

Advancing the Metascientific Program

First Dialogue

François Maurice¹, Martín Orensanz²

Abstract—What follows is a dialogue between Maurice and Orensanz, in which they will discuss some key topics stemming from Bunge's oeuvre. The objective of this dialogue is to advance the metascientific program even further. The main points that will be discussed can be presented as a series of questions: Is it possible to prove that the external world exists? What is matter? Is the part-whole relation transitive? What is the difference between systems and assortments? Do fictional objects have a function in ontology? Although those are the main topics, several other points will be discussed throughout this exchange.

Résumé—Dans le présent article, Maurice et Orensanz dialogueront sur quelques thèmes clés de l'œuvre de Bunge. L'objectif de ce dialogue est de faire avancer le programme métascientifique. Les principaux points abordés peuvent être présentés sous la forme d'une série de questions : est-il possible de prouver que le monde extérieur existe ? Qu'est-ce que la matière ? La relation partie-à-tout est-elle transitive ? Quelle est la différence entre les systèmes et les assortiments ? Les objets fictifs ont-ils une fonction dans l'ontologie ? Bien qu'il s'agisse des sujets principaux, plusieurs autres points seront abordés tout au long de cet échange.

Keywords—Metascience; Ontology; Metaphysics, Matter; Objects.

1] Dialogue

MARTÍN ORENSANZ: François, your position among the Bungeans is unique, since you suggest that Bunge ceased to be a philosopher and became a metascientist instead. In this sense, you have begun

¹ **François Maurice** has graduated in social statistics, mathematics and philosophy, independent researcher, founder of the Society for the Progress of the Metasciences and translator in French of the *Philosophical Dictionary* by Mario Bunge published at Éditions Matériologiques under the title *Dictionnaire philosophique*.

² **Martín Orensanz** is a *Doctor en Filosofía* from Argentina. His work focuses on three main topics: Argentine philosophy, contemporary philosophy and philosophy of science. He won two scholarships (doctoral and postdoctoral) from the National Scientific and Technical Research Council of Argentina (CONICET).

a journal, *Metascience*, dedicated to the advancement of the Bungean program. While I'm admittedly rather unconventional for a Bungean, I nevertheless believe that the metascientific project should be further developed. But let's start from scratch: What are the metasciences, and why should we work on them?

FRANÇOIS MAURICE: Martín, in a nutshell, metasciences are a group of disciplines that study sciences, but from a specific angle. They are interested in scientific knowledge, i.e., the concepts, statements, theories, classifications, models, etc. that science produces. They are therefore interested in the products of science, but not only. Metasciences are also concerned with general statements that science takes for granted, often implicitly. These statements have traditionally been the province of philosophy, but they can also be dealt with from a metascientific point of view. The metasciences also take on the task of formalizing "common sense" concepts such as "property". These concepts are often used in discussions between scientists. Finally, metasciences are concerned with epistemic or conceptual operations, such as reducing one theory to another. And why work on metascience? Because science deserves its own general discourse, independent of philosophy.

M. O.: I think that almost all metascientists would agree with those definitions. However, I wonder how many of them would also identify as Bungeans. In that sense, your position is not only unique among Bungeans, it's also unique among metascientists. What is it about Bunge's oeuvre that initially caught your attention? And why should metascientists in general take an interest in his works?

F. M.: It's true that most metascientists would agree with the way I've just summarily characterized metascience, but the devil is in the details. Apart from the methodological movement known as "metascience" that took shape following the publication of an article by John Ioannidis in 2005, prior to this date, metascience is associated with philosophy, notably that of logical positivism and structuralism in the philosophy of science. The aim is to reconstruct scientific theories and models by logical-mathematical means. But these approaches are based on philosophical doctrines such as empiricism or, more generally, anti-realism. Since Bunge rejects all these doctrines, the metascientists associated with these doctrines cannot in fact identify themselves as Bungeans. They practice what we might call philosophical metascience, whereas I advocate

scientific metascience. For this reason, these philosophers-metascientists have no interest in Bunge's work. With regard to the methodological movement mentioned earlier, it should be noted that philosophers of science and epistemologists did not initiate the questioning of the problem of reproducibility in science, and hardly participate in it at all. Will Bunge-style metascientists be able to do better? This is what I call the Bungean wager. Now, what drew my attention to Bunge's *oeuvre*? For reasons that are difficult to pin down, I used to associate philosophy, a rational discourse, with science, another rational discourse. When I began studying philosophy, I was shocked to discover that the vast majority of philosophical doctrines were irrational. A friend of mine described philosophy as secular theology. I started looking for philosophers who took science seriously, and that's how I came across Bunge's *Philosophical Dictionary*. The freshness of the approach, the closeness to science, the rejection of irrationalist doctrines, which I later interpreted as an implicit rejection of philosophy, were just a few of the many elements that convinced me that Bunge was on the right track to account for science and build a global worldview.

M. O.: That's a very interesting answer. I definitely agree that Bunge was on the right track. And, while it's true that he published many books and articles, I also think that there's still a lot of work to do, metascientifically speaking. Would you agree with that assessment? If so, what do you think are some of the main topics or problems that metascientists should focus on?

