. It is not even a necessary question.

1. Louis Althusser, *Cours de philosophie scientifiques*.

2. For a series of examples, see: Michel Serres and Alain Badiou, *Modèle et Structure*, the text of a scholarly television broadcast (mainly the fifth part). In *Emissions de philosophie pour l'année scolaire 1967-8*, publication of l'Institut Pédagogique National.

3. Gaston Bachelard, *L'activité de la physique rationaliste*, chapter III, and especially part 7 of this chapter.