

Mario Bunge: Epistemology is Here to Stay

Ricardo J. Gómez¹

RÉSUMÉ — Cette étude défend l'idée que, contrairement à l'opinion de Latour sur la nécessité de laisser de côté l'épistémologie pour traiter de tout ce qui a de la valeur pour la science, Mario Bunge a systématiquement construit une épistémologie détaillée et approfondie. La stratégie argumentative consistera à montrer (a) qu'il est faux que nous n'avons jamais été modernes (b) que l'épistémologie est là pour de bon et (c) que Mario Bunge soutient un réalisme scientifique fort, une version du matérialisme, du systémisme et de l'émergentisme, comportant une dimension morale (il existe des valeurs objectives comme la vérité, la paix et la justice qui méritent d'être étudiées). Ensuite, le réalisme de Bunge rejette la neutralité axiologique rendant les scientifiques responsables de leurs actions. Bunge a toujours été moderne et continue à enrichir ses propres positions.

ABSTRACT — The main claim of this study is that, contrary to Latour's view about the need to leave aside epistemology to deal with anything valuable about science, Mario Bunge has consistently built up a detailed and thorough epistemology. The argumentative strategy will be to show that (a) it is not true that we have never been modern, (b) epistemology is here to stay, and (c) Mario Bunge endorses a strong scientific realism, a brand of materialism, systemism and emergentism, including a moral dimension (there are objective

¹ Ricardo Gómez, Professor of Mathematics and Physics as well as of Philosophy (University of Buenos Aires). He is a Master in History of Philosophy of Science and Ph.D. in Philosophy (Indiana University). He is the author of seven books and more than seventy articles published in Academic Journals (Argentina, Brazil, Mexico, Ecuador, USA and Europe). He has been awarded with the Konex Platinum Prize in Logic and Philosophy of Science (2016). He is currently retired as an Emeritus Professor from the Department of Philosophy, California State University Los Angeles, United States.

values like, truth, peace and justice that deserve to be respected). Then, Bunge's realism rejects axiological neutrality making scientists responsible for their actions. Bunge has always been modern and keeps enriching his own views.

Contents

- 1 Equivocity of the Term "Modernity"
- 2 The Death Sentence for Epistemology
 - 2.1 Latour on Special Relativity
- 3 Mario Bunge: The Counter-Figure to "We Have Never Been Modern"
 - 3.1 Bungean Realism
 - 3.2 Bungean Realism and Quantum Mechanics
 - 3.3 Axiological and Practical Realism
 - 3.4 A Short Remark About Technology and Human Responsibility
- 4 Bungean Moral Realism: The Hard-Core of Epistemological Progress
- 5 Moral Realism as a Critical Foundation of the Theory of Rational Choice

1 EQUIVOCITY OF THE TERM "MODERNITY"

Latour recognizes that "with the adjective modern a new regime is designated, an acceleration, a rupture, a revolution of time"². But it always involves a contrast with an archaic and stable past. There is implicit a double asymmetry: an irregular break, and the presence of winners and losers. On the other hand, there are two types of practice. In one of them, hybrids are created, such as nature and culture. The second practice is "purification" where two ontological zones are created, that of humans and that of non-humans.

It is vital to recognize that, according to Latour, "while we consider these two practices separately, we are truly modern"³, but if we look at the purification and hybridization project "we are no longer totally modern"⁴.

The book has to try to show that as we always did the second, we have never been modern. With an additional paradox, the less hybrids are

² Latour, *Nunca fuimos modernos*, 2007 [1997], p. 27.

³ *Ibid.*, p. 28.

⁴ *Ibid.*

thought of, the more possible science becomes (but, as conceived by those who emphasize the separation-purification work).

With an addition: “nobody is really modern if he does not accept to distance God as much from the game of the laws of nature as those of the republic”⁵. The result of all this is that science corresponds to the representation of non-human, forbidden any appeal to politics, while the latter corresponds to the representation of citizens, but without relating them to what is produced by science⁶.

If we ask, with Latour, what there is, the answer is “hybrids” that through time are drawing skeins of politics, economics, technics, law, religion that multiply themselves.

Given a hybrid (a machine, an ozone hole, etc.), it is required to follow its march through history; the notion of “net” is Ariadne’s thread of all these mixed stories. The modern thinkers “break” the net into three parts, nature, politic and speeches. If this partition is not done, there is no separation between facts and their social context, but their inclusion-imbrication in each of the “moments” of the net.

Latour also claims that against usual characterizations, “modernity has nothing to do with the invention of humanism, the irruption of the sciences, the laicization of society or the mechanization of the world”⁷.

We, for our part, believe that modernity has a lot to do with all of these, but that is not necessarily all. For example, Richard Westfall, a specialist in the history of modern science states that the move to modernity (in science, of course) is a step to scientific realism⁸. What is also a wild exaggeration is to deny the presence in modernity of humanism, mechanization, etc.

But there is more: “when we see them, i.e. the revolutions, in ‘network’ ... there is no way to build a history of radical rupture ... of misfortunes

⁵ Ibid., p. 59.

⁶ This is a sort of a fairy tale about modernity. In the real world, it happened something totally different. On the one hand, distinguished scientists (Einstein, Darwin) and philosophers of science (Neurath, Putnam, Kitcher) acknowledge that ethical and political values might influence scientific activity. On the other hand, politicians have consistently used science for legitimating their decisions.

⁷ Latour, *Nunca fuimos modernos*, 2007 [1997], p. 62.

⁸ Westfall, *La construcción de la ciencia moderna*, 1980 [1977].

or irreversible sayings..."⁹. In other words, the modern concept of revolution is abandoned, in the scientific, political, etc. domains.