F. M.: Yes, definitely, there's still a lot of work to be done. In a way, everything needs to be done, since most of the thinking about science is done within a philosophical framework. On the other hand, Bunge shows us a way of doing metascience. So we have a starting point. Also, Pradeu and colleagues, in an article from 2021, have uncovered a small number of philosophers of science who, in my opinion, are no longer philosophers. There are philosophers who are moving away from philosophy to devote themselves to what I call metascientific research. Elliott Sober is just one example. So, these are other studies we can draw on to help us build a metascience. As Bunge points out, there are also nuggets in the work of some philosophers that we are entitled to pick up and integrate into metascience. As far as tools and approaches are concerned, we're not starting from scratch. Firstly, we have to use our natural faculties of reflection and reasoning, but applied to the scientific

constructs and epistemic operations that take place in the sciences, such as establishing a definition or a classification. But this is only possible if we take it for granted that scientific knowledge is a representation of a concrete world. Secondly, we have abstract logic and mathematics at our disposal to help us refine our thinking and thus our metascientific constructs. But logic and mathematics can only play their full role if—and I stress, only if—we take it for granted that they have no representational function of their own, either concrete or philosophical. In other words, they have no ontological commitment of their own. At this stage, it's difficult to say which are the main themes and issues that metascientists should be addressing. Surely, one can bet on the classic themes of the progress of scientific knowledge, and thus the change that this knowledge undergoes, and its accumulation over time. These themes are so general that they probably encompass all the other themes and problems that arise when studying science.

M. O.: You've mentioned several points, which I'd like to address one by one. The first one is that there are some philosophers of science who are moving away from philosophy, towards metascience. This idea intrigues me because I wonder if it applies to myself. As things stand, I think it doesn't. What I think is going on in my case is that I'm trying to do both things at the same time, philosophy and metascience, though I gravitate more towards philosophy. In that sense, you also mentioned that metascientists take the existence of the concrete world for granted. As you know, the question of whether or not we can demonstrate that the external world exists is an old philosophical problem. We certainly don't need to address it in our everyday lives, or even when we do science. It's a purely philosophical problem. But it's a problem that interests me, because I'm of the opinion that it can be solved. I know that this is not what Bunge believes, since he says the following in the third volume of his *Treatise*:

Another reason for having to postulate the existence of things is that, if we want to prove anything about existents, we must posit them. We cannot prove the existence of concrete things any more than we can prove the existence of deities or of disembodied minds. What can be proved is that, unless there were things, other items—such as acting on them and investigating them—would be impossible. (Bunge, 1977: 112)

And I'm aware that you agree with Bunge on this point, since you eloquently expressed this idea in one of your works:

A demonstration or logical proof of existence is impossible. It is through reflection, experience, and knowledge that we can convince ourselves of the existence of the world and the concrete objects that form it. And much of this reflection, experience and knowledge are fueled by science. More precisely, we cannot demonstrate the existence of the general concrete object because it does not exist. Only the existence of a particular concrete object postulated by the factual sciences can be the subject of empirical proof (in fact, it suffices to find only one) (Maurice, 2022)

I completely understand what Bunge and you are saying here. But I disagree. I think it's entirely possible to prove that the external world exists. It's not easy, but I believe that it can be done. In fact, I have been working on a proof of my own for some time now, which I hope to publish in the near future.

F. M.: It is, of course, possible to practice both metascience and philosophy, regardless of whether we think of them as two autonomous discourses that have no connection, or whether we think of them as two autonomous discourses that feed off each other, or whether we think of them as two discourses that have connections, such as metascience being a branch of philosophy, or any other kind of connection. In the same way, it was not uncommon for scholars of the modern era to practice science, philosophy, astronomy, astrology, alchemy, mathematics, numerology, etc., all at the same time. In the rare cases where metascience is mentioned since its appearance in the 19th century, according to my preliminary research, it is often in a philosophical context, apart from the recent methodological movement mentioned above. In fact, metascience was absorbed into philosophy of science. We see this, for example, in Bunge. While he used the expression "metascience" in the '60s, we find almost no trace of it thereafter. He also changed the title to *Philosophy of Science* when *Scientific Research* was republished. For philosophers, metascience is either redundant, being synonymous with philosophy of science, or uninteresting, because it is not sufficiently philosophical. But that's certainly not your position since you want to practice both philosophy and metascience? What role do you reserve for philosophy and metascience?

Now, one question that is sufficiently philosophical is that of the existence of the external world. You're right to say that this is a purely philosophical problem, since for science and metascience this is a pseudo-problem. And since it's a purely philosophical problem, the solution should be purely philosophical, i.e., a solution that fits into a philosophical doctrine that has philosophical methods for studying philosophical objects of a philosophical reality. Here, I take "philosophy" in its strongest sense. For the term "philosophy" to have any meaning, this approach must be distinct from scientific, theological or mystical approaches, and it must then postulate, not prove, the existence of a philosophical or metaphysical reality to which science has no access. So, Martín, either your proof of the existence of the external world is metascientifically satisfactory, and then philosophers won't be interested in it, or it's philosophically satisfactory, and then metascientists and scientists won't be interested in it. It's worth noting here that, from the outset, there's no difference between the various approaches. All of them, without exception, must postulate the existence of a reality: factual or concrete, philosophical or metaphysical, divine or supernatural, and so on. Once a postulate of reality has been adopted, each approach produces arguments and proofs concerning items of this reality.

