

Mario Bunge's Project

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This first issue of *Metascience* pays tribute to Mario Bunge on the occasion of his 100th birthday. This is not the first time, and certainly not the last, that thinkers pay tribute to Mario Bunge or that his work is the subject of a study, and rightly so, because the man is a humanist and the work is worthy heir to the Enlightenment. Mario Bunge has made significant contributions to a wide range of disciplines: physics, philosophy, sociology, psychology, cognitive sciences. This issue is also a way to make Bunge's thinking known to a French readership.

The Project of a Lifetime¹⁰

On New Year's Eve of 1937, at the age of 18, Mario Bunge resolved to study only serious intellectual subjects. He moves up a gear. He chooses to study physics at university and philosophy on his own. He is thus a physicist by training and a philosopher by vocation.

He had just spent a few relatively difficult years in high school. However, the last two years of primary school went well. The teachers of the progressive primary school Escuela Argentina Modelo were competent and motivating: "I flourished at that school, where I was put in charge of the classroom library, was elected senator of our miniature parliament, made some friends, and earned some medals. I looked forward to doing even better in high school. How utterly mistaken I turned out to be!"

The Colegio Nacional High School in Buenos Aires did not make a good impression on the young man. He had just left a progressive elementary school and enjoyed some freedom at home. The Colegio

¹⁰ We freely draw inspiration from Mario Bunge's autobiography, *Between Two Worlds*, 2016, to introduce you to this scholar of contemporary Enlightenment. All quotes in this section come from this autobiography.

offered only discipline, and merit was assessed only by exam scores. For Bunge, the school was more like a correctional facility than a place of learning. He rebelled. He published a short-lived *Magazine against the Professors*, one of whose professors, caricatured as a chimpanzee, made the headlines. He got away with a fourteen days' suspension: "Even I was surprised at my irreverence, because I had behaved well in my elementary schools."

The Colegio "frees" the student at the end of 1936 because he does not do well in most subjects: "I was a mediocre student because I was neither motivated nor fond of most of my teachers." In the same year, Bunge completed all subjects as a "free student" at the Colegio Nacional Sarmiento, with the exception of trigonometry, a subject in which he failed twice. He studied *Plane Trigonometry* by Isaac Todhunter, published in 1859, and then easily passed the trigonometry exam. He fell in love with mathematics, so he began to study *Calculus Made Easy* by Silvanus P. Thompson, published in 1910, a work which appealed to the notion of infinitesimal rather than the formal notion of limits. He received his high school diploma in 1937 and then enrolled in the Faculty of Physicomathematical Sciences at the National University of La Plata, an ideal place for a theoretical mind: "The young La Plata University was perhaps the most advanced in Latin America, because it assigned priority to the basic sciences [...] instead of being a factory for producing lawyers, physicians and bookish engineers [...]"

The year of resolution was a defining year: "That year of 1937, so critical for me, I read more than at any other time in my life." While reading Bertrand Russell's *Problems of Philosophy*, published in 1912, immediately convinced him that psychoanalysis was "pure fantasy", it took him ten years to realize that the "Hegelian verbiage" of dialectical materialism concealed two doctrines interesting in the embryonic state: epistemological realism and ontological materialism. He was impressed by the pre-Socratic, Spinoza and French Enlightenment philosophers. He also realizes that most philosophers have never practiced science. In order to do better than them, he studied physics for fourteen years and received his doctorate in 1952 from the University of La Plata. From 1943 to 1951, he worked under the direction of Guido Beck (1903-1988) on problems of nuclear and atomic physics. Bunge only considered himself a professional philosopher after two decades of philosophizing and only after he had published a few books and a dozen articles. The

demands Bunge had placed on himself made him go a long way in order to reach his goal: “to join philosophy with science.”