And, with it, all modern versions of progress disappear, with radical changes and progress towards the future. But, with the distorting addition introduced by Latour that "everything that happens is eliminated forever so that the moderns have the sensation of an irreversible arrow of time, of a capitalization, of a progress"¹⁰.

All this creative paraphernalia of an alternative version of modernity and what it is to be modern, culminates in claiming that "... what we are incapable of doing, now we know it, is really a revolution, be it in science, in technique, in politics, in philosophy"¹¹. This is, perhaps, the most monumental counterfactual ever perpetrated by any intellectual.

2 THE DEATH SENTENCE FOR EPISTEMOLOGY

One is tempted to add that everything said by Latour is opposed to what we have learnt in the history of science courses, especially in courses of epistemology on positivism, popperianism, Tom Kuhn, Lakatos, and so on.

What happens is precisely that Latour proposes that "it is necessary to return to anthropology capable of studying science overcoming the limits of the sociology of knowledge and, above all, of epistemology"¹². Observe, that by decree, Latour, has ruled out not only epistemology but the entire sociology of science, one of which, at one time, he himself defended.

The great problem that Latour faces is that the great scientists, from Aristotle to Einstein, visualize the development of sciences in terms much closer to those of the epistemology and philosophy of science than to Latour's renewed anthropology that when dealing with famous cases in the history of science commits elementary interpretative mistakes. We will return to this when referring to the answer that Bunge would give to Latour's interpretation of special relativity.

⁹ Latour, *Nunca fuimos modernos*, 2007 [1997], p. 79.

¹⁰ *Ibid.*, p. 104.

¹¹ *Ibid.*, p. 105.

¹² *Ibid.*, p. 138.

As it could not be otherwise, Latour explicitly reiterates that “we continue to believe in the sciences, but instead of taking them in their objectivity, their truth, their extraterritoriality, qualities that they never had but by the arbitrary recovery of epistemology...”¹³. That is to say that from Aristotle to Einstein, passing through the modern philosophers, all, while explicitly handling concepts such as truth, explanation, objectivity, etc., were wrong and they told us a story that we must replace by the hodgepodge of hybrids, networks, etc.

However, in that case, they cannot give an acceptable account of what the scientists are doing anytime they are attempting to reach the truth, to explain successfully, to predict with increasing accuracy, etc.

But the worst thing, from the perspective not only of the philosophy of science, but of the human pretension to understand, is that Latour’s version does not tell us everything or the most crucial thing to understand what scientists do in their practice leading to advance hypotheses and decide whether to accept them without reducing that process to negotiations decided by just power. That explains Latour’s failure for explaining paradigmatic scientific examples.

2.1 LATOUR ON SPECIAL RELATIVITY

By way of example let us consider his version of the special theory of relativity¹⁴.

His central thesis is that the theory of relativity is “social from end to end.” This is because it is about (a) how events are measured in different inertial systems using observers on trains that move at great speed with respect to observers at a station, and (b) transport information without deformation from one human observer to another, so that the problems generated by the different location of the observers arise.

All these statements show that Latour has not the slightest idea of what Einstein holds. On the one hand, the presence of human observers is not an essential requirement for the theory. Einstein mentions them in the public version, but not in the 1905 work on special relativity, as mere rhetorical devices. The important things in 1905 are the laws of

¹³ Ibid., p. 207.

¹⁴ Latour, « A Relativistic Account of Einstein's Relativity », 1988, p. 3-44.

transformation that Einstein proposes with the important consequences about the relativity of spatial and temporal measurements, the constancy of the speed of light in inertial systems, the new law of addition of speeds, as well as the fundamental proposal that all the laws of physics (not only the mechanical ones) are invariant with respect to the inertial systems of reference. None of this is mentioned by Latour.

Instead, Latour states that “the book is about how we send an actor from one reference system to another. Instead of describing nature’s laws, it is a book of semiotics, which tries to understand how any narration is constructed.”¹⁵ Our answer is that Einstein can totally dispense with the actors, and that the laws of nature are a priority theme of the book which has nothing to do with semiotic recommendations such as narrative prescriptions.

Lamentably, Latour also invents a “third observer” (in addition to the observer in the train and in the station), that obviously Einstein never mentioned or assumed. Such a third observer “is the author or one of his representatives [telling the story of what happens with the other two observers] who tries to superimpose the observations sent by the other two”¹⁶. This is grotesque, because postulating the existence of a third observer who plays according to Latour the role of a privileged observer, is inconsistent with the very meaning of Einsteinian special relativity (where there is no inertial reference system of privileged observers).

According to Latour, special relativity is, like any scientific theory, a social construction. Why? Latour’s response is chilling: the main observer is the third observer, since it is this one that allows “the control of the privileges to discipline docile bodies, as Foucault would say”¹⁷. Our final comment is, “Enough is enough”.

This seems to be a paradigmatic example of what happens when scientific rationality is abandoned vociferously, as Latour does: the pretension of objectivity also disappears as well as the assumption that the empirical world is the reference to which we try to elucidate scientific hypotheses and theories. It is also gone that it makes sense to speak of true knowledge

¹⁵ Ibid., p. 9.

¹⁶ Ibid., p. 11.

¹⁷ Ibid., p. 15.

or pretense of being true about that world. It is left for later, the growing and almost indispensable relationship between such knowledge and its progress and the exponential growth of the incidence of technology in the life of human societies and their survival. As we will see, Latour's contribution, in this respect, is less praiseworthy because it is almost nonexistent.

However, what is affirmed is not to the detriment of the large crowd of commentators of his work. Among them, there are pragmatists postmodernists (although Latour rejects postmodernism), and Foucault¹⁸, and even followers of Heidegger and phenomenology¹⁹.