For example, the scientific *proof* of the existence of the atom is not based on a philosophical *proof* of the existence of the external world, but rests on the *postulate* of the existence of this world. Once the postulate has been admitted, it is the scientific context that determines the validity of the proof, and this context includes the idea of the existence of a world independent of the representations we have of it. However, for a philosopher, the scientific context is problematic, scientific knowledge is problematic, which means that evidence based on this context is unsatisfactory for this philosopher. Yes, it's true that some philosophers, notably the scientific realists, admit the existence of the external world and are satisfied with scientific evidence, but this is only to get bogged down in a defense of scientific realism instead of producing results like the researchers of the methodological movement mentioned above, or like the researchers of the philosophy *in science* revealed by Pradeu and his collaborators, or like Bunge.

M. O.: I like your attitude. Your defense of realism and science is unapologetic and uncompromising, like Bunge's, and that's very refreshing, because the vast majority of thinkers who share the same

ideas tend to be very soft-spoken and apologetic in their defense of realism and science.

Regarding your question about the relation between philosophy and metascience, I think that they're different disciplines. I don't see metascience as a branch of philosophy of science, nor as a branch of philosophy in general. It's a unique field in its own right. So, on this point, I'm inclined to agree with your definition of metascience. On the issue of postulates and proofs, I'm not sure that I agree with you, at least not entirely. There are two problems, I think, with the position that Bunge and you are defending on this point.

The first problem is that if you postulate the existence of the external world instead of proving it, then that's simply a belief, it's something that you take on faith. If someone else postulates that deities exist, or that disembodied minds exist, then there are no significant differences between believing in the external world or believing in deities, or in disembodied minds. All of these beliefs would be on an equal footing, and here is where I disagree. Believing that there is an external world is not comparable to believing in deities or disembodied minds. And it seems to me that the best way to justify this difference is to prove that there is an external world, instead of postulating that there is one.

The second problem is that if you try to justify your postulation of the external world in any other way, you end up with a non-realist line of defense, which undermines your postulate. For example, suppose that you argue that the postulate of the external world has more explanatory power than the postulate that there are deities. But then your reasons for accepting that postulate are merely pragmatic. To use an analogy, Tycho Brahe's astronomical postulates had more explanatory power than Ptolemy's. That doesn't mean that those postulates were therefore true.

F. M.: Bunge has shown us how to conceive a general discourse on concrete reality and the sciences that study it, and to do so without any compromise with philosophy. Compromises can only be made within the same universe of discourse, or within the same conceptual or theoretical context, because each universe, each context, or each general discourse, is based on a set of assumptions and undefined concepts. Since I see philosophy as a general discourse distinct from the general discourse of metascience, there is no need

to seek a compromise between them. They are incommensurable. Hence a sense of frustration when reading the authors you mention, especially the scientific realists. They are very soft-spoken and apologetic in their defense of realism and science because they try to have it both ways. They no longer question science, which for all intents and purposes is an anti-philosophical position, and they have also learned the lessons of the many failures of empiricist doctrines, but believe they are able to develop a philosophical doctrine, realism or scientific realism, which would serve as a foundation for science. But the search for a foundation for science is illusory. Hence the need for a pragmatic component (practical or pragmatist, not pragmatist), not only for science, but also for many human activities. The proof is in the pudding. For example, government laws and regulations must be enforceable, whether for the good of all, to favor certain groups, or to silence political opponents. And it is a conquest of the scientific revolution that ideas in science must be validated by empirical tests, which does not justify resorting to an empiricist doctrine of science in an attempt to justify this essential aspect of science.

Similarly, believing in the existence of the “external world” is not based on a philosophical doctrine, even if it were called realism or scientific realism. Nor is it an act of faith. Quite the opposite, in fact. Belief in the existence of the external world is based on a complex reflection on our experience of the world, notably the experience of the world offered by science. Philosophers see it as an act of faith because they are looking for indubitable knowledge, and if knowledge is not indubitable, then it is not knowledge. This sophism is widely used by philosophers against science, and by philosophical skeptics against any form of discourse, including philosophy, but not skepticism itself! Complex thinking, in all human endeavors, requires the evaluation of a multitude of elements. Complex thinking in science accumulates evidence, in much the same way as evidence accumulates in a court case. Similarly, on a more abstract level, some philosophers, notably scientific realists, have produced arguments—some rather weak, others much stronger—for the existence of the external world. These arguments are evidence that we can put on the record, but they do not constitute proof, either in the logical sense or in any sense imagined by philosophers.

M. O.: There's a passage in Bunge's book *Evaluating Philosophies* that I think is relevant to the issue that we're discussing here. It's the one in which he discusses Anselm's argument for the existence of God. Allow me to quote it:

Using the existence predicate defined a while ago, we may reformulate Anselm's argument as follows.