After returning from a postdoctoral stay with David Bohm in Sao Paulo in 1953, Bunge embarked on two long-term research projects: the study of the philosophy of physics and its foundations, and the study of categories of determination, including causality and chance. These projects occupied him from 1954 to 1970 and led to the publication of *Causality* and *Metascientific Queries*, both in 1959, then to that of *Foundations of Physics* and *Scientific Research*¹¹, both in 1967. The *Treatise on Basic Philosophy* was born a few years later, in 1974, the culmination of this search for a link between philosophy and science.

Reading Bunge

Mario Bunge's project has led him to write more than 150 books and 540 articles or chapters, including translations into several languages. The work covers all branches of philosophy, from ontology to ethics, including semantics, epistemology, methodology, praxeology and axiology, as well as a wide range of scientific disciplines, from physics to sociology, including chemistry, biology and psychology. Undoubtedly, Bunge's magnum opus is the *Treatise on Basic Philosophy*. The first volume of the *Treatise* was released in 1974, the last in 1989. There is a before and an after the *Treatise*.

There was also a before and an after *Foundations of Physics* and *Scientific Research*. The year is 1967. For Bunge, the situation is clear. In his preface to *Foundations of Physics*, he invites us to roll up our sleeves since in any case the analytical tools for metascientific research are available:

There is little excuse for failing to attempt it, as all physical theories teem with logical and semantical difficulties, and the great majority of them are in their infancy as regards logical organization and physical interpretation. The prime matter—supplied by the physicist—and the tools—wrought by the mathematician, the logician and the philosopher of science—are there.

This work of axiomatization of theories of physics was undertaken to combat operationalism and to remove from the field of physical theories any concept pertaining to psychology. For Bunge,

¹¹ *Scientific Research* was republished as *Philosophy of Science* in 1998.

without this double axiomatization, formal or logical, and factual or semantic, to discuss the interpretation of a theory is only tantamount to “hand-waving, when not magic-wand-waving.”

With *Scientific Research*, Bunge offers us a manual of “methodology”, each section of which ends with a set of 10 problems, which makes a total of 930 problems to be solved. Many of these problems could be the subject of a master or doctoral thesis, and some of them would occupy a lifelong researcher. Answers to problems are not provided! Fortunately, each chapter ends with a detailed and commented bibliography. Let us understand that this is a manual of methodology in the Bungean sense, and not a manual of method, that is to say a manual which explains the methods specific to a discipline, the methodology here being the study of methods, the normative branch of epistemology. *Scientific Research* is an opportunity not only to deal with the methodology of science, but also the methodology of philosophy and metascience. The successes of formal logic and semantics “suggest adopting a clear methodology, more precisely one that draws on that of science.” A significant part of the work is also devoted to the semantics of the factual sciences, a theory necessary for the dual axiomatization of *Foundations of Physics*.

There was also a before and an after *Causality* and *Metascientific Queries*. The year is 1959. Several of the main Bungean themes are present: the dichotomy between formal and factual sciences, the notion of factual semantics, the unity of science, the nature of scientific laws, the different meanings of “law”, the notion of levels of organization, that of novelty and emergence, the different categories of determination, including causality and randomness, the lawfulness principle], scientific explanation and prediction, as well as a conception of metascience. Make no mistake, *Causality* is not just about causality; the work is sharp and wide, as evidenced by the subtitle: *The Place of the Causal Principle in Modern Science*. In the same way that *Scientific Research* is the companion of *Foundations of Physics*, *Metascientific Queries* is that of *Causality*: one is the general framework in which the research of the second takes place. We will find similar couples a few years later with *Philosophy of Psychology* and *The Mind-Body Problem*, then *Finding Philosophy in Social Science* and *Social Science under Debate*.

After the publication of *Foundations of Physics* and *Scientific Research* in 1967—and a few other texts in the same year and the following years!—during a trip to Spain, while staying with his family in a rented house near Marbella, Bunge recalls in his autobiography that “in the backyard there was a green lawn without trees and surrounded by a high wall, so there was nothing to do but think. There I had the idea of expanding my work to encompass all the main branches of philosophy.” It is an understatement! Not only will Bunge publish a treatise on philosophy which will cover all branches of philosophy, but he will also give himself the task of studying the main scientific disciplines in the light of his philosophical theories.