This forces us to ask ourselves who obviously criticizes his position. Undoubtedly scientific realist scientists and philosophers of science, and especially a distinguished contemporary representative of them, Mario Bunge, does it.

We have dealt with Bunge's strong critical rejection of Latour's social constructivism²⁰. We must now focus on what we consider to be his most important disagreements with the thesis that "we have never been modern."

3 MARIO BUNGE: THE COUNTER-FIGURE TO "WE HAVE NEVER BEEN MODERN"

Let us recall Kant's notes about the Enlightenment²¹, which are also cited by Latour, and that we believe are fully satisfied by the work and intellectual performance of Mario Bunge:

Daring to know, what involves daring to change, to think for itself without being founded on any authority and especially without reference to theological or divine entities.

¹⁸ Foucault, *Power/Knowledge*, 1980.

¹⁹ Without identifying or even making them similar, postmodernism and social constructivism share some of their most fundamental notes. For example (a) their negative attitude about modernity, no matter that it is more extreme in Latour than in any postmodern philosopher, (b) the dismissal of the modern concepts of modernity like truth, progress, revolution, (c) the conservative attitude about the social consequences of the use of science and technology.

²⁰ Gómez, « Contra la mala ciencia y peor filosofía », 2000, p. 117-38.

²¹ Kant, *¿Qué es Ilustración?*, 1989 [1784].

In addition, the deep belief in scientific progress and that the latter is a promoter of social progress. Such progress is the result of the rational activity of humans in their cognitive approach to nature and social reality which makes it possible to put it at the service of humanity.

If we add to this the normative trilogy of the modern political revolution, i.e. freedom, equality and fraternity, we obtain the modern characterization of the human being as the architect of his own destiny and progress through the use of reason to know and dominate nature and achieve the rational organization of society.

If these notes are accepted, there is no doubt that Bunge does not abjure any of them, whereas Latour does it, insofar as, for example, he strongly criticizes rationality and progress through critical activity with the presence of revolutionary ruptures²².

There is no doubt: in terms of this characterization, Bunge is archetypally modern while Latour is not. They were also modern Galileo, Marx, Einstein, Planck, Bohr, and many others. Therefore, it is not true that we have never been modern. This strange thesis is the result of a characterization of modernity that would make possible such a wrong interpretation.

Someone can affirm that we are in the presence of two stories about us, one by Latour and the other by historians and philosophers of science. And both are conceived as defensible ones.

We are opposed to accept this escape route because, in our opinion, the former has as its ultimate objective to declare by decree the death of the philosophy of science. In other words, it would mean the end of a tradition that has accompanied humanity since its inception, precisely the one that makes possible criticism and the need to evolve (another notion rejected by Latour) through changes, those that culminated in science and technology as engines of human progress. In other words, the tradition that is to culminate in the scientific, political and social modernity.

Another general way of rejecting Latour's proposal about never being modern is by handling the obvious argument that he is accepting:

²² See Cohen, *Revolution in Science*, 1987, for a careful analysis of the history of the idea of scientific revolution and how it was gradually transformed for encompassing political revolutions.

(P1) If we have been modern, then we believe that there are ruptures, i.e., revolutions in the scientific development, and that the notions of truth and objectivity play a crucial role in a sound version of that development.

(P2) However, there are not truly big ruptures (revolutionary breaks), and truth (as correspondence as well as objectivity) do not actually take place in a sound version of scientific development.

From (1) and (2), it follows that we have never been modern.

However, the problem is with (P2). It is hard to believe; it seems like a sort of a sudden by-product of Latour's imagination. But, according to him, we should believe it, because, as he explicitly affirms, the existence of revolutions, the role of truth in scientific research and the relevance of objectivity are just inventions of epistemology.

By a single stroke, Latour makes that those who like the great scientist, speak of revolutions, truth and objectivity, have taken part in a sort of imaginary concoction.

However, that sounds, at least, like insulting and unbelievable.

Someone might say that scientists make mistakes. Sure, but people like Latour, also. Then the question is who do we trust? In other words, who is more credible about science and its development: great physicists like Einstein or a master of distorting how important scientific theories are, like Latour?

Here we arrived at the ending point: Everyone interested in the issue should make a choice. I have already made mine: (P2) is blatantly false.

Have we ever been modern? No way!

Look at what follows about Mario Bunge.

3.1 BUNGEAN REALISM

As an example of the main core of that sort of realism, it is unavoidable to mention some of the fifteen characteristics that Bunge considers to be specific to scientific knowledge:

1. It is explanatory and predictive;

2. It is capable of progress. The modern scientist is a generator of problems, loves the truth, tries to prove new and uncertain, makes mistakes and learns from them;
3. It is useful and also represents social advances.

Bunge clarifies that technology consists of the treatment of practical problems through a scientific approach, which can also offer growth through the invention of new theories or research techniques.

More important than all of this is Bunge's strong attachment to the distinctive and separating note of the Medioevo from modernity; the key break is about the cognitive value of laws and scientific theories: they pass from mere predictive instruments to statements about the reality of the natural world²³.

Bunge, of course, is more modern than most of his colleagues in that regard because he defends a particular form of realism that has been characterized as "bungean realism", understood as a variety of scientific realism conceived by Bunge as a form of hyperrealism that goes hand in hand with the realistic ontological thesis, also being "materialist, systematic and emergentist"²⁴.

Bunge affirms that the main assumption of materialism is that "all material things and only them, together with their properties and changes are real"²⁵. The systemic hypothesis can be stated as follows: all properties are given in packages, not isolated from each other. This implies that all entities are already systems, already current or potential constituents of systems, such as cells and genes. What is in reality is therefore a system or a component of such. Systemism is therefore a structural vision of something that in the case of systemic materialism is composed of matter.