God is perfect	Pg
Everything perfect exists in R [really]	$\forall x(Px \rightarrow E_{Rx})$
God exists in R.	E_{Rg}

Both premises are controversial, particularly the first one since it presupposes the existence of God. Hence the atheist will have to propose serious arguments against it instead of the sophistry of the logical imperialist. An alternative is to admit the existence of God for the sake of argument, and add the ontological postulate that everything real is imperfect: that if something is perfect then it is ideal, like Pythagoras' theorem or a Beethoven sonata. But the conjunction of both postulates implies the unreality of God. In short, Anselm was far less wrong than his modern critics would have it. (Bunge, 2012: 175)

It seems to me that this passage from *Evaluating Philosophies* contradicts what Bunge says in the third volume of his *Treatise*, the part in which he says that the existence of the external world can't be proved any more than the existence of deities or disembodied minds. So I think that Bunge changed his mind on this issue. Which isn't surprising, since he changed his mind on other topics as well. For example, in the third volume of his *Treatise* he says that there can't be a general theory of objects, while in an appendix to *Matter and Mind*, he provides an outline for such a theory.

But let's focus on what Bunge says about Anselm's proof. Clearly, the proof in question is not a fallacy, it's a valid argument, since it's a *modus ponens*. If one wishes to resist it, it must be shown that the argument is unsound, even if it's valid. And for the argument to be unsound, at least one of the premises must be false. Bunge argues that the second premise is the false one. So, Anselm's argument fails. However, as Bunge says, Anselm was "far less wrong than his modern critics would have it", not because his argument for the

existence of God is sound, since it isn't, but rather because he was right in believing that it is entirely legitimate to offer an argument for the existence of this or that, whether it be deities, disembodied minds, or the external world. A proof for the existence of any of these things will always be an argument, that is, a group of premises from which a conclusion is deduced. This is the sort of proof that I have been working on for some time, in which I argue for the existence of the external world, and as far as I can tell, all of the premises of my argument are true, which means that the argument is not only valid, it is also sound. And I also show why skeptical arguments, while valid, are unsound, because they contain at least one false premise.

Back to Bunge's ideas, even though I agree with many of the things that he says, I nevertheless disagree with him on some other specific points. Take, for example, his definition of matter. In his book *Scientific Materialism*, as well as in *Chasing Reality*, he says that matter itself is not real, it's fictional. This is because he defines matter as a mathematical set, and all mathematical sets are fictional. To be sure, he's a materialist, because he says that concrete objects (such as a certain hydrogen atom or a certain person) are material. But he also says that hydrogen, understood as the set of all hydrogen atoms, is merely conceptual, and the same goes for humankind, understood as the set of all human beings. What are your thoughts on this?

F. M.: I see your point about the kind of argument you develop to prove the existence of the external world, but I remain skeptical about the possibility of proposing a set of premises that are all true without producing a circular argument, i.e., without presupposing the very existence of the external world. That said, I'd like nothing more than to be convinced, and I look forward to reading your argument.

Bunge is right to say that the refutation of the ontological argument for the existence of God on the basis of the existential quantifier is not a valid refutation. Existence is a real property that can be represented by an existential predicate like any other property. But in the excerpt you quote, Bunge changes the argument for God's existence. We could say that he puts forward an ontological argument against the existence of God within its own system of thought. And this argument contains implicit premises. For example, to say

that “everything that is real is imperfect” can be debated by religious people and theologians for whom the spiritual or divine is real and perfect. But, for Bunge, what is real are concrete objects that exist in the “external world” (which exist even if we don’t think about them), and traditionally, the concrete or material world is imperfect, whereas conceptual or ideal objects would be perfect. Bunge grants to theologians this point for the sake of argument (even if the notions of perfection and imperfection don’t apply to concrete objects), in order to appeal to his dichotomy between real and conceptual or ideal objects. He can then conclude that God does not exist, since (real, concrete) existence implies imperfection.

So, I don’t think Bunge has changed his mind since the third volume of the *Treatise* on the impossibility of proving the existence of the external world (but he has certainly changed his mind about the impossibility of producing a general theory of objects). Here, he has merely asserted the idea that a predicate of existence is an acceptable concept, and then concocted an argument that takes for granted the real existence of God and his perfection, that (concrete) reality is “imperfect”, and therefore, that God does not exist (besides, the mere fact that for Bunge reality is concrete, implies that God cannot exist). We are dealing here with different and incommensurable discourses. And each discourse must have a starting point and must take for granted some premises, like the existence of the external concrete world in Bunge’s argument.

Now, back to Bunge’s famous (or infamous) idea that *matter is immaterial*. As formulated, this statement is in keeping with Bunge’s provocative style. But Bunge usually makes it clear that it is the concept of matter that is immaterial, as any other constructs. As you mention, the concept of matter is defined using a simple mathematical structure, a set whose elements satisfy a predicate. In that case, the predicate is read “is material”. So “matter” is the set of all material objects or entities: $M =_{df} \{x \mid \mu x\}$, where μ reads “is material” or “is changeable” (we can also read “is energetic” or “is concrete”). So we “place” all the concrete objects in this set. This is an operation of the mind. What really exists are these individual concrete objects. This is what Bunge calls the reference class of a construct. So the reference class for the concept of matter is made up of all individual material or concrete objects. So, constructing a set using a factual predicate also means constructing the reference class for that predicate. So the reference class is also a construct,

and so it is also immaterial. We're trapped in our own heads. We must therefore take the existence of the external world for granted, and the referent of a predicate becomes a hypothesis for Bunge that must be validated by science. So the reference relation is not a concrete relation like a relation between two concrete objects, but an operation of the mind (in fact, an abstraction, which is a brain process). The reference relation is a semantic relation, and therefore immaterial (which makes any causal theory of reference impossible). So, the concept of matter is immaterial, but the objects to which it refers are material.