The *Treatise* is therefore the culmination of some twenty-five years of research and reflection on the nature of science, but also on the nature of philosophical or metascientific research. But to fully appreciate both the *Treatise* and the entire work, one must keep in mind the fiction/reality dichotomy and the distinction between reflection and theorization. From the dichotomy between fiction and reality follows other dichotomies: between the formal and the factual, between a concept and the object to which it refers, between an attribute and the property it represents, etc. So the world should not be confused with our representation of it. This implies that there are no philosophical, metaphysical, logical or linguistic links between us and the world. But, instead of concluding that the world is then inaccessible, Bunge reflects on the situation, takes note of the success of science, adopts the same general postulates to which science subscribes, to finally develop general theories, a theorization that is not about the facts of the world but their scientific representation. To adopt the same general postulates as science is to say that Bunge does not problematize scientific facts in the same way as his fellow philosophers.

This state of mind is reflected in Bunge's work through the use of a singular expression: to take for granted. We find the expression everywhere in Bunge's work, and without an understanding of it, the expression will appear incomprehensible or trivial. Aren't we saying that nothing should be taken for granted? Isn't it peculiar to a philosopher to question everything? Bunge disagreed. He takes for granted an astonishing quantity of principles and postulates, the justification of which is found in a reflection on the world, on our relationship to it, and on the success of science. If science is

successful, the majority of assumptions taken for granted by scientists must be the right ones. Why problematize them if they are the source of such success? Why not adopt them and thus build general theories, ontologies, epistemologies, methodologies and semantics, on a common basis with science? That's what he did. It must be understood that these general postulates are for Bunge a springboard for the development of his philosophical or metascientific theories; they are not the culmination of metascientific research but its beginning.

At the end of this introduction, we have grouped together a few books and journal numbers devoted to the thought of Mario Bunge. For the French readership, we have also grouped books, articles and chapters of Mario Bunge as well as texts devoted to his thinking available in French. This is not the first attempt to introduce Mario Bunge into the French-speaking world, but it seems to remain hermetic to his thinking. Note the effort of Éditions Vigdor to have published in the '90s three translations by Adam Herman of Mario Bunge's text as well as to have produced two videos in which Mario Bunge explains his vision of quantum physics and democracy. Publishing Bunge in French is a militant gesture.

Contributions

The eight contributions to this issue come from authors of different backgrounds, as it should be for a thought that covers as broad as that of Mario Bunge. Like Bunge's project, the following contributions are neither part of the analytic movement nor the continental movement in philosophy. Note, however, that the contributors to this first issue of *Metascience* do not necessarily endorse Sopromet's research program or the journal's editorial policy. We can reasonably think that they were willing to participate in the issue in order to pay tribute to a thinker dear to them. Nevertheless, we distinguish three types of contribution: 1) studies on the Bunge system; 2) applications or extensions of Bungean thought; 3) reflections and testimonies.

1] Studies on Bunge's System

François Maurice, in his contribution "**Metascience: for a Scientific General Discourse**", defends a non-philosophical

interpretation of Bunge's work by revisiting the problem of the nature of philosophy, including the way it has to problematize reality and the knowledge of it, as well as that of the nature of human reflection, which does not present itself as the prerogative of philosophy, but as "the most fairly distributed thing in the world." In order to take into account the particular nature of philosophy and the universal nature of reflection, Maurice advances the notion of general discourse. Philosophy then appears as a general discourse among others. Since Mario Bunge neither problematizes reality nor knowledge of it in the same way as philosophers, he cannot be considered as a philosopher, but rather as a metascientific. By separating the faculty of reflection from the philosophical discourse, it is then possible to envisage the development of a general scientific discourse, a metascience, the objects of study of which are the products of science, i.e. concepts, propositions and scientific theories, and whose main task is the development of metascientific theories, as found in Mario Bunge's *Treatise on Basic Philosophy*.