Furthermore, as we will point out below, insofar as bungean realism is also valid for ethics and politics, it deals, for example, with "value

²³ Galileo is then the first representative of modern scientific realism. To defend heliocentrism (Copernicus) was not enough for becoming a modern scientist insofar as he was outspokenly an instrumentalist just as the medieval astronomers were.

²⁴ According to Bunge, scientific realism is one of the defining notes of the Scientific Revolution " ... the scientific revolution was much more than a new view of science: it also included a new cosmovision, mechanicism, and a new gnoseology, scientific realism" (Bunge, *A la caza de la realidad*, 2012 [2006], p. 74).

²⁵ Bunge, *Memorias*, 2014, p. 56.

packages, such as freedom, equality and fraternity, instead of isolated values"²⁶. This can be taken into account to criticize the neoliberalism that considers as a supreme value the free market, without discussing in detail the price that is paid in terms of equality and fraternity²⁷.

Being systemic, the bungean materialism is "emergentist": "every system has properties that lack their constituents, starting with their composition"²⁸. The explicit corollary is "the existence of several levels of reality, each of which has emerged from preceding levels in the course of a process"²⁹.

Bunge also talks about seven aspects of such realism: ontological, gnoseological, semantic, methodological, axiological, moral and praxiological. The extension of realism to all those levels or dimensions is in itself a very rich novelty in contemporary realism.

Ontological realism affirms the existence of the world independently of the knowing subject in which things and facts are studied through "constructs" (data, hypothesis, models and theories). The existence of the outside world is "shown" by the presence of our errors, which makes explicit that there is something different from us and that it is not constructed. Everything we know of that world has an emergent property, against physicalism, which gives rise to a philosophy of mind and social philosophy.

Gnoseological realism presupposes the ontological as it states that reality is knowable, although it is an imperfect knowledge but always perfectible so that scientific hypotheses can be corrected to approximate the truth. The knowledge of the world is therefore always incomplete, indirect and fallible. Such realism is therefore not naive in that it does not deny the possible existence of errors in the act of knowing.

Moreover, the presence of metaphysical assumptions is unavoidable as well as that of auxiliary hypotheses to enable empirical testing.

²⁶ *Ibid.*, p. 235.

²⁷ Milton Friedman's view about the issue is the most honest recognition that any question about inequality and social justice (1967) should remain out of the sphere of economics. Consistently, the market (the Big Game) is beyond good and evil and no one is responsible for those who are the losers, i.e. the poor.

²⁸ Bunge, *Memorias*, 2014, p. 235.

²⁹ *Ibid.*

Semantic realism holds that some propositions are about facts and not just about ideas, that some are approximate to the truth and that every approach is perfectible.

The strong thesis is that only those facts described by variables included in the laws of a theory are considered genuine references of that theory. For example, quantum mechanics does not refer to subjects of any kind because they do not appear in their laws, which makes the Copenhagen interpretations wrong.

While a correspondence theory of truth is assumed, truth values only emerge in the testing of the theory; there are therefore no inherent values of truth of a proposition because it can change with time.

Methodological realism assumes, on the one hand, that the scientific method consists of a general strategy of knowledge acquisition that involves experience, reason and imagination, on the other hand, the testing is global, affecting the whole theory. The explanation of regularities always requires, for being reliable, that it be through mechanisms.

3.2 BUNGEAN REALISM AND QUANTUM MECHANICS

These types of realism so far mentioned converge in Bunge's treatment of quantum mechanics. It is here that the novelty of Bungean realism, especially ontological and epistemological, appears explicitly. The formalism of quantum mechanics must be interpreted as being about very particular entities of nature that exist independently of the knowing subject. Bunge calls quanton such *sui generis* entities³⁰. Their main characteristic is that they are fuzzy entities; this means that the physical world is not composed only of entities whose properties always have precise values. For example, the values of the electric charge can be defined at any moment with precision, but position, momentum and energy of the quantons are normally undefined (fuzzy) in the sense that their values are numerical ranges instead of unique numbers.

This specific character of the quantons differentiates Bunge's position from those that, according to him, such as Einstein's, are not truly realistic, since by holding that all entities in the world are always measurable, they could not cover the quantons. Einstein, according to Bunge, does not

³⁰ Bunge, *Epistemology III* (1) : Formal and Physical Sciences, 1985, p. 171.

hold a realistic position but a classicist one because he believes that ultimately all entities are describable by classical or neoclassical theories.

In summary: Bunge believes that quantum mechanics describes a very special world (as opposed to the Copenhagen interpretation) composed of real entities unknown to classical physics whose states are described by state functions that they are not directly observable.

As a consequence, Bunge proposes a different version of the interpretation of, for example, the principle of indeterminacy of quantum mechanics. Bunge affirms that such a principle “relates the standard deviation of the position and momentum of a quantum in any arbitrary state and any moment of time”³¹. Note that for Bunge “the observer is not among the referents of quantum theory and the apparatus appears only when it is explicitly represented in the state function of the system”³².

Heisenberg’s indeterminacy inequality expresses a nonclassical objective property of the quanton that “has nothing to do with measurements or mental states ... [emphasizing] that quantons are not punctual particles ... [and therefore] have no precise trajectories”³³. Therefore, what the principle does is to reveal a new mode of behavior in the orb.