M. O.: I'm still working on the proof, but I can share a few ideas about it. One of my main claims is that skeptical scenarios are impossible. For example, recall that Descartes says that the external world could be an illusion created in our minds by an Evil Genius. As far as logic goes, we could reconstruct his argument in many different ways. One such reconstruction might be the following one:

(DES1) If it is possible that there exists a Cartesian Evil Genius, then it is possible that the external world does not exist.

(DES2) It is possible that there exists a Cartesian Evil Genius.

(DES3) So, it is possible that the external world does not exist.

I claim that DES2 is the false premise in this *modus ponens*. It is impossible that there exists a Cartesian Evil Genius. But this is where defenders of the skeptical argument can push back. How? Usually they will say that there can exist an Evil Genius because we can think or imagine that such an entity could exist. In other words, they would advance a new argument in support of DES2, which is now a conclusion instead of a premise:

(DES4) If we can think that there could be a Cartesian Evil Genius, then it is possible that there exists a Cartesian Evil Genius.

(DES5) We can think that there could be a Cartesian Evil Genius.

(DES2) So, it is possible that there exists a Cartesian Evil Genius.

I suggest that the false premise here is the first one, DES4. A statement of the form "if p, then q" can only be false if the antecedent is true while the consequent is false. In this case, it's true that we can think that there could be a Cartesian Evil Genius. I have no problem imagining such a mischievous entity, even if most of the

details have not been specified. But this does not entail that it's possible that such an entity actually exists. There are many things that can be imagined. But just because we can imagine something, that does not entail that whatever we can imagine, can really exist. For example, I can imagine that the Moon is made of cheese. But this does not mean that it's possible that the Moon is really made of cheese.

Skeptics will probably want to challenge this last claim. They would ask: How do we know that it's impossible that the Moon is really made of cheese? For all we know, it could indeed be made of cheese. And here is where I would push back, by advancing the following *modus tollens*:

(DES6) If it is possible that the Moon is made of cheese, then contemporary science is fundamentally wrong.

(DES7) It is not the case that contemporary science is fundamentally wrong.

(DES8) So, it is impossible that the Moon is made of cheese.

Once again, skeptics (and presumably not just skeptics) will want to know what I'm talking about when I say that it is not the case that contemporary science is fundamentally wrong. What, exactly, am I referring to here? A substantial part of my proof for the existence of the external world is dedicated to developing this point. What I can say here, in relation to the example of the Moon, is that if it is truly possible that the Moon is made of cheese, then some of the most basic statements of the sciences (including astronomy, biology, history, anthropology, etc.) are false. For example, it would be false that the Moon has existed long before the invention of cheese, and that cheese was first made by human beings, here on Earth, around 8000 BCE.

These are just some of the ideas that I'm trying to develop in my article about the existence of the external world. Whether or not it's enough to refute skeptical arguments is up for debate. Some readers might agree with my refutations, but they might also demand that I offer an argument of my own for the existence of the external world. In that case, one such argument could be the following one:

(EXT1) If the external world does not exist, then contemporary science is fundamentally wrong.

(EXT2) Contemporary science is not fundamentally wrong.

(EXT3) So, the external world exists.

Notice that EXT2 is the same premise as DES7, they both state the same thing, although with a slightly different wording. Once again, the mostly likely point of discussion will be about contemporary science. Another thing that I would like to say about this proof is that it's not question-begging. It doesn't presuppose what it is trying to prove (i.e., that there exists an external world). This can be seen by looking at its propositional structure:

(EXT1) $\neg p \rightarrow q$

(EXT2) $\neg q$

(EXT3) p

If this argument presupposed the conclusion, then "p" would have to be one of the premises. But it isn't. My argument is not fundamentally different from other arguments that have the structure of a *modus tollens*. If it presupposed the existence of the external world, then every argument that has the structure of a *modus tollens* would be question-begging as well.

F. M.: Regarding your argument about the existence of the external world, you're right that your argument will be attacked by questioning your conception of contemporary science (DS7 or EXT2). At this point, I could point out that, by definition, science studies what philosophers call the "external world". And it is precisely for this reason that scientific knowledge is dubious in the eyes of philosophers, since the object of this knowledge, the 'external world', is not well founded philosophically. The fact that science takes the external world for granted means that science is not philosophy. But I understand that you're working on an argument which doesn't take the existence of the external world for granted, but on the contrary has to prove its existence, and at this point you have to develop an argument whose conclusion is "contemporary science is not fundamentally wrong".

Now, regarding the sceptical argument for the possibility of the non-existence of the external world, by attacking proposition DS4, you are attacking the conceivability argument, a monumental fallacy at the foundation of philosophy: whatever is conceivable is possible. This fallacy allows anyone to say anything and its opposite. To accept this fallacy is to reject the principle of noncontradiction. No rational discourse is possible if we accept this fallacy in our

arsenal of argumentative tools. So you are right when saying: “I have no problem imagining such a mischievous entity, even if most of the details have not been specified. But this does not entail that it’s possible that such an entity actually exists.” But your refutation of the conceivability argument will never appeal to philosophers and philosophical sceptics. The argument has been attacked many times and from many angles without any effect on philosophical practice. This is to be expected, since philosophical discourse is based on this argument. Your general discourse has nothing to do with a philosophical discourse because when you think of “possible” or “exists”, you think of “factually possible” or “exists concretely”. But for philosophers, anything can exist. And since your arguments are not part of a philosophical discourse, they will have no weight for philosophers, just as they would have no weight for religious or mystical people, since your discourse is not part of a religious or mystical discourse.