2] Applications or Extensions of Bungean Thought

Luis Marone, in his contribution "**On the Kinds of Problems Tackled by Science, Technology, and Professions: Building Foundations of Science Policy**", proposes to distinguish the components of the system of human knowledge, namely the science, technology and professions, based on an analysis of the types of problems encountered in each of them. He puts forward a typology of problems and solutions to these problems where the notions of direct problems and inverse problems, dear to Bunge, play an essential role. From this typology, it is then possible to classify activities within science, technology or professions. This understanding of the distinct nature of the activities of the system of human knowledge is essential for the formulation of a science policy for integral development.

Eduardo Scarano, in his contribution "**The Inverse Approach to Technologies**", offers us a study of the components of technology, especially the non-scientific components, through an approach complementary to that of Bunge. Scarano's analyses reveal no less than a dozen components of the technology. Although aware of the existence of non-scientific components of technology, Bunge was primarily interested in the link between science and technology. The study of the components of the technology, what Scarano calls the

inverse approach (not to be confused with an inverse problem), allows a tidy classification of technologies. In fact, Scarano postulates the existence of a continuum of technologies that “at one extreme, come close to being almost confused with science and, at the other extreme, tenuously fulfill some requirement of science.”

Martín Orensanz, in his contribution “**A Critique of Meillassoux’s Reflections on Mathematics from the Perspective of Bunge’s Philosophy**”, criticizes the main thesis defended by Meillassoux in his book *After Finitude* in light of Bunge’s philosophy of mathematics: “all those aspects of the object that can be formulated in mathematical terms can be meaningfully conceived as properties of the object in itself”, or as Orensanz reformulates it, “any property which can be mathematized can be construed as a primary quality”. Orensanz’s critique has as its starting point an ambiguity in Meillassoux’s conception of the nature of mathematics and that of objects in themselves and their primary qualities, which compromises Meillassoux’s very thesis. By appealing to the Bungean dichotomy between the factual and the formal, Orensanz refutes the Meillassian thesis while betting that Meillassoux’s philosophy can hold up if it benefited from Bunge’s mathematical philosophy.

Ricardo Gomez’s contribution, “**Mario Bunge: Epistemology is here to Stay**”, is a defense of the Enlightenment, of modernity, of epistemology, and of Mario Bunge, contemporary representative of modernity, and a destructive criticism of Latour’s notion of non-modernity. Two brief comments by Gómez on Latour’s conceptions say it all: “Enough is enough”, and a little further, “Enough, again”. Latour builds a straw man and then tells us that we have never been this straw man. It introduces ill-defined and ad hoc concepts, unrelated to scientific disciplines, such as “hybrids”, “networks”, “hybridization”, “purification”: for Gómez, it is a “creative paraphernalia of an alternative version of modernity and what it is to be modern.” Before even tackling this notion of non-modernity, Gómez gives us a taste of Latour’s argumentative method by criticizing a text by Latour on special relativity, “A Relativistic Account of Einstein’s Relativity”, whose conclusion is unequivocal: “All these statements show that Latour has not the slightest idea of what Einstein holds.”

3] Reflections and Testimonies

Mario Bunge, in his contribution “**Criticism: Destructive and Constructive**”, invites us to consider constructive criticism as more important than destructive criticism, although the latter proves necessary. Bunge calls upon his experience as a critic of sterile philosophical schools to deliver the message “the most effective criticism is the one accompanied by a suitable substitute”, and for Bunge a solution often takes the form of a philosophical theory.

These and other contributions, published in various languages, including English and Spanish, demonstrate the potential of a research program inspired by Mario Bunge's project. This project is part of the humanist and scientific tradition of the first Enlightenment in ancient Greece and the second Enlightenment in Europe. The researcher, unlike followers of the contemporary Counter-Enlightenment sects, does not conclude in the face of a difficult and complex problem that there is no solution or that all solutions are equal. No, he lifts up his sleeves, he works hard, he thinks, he analyzes, he synthesizes, he advances solutions, he tests them, he offers them for examination, in short, he confronts reality, at the risk of undermining his own beliefs.

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