Consistent with the above, Bunge argues that Bell’s work, by showing that quantum mechanics violates Bell’s inequalities, implies that no theory of local hidden variables can reproduce all the predictions of quantum mechanics. Bunge argues that Bell’s work emphasizes that the objective of a theory of hidden variables of restoring realism failed, but that objective can be achieved without appealing to such variables. The realism left out of the scene is that which, like the EPR, assumes localism (distant things always behave independently of one another) and determinism.

But it does not allow us to conclude that the failure of Bell’s inequalities in quantum mechanics has refuted the philosophical realism according to which the physical world exists without help from those who want to know it, against the interpretation of Heisenberg or Bohr that Bunge considered out of place to account for the epistemological status of quantum mechanics.

³¹ Ibid., p. 181.

³² Ibid., p. 191.

³³ Ibid., p. 182. See, for example, Heisenberg, *Physics and Philosophy*, 1958.

From the ontological point of view, Bunge believes that there is a kind of systemic holism (for example, given two quantons that are initially parts of a system, the state of each component is not only determined by local conditions but also by still belonging to a system). That is, physical separation implies spatial separation, but the converse is not true. Bunge, unlike classicists like Einstein, accepts distant correlations so if there are certain quantons being part of a system they always will be.

3.3 AXIOLOGICAL AND PRACTICAL REALISM

It assumes that there are “objective values”, those rooted in biological and social needs. They are attackable and defensible in a rational way with the help of scientific knowledge. These values include health, knowledge, security and peace, among others. They are not absolute and tensions may arise between them. It is remarkable that Bunge affirms that axiological neutrality is not desirable or always possible since there are objective values worthy of being protected such as truth, justice and peace. Note that the values Bunge speaks of are not only epistemic.

Practical realism proposes that while there are medium-end pairs and there are objectively more efficient means to achieve certain ends, and as our actions may affect third parties, we have, therefore, to take into account the foreseeable consequences. Ergo, practical realism has to submit to a principle of responsibility.

To conclude: It is important to emphasize the strong character of this scientific realism, which encompasses much more than the cognitive dimension of human activity.

It should also be clarified that in philosophy of mathematics Bunge is not a realist of any kind but defends a moderated “fictionism”, while in aesthetics he considers realism a conservative position, and in politics as a form of “political cynicism” so that he rejects it openly.

Be aware that all these notes that characterize Bunge's position, not only involve a strong attachment to the epistemological approach but, especially, that his notes of scientific realism and science are exactly opposite to those that Latour denies to modernity with which never, according to him, were we related: truth, change, progress, rationality, among others.

We cannot fail to mention, in this regard, that the Latourian elucidation of artifacts, those that have basically changed the ontology of the world in which we live and do science, is even more susceptible to being rejected by Mario Bunge.

3.4 A SHORT REMARK ABOUT TECHNOLOGY AND HUMAN RESPONSIBILITY

We believe it is important to highlight two aspects of the enormous differences in this respect between both authors. Mario Bunge, undoubtedly the philosopher who introduced the philosophy of technology in the Hispano-American world, believes that this philosophy consists of five fundamental components: techno-metaphysics, which deals with discussing the status of artifacts, techno-epistemology, which discusses the distinctive characteristics of technological knowledge, techno-axiology, occupied with the distinctive characteristics of the values present in the decisions related to the knowledge and use of artifacts, techno-ethics that discusses how to elucidate the positive character (good or not) of artifacts and their knowledge and use, and techno-praxiology, whose main theme is that of technological rationality. Of course, there has been different views about technology, from Aristotle through Marxism and neo-Marxism: the optimism of the majority of those who deal with applied science; the pessimism of Ellul³⁴, and the contemporary versions such as Feenberg³⁵ and Winner³⁶.

Then, just as Latour rejects as irrelevant any discussion about the scope of the different philosophies of science, because all philosophy in this respect must be replaced by an anthropological-scientific approach, something analogous happens to the philosophy of technology. Hence any discussion about positions since Aristotle, Marxists and contemporary philosophers disappears in his work.

This, of course, does not prevent the philosophers of technology from eventually referring to Latour. Thus, Winner, from a philosophical stance with technological pessimistic tints, criticizes Latour's position on the social constructivism of technology. First, it highlights the imperialist

³⁴ Ellul, « The Technological Order », 1983.

³⁵ Feenberg, « Democratic Rationalization », 2014.

³⁶ Winner, « Do Artifacts Have Politics? », 2014.

pretension of Latour's approach because it aims to open the black box of technology throughout history to its current state³⁷.

Without considering the summary and critiques of Latour's position by Winner, it is essential to emphasize what he considers to be the most obvious defect of sociological constructivism: "an almost total disregard for the social consequences of technical choice"³⁸. That is, it neither took into account the quality of daily life that is generated by choice or decision, nor the distribution of power in society, the texture of human communities, social relations, etc. Winner also wonders what happens to groups that have no voice but are affected by the results of technological change and what happens to groups that have been deliberately excluded.

Winner is proposing, without saying it, that Latour's position is an obvious form of elitism. More than that: Winner stresses that by not taking into account the social consequences (consequences to change society and those that do not affect it socially), what is offered is an implicitly conservative version of society and politics. Latour's version, therefore, conceals as much as it reveals; for example, nothing is said about which groups "have been left out of the laboratory and which voices have been silenced." Nor is an "evaluative stance," or any kind of ethical or political principle, that helps people judging possibilities open by technologies.

That is to say, the sociological constructivism is agnostic about the evil-good that they accrue or accompany (linked to particular technological achievements). More briefly and emphatically: social constructivism does not have any stance about the relationship between technology and human welfare. It is actually morally and politically indifferent.

Latour's social constructivism then looks as an academic point of view sanitized of any critical posture that might contribute to the critical discussion about the ethical, political and even ecological dimensions of technological choice.