It should not be forgotten that scepticism, as a philosophical doctrine, is also based on philosophical postulates or suppositions. For example, philosophers traditionally maintain that knowledge worthy of the name is certain, indubitable knowledge. Sceptics accept this conception of knowledge. By conceiving knowledge in this way, it is easy for philosophical sceptics to refute or cast doubt on all philosophical doctrines. And, in an attempt to exclude their own doctrine from sceptical criticism, sceptics suspend their judgment. But it is too late. They should have kept their mouths shut from the start, but they have accepted the idea that knowledge is indubitable. How do they know this? How can they justify it? On the other hand, if we no longer conceive knowledge in this ancient and outmoded way, if we withdraw from philosophical discourse in the same way that we withdraw from religious discourse and mystical discourse, the conceivability argument is seen for what it is, a fallacy.

M. O.: Turning now to the issue of matter, I agree that the concept of matter is fictional, since it’s a mathematical set. But I don’t think that matter itself should be identified with its concept. Instead, it should be identified with concrete material objects. In other words, Bunge’s distinction looks like this:

(the concept of matter = matter itself) \neq material objects.

Whereas I would switch the signs “=”, “ \neq ”, like this:

The concept of matter \neq (matter itself = material objects)

The nice thing about Bunge's distinction, as you pointed out, is that it keeps up with his provocative style. On this point, his skills as a polemicist and provocateur were unmatched, and that is one of the things that makes his works so entertaining. But I think that the distinction that I propose has a different advantage. If we identify matter itself with material objects, then our discourse gains clarity, since we are able to say that matter itself exists, literally instead of figuratively. Matter itself exists because it is many things, it is all of the concrete material objects that exist, from galaxies to atoms, from mountains to rivers, from whales to ants, from houses to tables.

If this is so, then one burning question is if matter itself is a single composite object or a plurality of objects instead. This question is not exclusive to matter, because it pertains to other objects as well. Take, for example, the case of the Supreme Court. As Korman argues in his book *Objects: Nothing Out of the Ordinary*, if the Supreme Court is a composite object, then it's a single fleshy object with nine tongues and eighteen elbows, assuming that the part-whole relation is transitive. So, he instead suggests that the Supreme Court is a plurality of objects, specifically nine judges. These nine judges do not compose anything, there is no object that they compose, but this does not mean that the Supreme Court does not exist. It does, because it is identical to those nine judges. I would make a similar case for matter itself. It exists, not as a single object, but rather as a plurality of material objects. Indeed, it exists as the largest plurality of all. What do you think of all this?

F. M.: I'd like to offer an initial response, although I haven't yet read Korman and so I don't have a clear idea of some of the concepts he uses, such as "an assortment", "a plurality" and "a composite". In other words, I'm going to answer from a strictly Bungean perspective. The short answer is that matter cannot exist because it is not a concrete individual object, and only concrete individual objects exist. You mentioned the notion of hydrogen, since Bunge understood it as the set of all hydrogen atoms, which makes it merely conceptual. It's easy to be confused because we use the same word, the same linguistic expression to talk about all hydrogen atoms as well as to talk about each hydrogen atom as an individual concrete object. The same thing happens with the word "family". The

members of a family, which is a set, cannot be confused with a family as a concrete social system (in this last case, a family “member” is a part or a component of a concrete family, not a member of set). So the words “hydrogen” and “family” are used either to designate a set or to designate a concrete system. In the case of “matter”, the word does not designate any concrete object or system. We cannot say “this matter” as we say “this hydrogen atom” or “this family”. So the only way to define matter, if we want to use it at all, is as the set of all concrete objects.

Now, as far as the Supreme Court is concerned, it is a social system that has its own properties and this social system, as any other social systems, does not have tongues or elbows. So, in Korman’s terms, it is not a composite because, I presume, it seems strange that a composite like the Supreme Court would have nine tongues and eighteen elbows. So, according to Korman, the Supreme Court is a plurality of objects identical to the nine judges. Here, I don’t know what “being identical” means. But, from what you report, the nine judges are not the components of anything. Yet the Supreme Court is made up not only of the nine judges, but also of a host of people, all interacting with each other in a mesh of processes that maintains the integrity of the system.

Korman seems to belong to the tradition of analytic metaphysics, which is not good news. A quick search for the terms “system” and “science”, in his book *Objects: Nothing Out of the Ordinary*, shows that he uses “system” only in the expression “solar system” and, worse, he never uses the word “science”. Korman outlines his objective: “My target of inquiry is the way the world is, not our way of thinking about the world” (Korman 2015, 25). It’s impossible to achieve this without science. It is science that tells us in what circumstances two or more material objects make up another object. There may be a few nuggets to be extracted from his work, as Bunge would say, but it certainly has little to offer for the elaboration of a general scientific discourse, which is the lot of all philosophical doctrines.

M. O.: Let’s recall Bunge’s definition of a system. He says that every system has three elements: some components, an environment, and a structure. In later writings he added a fourth element: a mechanism. Bunge says that elementary particles, such as electrons, photons, and quarks are not systems, because they don’t have

components. What he doesn't say is that according to his definition, the Universe can't be a system either. Not because it doesn't have components, but rather because it doesn't have an environment. In other words, if X lacks one of the elements that define a system, then X is not a system, no matter what X is. So, either an elementary particle and the Universe are both systems, or neither of them is. It can't be the case that one of them is a system and the other one is not, because that would be arbitrary, unless a reason is given for why one of them would be a system and the other one would not.

By comparison, it is just as arbitrary to say that the Supreme Court does not have nine tongues but that your body has twenty fingers. In other words, the topic of discussion here is the transitivity of the part-whole relation. The only way to claim that the Supreme Court is a composite object (i.e., a system) that doesn't have nine tongues is to deny that parthood is a transitive relation. But if you deny that, then you also have to deny that your body has twenty fingers. Why? Because if your fingers are parts of your hands and feet, and if your hands and feet are parts of your body, and if you deny that parthood is transitive, then it follows that your fingers are not parts of your body, just as the tongue of each judge is not a part of the Supreme Court. Just as in the case of elementary particles and the Universe, in which we must declare that neither of them are systems or both of them are, here we must declare that parthood is (or is not) transitive for the Supreme Court as well as for your body.

I think that the best strategy for solving this problem is to claim that there is a difference between the Supreme Court and a human body. The latter is a composite object, while the former is not. Parthood is transitive, and your fingers are certainly parts of your body. But the tongue of each judge is not a part of the Supreme Court because the Supreme Court, unlike a human body, is not a composite object. The Supreme Court is comparable to, for example, a group of students. When I say "the students surrounded the building", to use one of Korman's examples, I don't mean to say that there is a single object composed of the students and that such an object is surrounding the building. What I mean to say is that there are many people (i.e., a plurality of students), that are collectively surrounding the building. Or, to use a different example, when I say that there are some fruits on my table, I don't mean to say that

there is a single, large composite multi-flavored fruit on the table, I simply mean that there is a plurality of different fruits there.

Otherwise, I would be committed to the claim that any two objects whatsoever compose a third object. Bunge himself made such a claim in the third volume of his *Treatise*:

Indeed, an individual on our planet and another in a distant galaxy may be taken to associate to form a third individual, so that each component will be a part of the whole, just as much as the two components of a miscible fluid poured into a glass. (Bunge, 1977: 30)

I disagree with Bunge here. In the field of analytic metaphysics, a position like Bunge's would be characterized as permissivist. Proponents of permissivism typically hold that any two objects compose a third, no matter what the objects in question are. David Lewis used the example of a troutkey or trout-turkey, which is an object composed by the front half of some trout and the back half of some turkey, even if these animals are several kilometers apart and are not interacting with each other in any way. Or, to use one of Korman's examples, permissivists are committed to the claim that some dog and some tree compose a trog, no matter if they are interacting with each other or not. In fact, one of Korman's critics, Louis deRosset, argued that trogs exist as physical systems, and he appealed to science in order to justify that claim. Korman examined that critique (as well as other critiques) in an article that he published in 2020:

let us turn to arbitrary physical systems. Take some particular dog and trunk and let us ask: is there a physical system comprising the atoms arranged dogwise and the atoms arranged trunkwise? A dilemma looms. If the conservative agrees that this system exists, then that is tantamount to accepting that trogs exist. Yet denying that there is such a system, deRosset tells us, "is implausible in light of the results of settled science" (Korman, 2020: 566)

Korman denies that there is a system composed of a dog and tree, and I agree with him on this point. He adds the following remarks:

What, then, are these "results of settled science" that are supposed to make this denial so implausible? If deRosset just means that scientific investigation has resulted in a consensus among practitioners that there are such systems, this in itself carries no more weight than a consensus among biologists that Pando exists and is a single

object that is identical to some aspens. Not even if we can get scientists to clarify that they really do think of a system as a single composite object and that they do not regard “systems”-talk as a round-about way of talking about pluralities. What matters is whether they have produced any evidence in support of the metaphysically loaded conclusions they draw, and which tells against less-metaphysically loaded counterparts. (Korman, 2020: 567)

In other words, if I have to choose between agreeing with Bunge when he says that “an individual on our planet and another in a distant galaxy may be taken to associate to form a third individual”, or agreeing with Korman in denying that arbitrary physical systems exist, then I most certainly agree with Korman on this point, which doesn’t entail that I agree with him on other points.

How about you? Do you think that Bunge is right in claiming that any two objects whatsoever compose a third?