Winner concludes that the box opened by Latour and other social constructivists is obviously empty.

³⁷ Ibid.

³⁸ Winner, « Social Constructivism », 2003, p. 237.

Enough, again. Latour's view is totally opposed to the fact of even posing the questions of an ethical and axiological dimension inescapable in Bunge's proposal and central to any modern position.

In addition, such failure in stressing that ethical and axiological dimension is in open opposition to the realizability of what Bunge calls "integral development", the "statement that the thesis of authentic development and that benefits the people is not only economic, but also sanitary, cultural and political"³⁹. This idea "contradicted the two dominant currents of scientific policy: the economicism defended by economists and the anti-science preached by both the economists and the right wingers of a new stamp".

We cannot fail to mention a masterly statement by Bunge about the dominant neoliberal economics, the one about which Latour & Co. keep absolute silence: "standard economic theory is built on vague concepts, lacks empirical support, does not serve to face the crisis because it assumes that the economy is always in balance and disregards the suffering caused by poverty, inequality, unemployment and economic crises"⁴⁰. Otherwise, Bunge, the modern, deals with something that Latour disregards: Everything related to a more fortunate future of the people.

4 BUNGEAN MORAL REALISM: THE HARD-CORE OF EPISTEMOLOGICAL PROGRESS

Bunge strongly believes in the existence of epistemological progress. There is epistemological progress every time a certain epistemology allows a better understanding of the contemporary state of science (or of a certain science) also realizing that the corresponding scientific development is also progressive.

More clearly: A paradigmatic example of that progress is the obvious fact that in the last twenty years, at least, a thesis that reduces and impoverishes the complexity of scientific activity has been demystified. Until the nineties of the last century it was a kind of mortal sin to affirm that the scientific activity is loaded with both epistemic and non-epistemic

³⁹ Bunge, *A la caza de la realidad*, 2012 [2006], p. 316.

⁴⁰ *Ibid.*

values (peace, the well-being of a certain group, etc.). This was the consequence of the maintenance of two founding myths: the dichotomy of factual judgments/value judgments, and the inescapable identification of scientific objectivity with the evaluative neutrality of the scientific activity.

Today all this is past. Hallelujah: there is no such a dichotomy⁴¹ as evidenced in statements like “the Nazis were evil” in which there is an entanglement between the empirical and evaluative content of it. But, as Bunge will argue, while it is possible to consider that certain values are objective, the presence of them in a research process does not color it with any subjectivity. The point is, even as Bob Nozick⁴², not precisely a scientific realist, stated years ago, that science is objective because of the values it is infused with.

Mario Bunge has in this regard a solid defense of such objectivity and a clear elucidation of why the unavoidable presence of values of all kinds in all contexts, even in the context of justification, does not necessarily imply the absence of objectivity; everything depends on what values and how they intervene.

Bunge proposes that “objectivity should not be confused with neutrality regarding values”⁴³, because, for example, the search for certain values (such as welfare, peace and security) is preferable to that of others. Such objectivity is constitutive of scientific realism since the modern scientific revolution.

It is even deeper, because certain values are objective “because they are rooted in biological and social needs”⁴⁴. Therefore, instead of arguing that the fact/value dichotomy leads to the naturalistic fallacy, Bunge and the moral realists “consider the fact/value an over-naturalist or irrationalist fallacy”⁴⁵. Such objectivity makes it possible for these objective values to be discussed on scientific grounds.

⁴¹ See, for example, Putnam, *The Collapse of the Fact/Value Dichotomy and Other Essays*, 2002.

⁴² Nozick, *Anarchy, State, and Utopia*, 1975.

⁴³ Bunge, *A la caza de la realidad*, 2012 [2006], p. 62.

⁴⁴ *Ibid.*, p. 363.

⁴⁵ *Ibid.*, p. 364.

Therefore, statements containing objective, even moral, values can be considered as true or false. To do this, they must always be put in context: “from a situational perspective ... lying, stealing and helping others without expecting a reward are moral facts; and the norms and counter-norms associated with these facts are true because they conform to the supreme moral principle: enjoy life and help others live lives worthy of being enjoyed”⁴⁶. The quote says it all: moral realism assumes the existence of moral facts and, therefore, moral truths.

The main example that Bunge uses is more than revealing: “Poverty is a moral fact, not just a social fact, because it involves unnecessary suffering and degradation” and “the creation of work is a moral fact not only an economic fact, because it satisfies the right to work”⁴⁷.

Nothing therefore prevents that such moral facts in which every society is involved can be studied with the help, not only of factual truths, but also moral ones.

Without a doubt this constitutes an enormous epistemological progress, involving a different moral treatment of the considered facts, with respect, for example, to the neoliberal proposals of Hayek⁴⁸ and Friedman⁴⁹. Faced with the lack of human compassion in all of Hayek’s work proposals on economics and vociferated in Friedman’s work, Bunge would never negotiate such virtue, human companionship, when seriously analyzing facts involving it⁵⁰.

All this seems to be not only epistemological but also moral progress according to Bungean realism.

Not all truths are true in any context. Moral truths are not, because they “ultimately concern rights and obligations and since they are related to a culture and its moral code ... therefore, they are contextual”⁵¹. In our Western context, “it is good for us to do good works, unless one has been educated in the harsh school of orthodox economics, for which selfishness

⁴⁶ Ibid., p. 365.

⁴⁷ Ibid.

⁴⁸ Hayek, *Studies in Philosophy, Politics and Economics*, 1967.

⁴⁹ Friedman, *Capitalism and Freedom*, 1967.

⁵⁰ The most explicit examples of Friedman’s extremism about ethics and economics show up in his most quoted book, *Capitalism and Freedom*.

⁵¹ Bunge, *A la caza de la realidad*, 2012 [2006], p. 368.

is the supreme virtue"⁵². That is, on the one hand, moral truths are contextual, on the other hand, there is an enormous distance from Friedman and neoliberal views about the relationship between economics and ethics to Bunge's revival of the relevance of ethics when dealing with economic issues.

Besides, having a clear view of the contextuality of moral truths requires perceiving that "all moral imperatives can be expressed in the indicative way. The imperative 'you will not kill' can be translated as 'killing is bad'". This translation "designates a proposition that is true in every moral code that affirms the right of persons to life and is false in every code that does not admit such a right"⁵³.

The most obvious consequence is the possibility of empirical testing of moral standards. This is possible in three complementary ways: coherence or compatibility with higher-level principles, compatibility (with the best common knowledge, scientific or technological available), and contribution to individual or social well-being⁵⁴. Like the scientific truths, they are perfectible, "what discards the possibility of a perennial ethic, modeled for perfect humans who live in a perfect society"⁵⁵.

As a consequence, ethical theories can be tested in a similar way to scientific theories, i.e. "agreement with the relevant facts and compatibility with other theories"⁵⁶.

Bunge himself allows us to end this section with what we started with: the categorical denial of the fact/value dichotomy in contemporary epistemology: "In short, there are facts and moral truths. The former are part of the fabric of reality and the moral truths are interwoven with other factual truths"⁵⁷.

To conclude: there is no stronger and more welcome version than the bungean one of the entanglements between science and ethics, especially in a scientific realist view.

⁵² *Ibid.*, p. 369.

⁵³ *Ibid.*, p. 371.

⁵⁴ *Ibid.*, p. 372-73.

⁵⁵ *Ibid.*, p. 374.

⁵⁶ *Ibid.*, p. 375.

⁵⁷ *Ibid.*, p. 377.

5 MORAL REALISM AS A CRITICAL FOUNDATION OF THE THEORY OF RATIONAL CHOICE

It is known that such theory constitutes the unavoidable principle of orthodox economics and neoliberalism. It is the one that cannot be abdicated even though it is falsified by the empirical activity of human beings and by agents in the market. According to this principle, to act rationally is to try to maximize the achievement of the goal, and therefore, in the capitalist market, this means acting efficiently in order to maximize profit.

On the problems cited by Bunge that this principle has it should be emphasized that (a) real-life actors are very rarely free as assumed in the theory discussed, (b) they are constrained by social and moral norms. Therefore, you should not aim to maximize efficiency because you will sacrifice other values, such as welfare and environmental protection. Similarly, before the praise of supposed benefits of the globalization of the free market, it is necessary to discuss how to “correct or compensate for the growing imbalances it produces”⁵⁸.

There are deep theoretical problems underlying what Bunge says. The theory of rational choice assumed by neoclassicism and neoliberalism takes for granted that we choose, decide and act according to the objective order of our preferences. However, we could establish, in principle, the objective order of preferences of an individual, but there is no dependable way of establishing interpersonal utility comparisons, because the levels of desire are totally subjective. We could not establish how much more utility would obtain a consumer of a given good than another consumer of the same good. We could also not measure in a dependable way the utility differences for a single individual; for example, statements like “we achieve three units more of utility from a pear than from a peach” are not dependable.

Therefore, it cannot use Bentham⁵⁹ utilitarian formula that considered a certain result as the best for all the society if it is the greatest sum of utility of all the members of that society (because this assumes that it is possible to measure the utility for each individual). Accordingly, the maximum of utility cannot be used as a normative principle.

⁵⁸ Ibid., p. 379.

⁵⁹ Bentham, A Fragment on Government, 1776.

Pareto's criterion came to the rescue: a result A is Pareto-superior to a result B, if at least an individual in the society prefers A to B, whereas no one prefers B to A. Moreover, a result for which there is no other result that would be Pareto-superior is called "Pareto optimum"⁶⁰. However, this merely apparent solution is irrelevant because people's preferences are not linearly ordered. The standard solution is to use the Kaldor-Hicks criterion⁶¹. According to it, a result A is Pareto-superior to a result B if those who are better in the situation A could compensate those who would be better in the situation B, and yet would have a net benefit. As a matter of fact, this criterion favors always those results that involve a bigger quantity to distribute, although some members of the society receive less than in another situation where it would be less to distribute. Besides, the criterion emphasizes the potential distribution over the actual one; the winner "could" compensate the looser but this does not mean that she should be committed to do it.

Most importantly is to stress the fact that all this is, then, ethically neutral and innocuous with respect to the obligation of dealing with the inequalities. In other words, all this terminological paraphernalia is metrically insufficient, because it makes neoclassical and neoliberal economics ambivalent with respect to elementary problems of inequality. If it could be decided to distribute half a million dollars of a rich person for inoculation of poor kids and improve their health, society would be better in this situation than if the distribution would not have been made; but, according to the same neoclassical theory, the millionaire would suffer a certain loss, a loss of utility. There is no way of comparing with any metric, according to all the neoclassical frame adopted by neoliberalism, the loss of utility suffered by the millionaire with the one won by those who were inoculated. But that ambivalence is a political and ethical disaster, because, as a consequence, in the real practice the final decision is taken by those with more power. In the most vital issues, from a social point of view, the assumed scientific rigor disappears and is replaced by voluntarism or by barbarianism.

⁶⁰ Pareto, *Manual of Political Economy*, 1906.

⁶¹ Kaldor, «Welfare Propositions of Economics and Interpersonal Comparisons of Utility», 1939, Hicks, «The Foundations of Welfare Economics», 1939.

The worst outcome is that any question of equality and social justice is out of the domain of economics, and is not related at all with the evaluation of the behavior of the market and its results.

Therefore, the market is beyond good and evil, and is not responsible—truly speaking no one is—of those who are annoyed by the market results. More precisely, the market is beyond any moral judgment.

And that, and precisely that, is a moral disaster that Bunge's recent views on moral realism outspokenly denounces and makes him call to overcome neoclassical and neoliberal economics.

There is much more, such as linking realism and scientism to materialism, obtaining the triad that Bunge calls scientific hylorealism.

However, it is the same empirical reality and its complexity approached by such hylorealism that invites us to be fair with the reader and to stop supposing to have shown convincingly the unique character of Mario Bunge as a philosopher of science for (a) his respect of the reality of which science is made, (b) its detailed and always updated analysis of it, (c) its defense of the possibility of knowing it as it is and, especially, (d) its indisputable achievement of a global version that does not leave out the ethical dimension constitutive of human reason.

And this makes him different, much more so when in the twentieth century two fatal reductionisms had been consummated: first, of philosophy of science to epistemology and second, of the latter to the logic of scientific research thus impoverishing both the reality addressed and its critical study.

Bunge is a living example of the rejection of those reductionisms. And mainly, of another even more damaging reduction: that of human reason to theoretical reason. That means that Bunge has not left out the rational discussion of our choices and their consequences. In other words, what modernity called practical reason is back in the domain of science and its philosophy.

Acknowledgments

I appreciate the excellent comments of the proofreader that allowed a clearer and more rigorous final version of this paper.

References

- Bentham J., 1776, *A Fragment on Government*.
- Bunge M., 1985, *Treatise on Basic Philosophy: Epistemology and Methodology III, Philosophy of Science and Technology, Part I, Formal and Physical Sciences*, vol. 7, 8 vol., Dordrecht, Reidel.
- 2014, *Memorias: entre dos mundos*, Barcelona/Buenos Aires, Gedisa Editorial/Eudeba.
- Bunge M.A., 2012 [2006], *A la caza de la realidad: la controversia sobre el realismo*, Barcelona, Editorial Gedisa, traduit par R. González del Solar, *Chasing Reality: Strife over Realism*, Toronto, University of Toronto Press.
- Cohen I.B., 1987, *Revolution in Science*, Cambridge, Belknap Press.
- Ellul J., 1983, « The Technological Order », in Mitcham C. & Mackey R. (éd.), *Philosophy and Technology: Readings in the Philosophical Problems of Technology*, New York, The Free Press, p. 86-108.
- Feenberg A., 2014, « Democratic Rationalization: Technology, Power, and Freedom », in Scharff R.C. & Dusek V. (éd.), *Philosophy of Technology. The Technological Condition: An Anthology*, Oxford, Wiley-Blackwell, p. 706-19.
- Foucault M., 1980, *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977*, New York, Pantheon Books, édité par C. Gordon.
- Friedman M., 1967, *Capitalism and Freedom*.
- Gómez R., 2000, « Contra la mala ciencia y peor filosofía », in Denegri G.M. & Martínez G. (éd.), *Tópicos actuales en filosofía de la ciencia: homenaje a Mario Bunge en su 80º aniversario*, Mar del Plata, Universidad Nacional de Mar del Plata/Editorial Martín.
- Hayek F.A. von, 1967, *Studies in Philosophy, Politics and Economics*, Chicago, University of Chicago Press.
- Heisenberg W., 1958, *Physics and Philosophy: The Revolution in Modern Science*, New York, Harper.
- Hicks J.R., 1939, « The Foundations of Welfare Economics », *The Economic Journal*, 49 (196), p. 696-712.
- Kaldor N., 1939, « Welfare Propositions of Economics and Interpersonal Comparisons of Utility », *The Economic Journal*, 49 (195), p. 549-52.
- Kant I., 1989 [1784], *¿Qué es Ilustración?*, Madrid, Tecnos, édité par A. Maestre, traduit par A. Maestre & J. Romagosa, « Was ist Aufklärung? », *Berlinische Monatsschrift* (décembre).
- Latour B., 1988, « A Relativistic Account of Einstein's Relativity », *Social Studies of Science*, 18 (1), p. 3-44.
- 2007 [1997], *Nunca fuimos modernos: ensayos de antropología simétrica*, Buenos Aires, Siglo Veintiuno, traduit par V. Goldstein, *Nous n'avons jamais été modernes: essai d'anthropologie symétrique*, Paris, La Découverte.
- Nozick R., 1975, *Anarchy, State, and Utopia*, Oxford, Blackwell.
- Pareto V., 1906, *Manual of Political Economy: A Critical and Variorum Edition*, Oxford, Oxford University Press, édité par A. Montesano.

- Putnam H., 2002, *The Collapse of the Fact/Value Dichotomy and Other Essays*, Cambridge/Londo, Harvard University Press.
- Westfall R.S., 1980 [1977], *La construcción de la ciencia moderna : mecanismos y mecánica*, Barcelona, Labor, traduit par R. Jansana Ferrer, *The Construction of Modern Science : Mechanisms and Mechanics*, Cambridge, Cambridge University Press.
- Winner L., 2003, « Social Constructivism : Opening the Black Box and Finding It Empty », in Scharff R.C. & Dusek V. (éd.), *Philosophy of Technology. The Technological Condition : An Anthology*, Oxford, Wiley-Blackwell.
- 2014, « Do Artifacts Have Politics ? », in Scharff R.C. & Dusek V. (éd.), *Philosophy of Technology. The Technological Condition : An Anthology*, Malden, Wiley-Blackwell