F. M.: Your last reply deserves a more detailed response than I can give in a first reply. But here are a few points I can make in response. I agree that a physical (material, concrete) system is not arbitrary, and I’m sure that Bunge would agree too, since he strongly defends the lawfulness principle. Concrete objects can’t do just about anything and therefore can’t associate in just any way. So, Bunge is not claiming that any two objects whatsoever compose a third. Having said that, how to interpret the passage you quote, which I’ve reproduced here for greater clarity:

Indeed, an individual on our planet and another in a distant galaxy may be taken to *associate* to form a third individual, so that each component will be a *part of the whole*, just as much as the two components of a miscible fluid poured into a glass. (Bunge, 1977: 30; italics by me)

This passage is found in chapter 1 of volume 3 of the *Treatise*, a very abstract chapter influenced by mereology. Chapters 1 and 2 of this volume are intended to serve as a foundation for the notion of a thing or concrete object dealt with in Chapter 3. In other words, neither Chapter 1 nor Chapter 2 deals yet with concrete objects or systems. I have not yet formed a clear idea of the usefulness of these two chapters, but what is clear is that such abstract results, to be of any use, are to be obtained by studying the products of science or scientific constructs, whether by axiomatizing scientific theories or

by any other method of analysis. But, traditionally, the approach to mereology is a priori. According to Bunge, this is not the case with his own mereology. He constructed his own mereological theory from the axiomatization of some physical theories. He also points out that the part-whole relationship is not formal. So, if the part-whole relation is neither formal nor metaphysical (a priori), what is it? It is a useful fiction:

[...] we shall be concerned with concrete objects such as atoms, fields, organisms, and societies. We shall abstain from talking about items that are neither concrete things nor properties, states or changes thereof. Any *fictions* entering our system will be devices useful in accounting for the structure of reality. (Bunge 1977, 3:xiv; italics by me)

For Bunge, constructs are fictions. A construct can refer to a concrete object or to another construct, i.e., a conceptual object. In the same way as Bunge's notion of the naked individual and that of the null individual, the notion of a part of a whole and that of the part-whole relation are nothing more than useful fictions, not only in the sense that the concept of "part-whole relation" is a fiction, but also in the sense that this concept refers to a conceptual object that is also called "part-whole relation". In other words, the concept of "part-whole relation" does not refer to a concrete relation. So the passage you quote from Bunge is highly ambiguous. The association relation and the part-whole relation are fictions in this passage, but a planet, a galaxy, a fluid and a glass are concrete objects. Another difficulty in this passage arises from the expression "may be taken", which changes meaning depending on the context. Bunge probably means "can be brought together" to form a third individual. That said, the difficulties of interpreting Bunge's mereology remain. Is the part-whole relation the same as the relation of "being a subsystem of a system"? (Note that for Bunge, the two relations have the same logical properties: they are reflexive, asymmetrical and transitive.) Or is the relation of "being a subsystem of a system" a specification of the more general part-whole relation? But, if we refer to volume 4 of Bunge's *Treatise* on systems theory, we can see that the notion of part-whole is used to define the notion of atomic composition of an object, but this relation is not transitive:

Let us start by defining the composition of a system. A social system is a set of socially linked animals. The brains of such individuals

are parts of the latter but do not qualify as members or components of a social system because they do not enter independently into social relations: only entire animals can hold social relations. In other words, the composition of a social system is not the collection of its parts but just the set of its atoms, i.e., those parts that are *socially connectible*. (Bunge 1979, 4:5 italics by me)

According to this notion of atomic composition, the US Supreme Court does not have nine tongues. Each tongue is a part of a judge as a living organism, and each judge is a part of the Supreme Court as a social system. Each judge is a part of the Supreme Court because each judge is *linked, connected or coupled* to the other judges through social ties. So, you are right, there is a difference between the Supreme Court and a human body: they are two different kinds of systems, each with its own *coupled parts*. You are also right when you say that the Supreme Court is comparable to a group of students around a building because in both cases they are social systems and not because in both cases we are dealing with a plurality of objects. The people who are the judges and the people who are the students are coupled parts of the Supreme Court and of an education system respectively. (It is interesting to note here that a single person is part of several social systems, which is not the case for an organ, which belongs to a single body. The lesson here is that physical, chemical, biological and psychosocial systems are not organized in the same way, which requires not only different sciences, but also different metasciences.) What about some fruit on a table? These fruits are part of several social systems. The main role of some social systems is to pick or produce fruits and then distribute it. These fruits end up in the stomachs of certain biological systems, human beings, to keep them alive and allow them to maintain social links in several social systems.

Thus, while analytical metaphysics gives a large role to mereology, Bunge sees his own mereological theory as an important but tiny part of his own ontology. From a few mereological notions, he constructs much richer and more powerful ontological notions which allow him to give a more accurate account of a general (metascientific) representation of the world because it accords better with more specific (factual) representations of each science.

M. O.: Given how abstract the initial chapters of the third volume of the *Treatise* are, it's certainly possible that the parthood relation

is fictional according to Bunge. But if this is so, then it leads to a contradiction if we take into consideration his definition of reality:

Our definition of “reality” cannot be other than this:

DEFINITION 3.30 Let Θ be the set of all things and $[\Theta]$ its aggregation. Then

Reality =_{df} $[\Theta] = \square = \text{the world}$.

The reality of an object consists in its being a part of the world. (Bunge, 1977: 161)

Notice that Bunge is using the term “reality” in two different senses here. Firstly, he says that reality is identical to the world. And by “world” he means the Universe. In other words, Bunge believes that the Universe and reality itself are the same thing, they’re identical. Secondly, he says that an object is real if it’s a part of the world. And when he says “part” here, it should be understood in a mereological sense, he’s talking about the part-whole relation. This can be seen by taking a look at Postulate 1.2 and Definition 1.3, in the same book:

POSTULATE 1.2 There exists an individual such that every other individual is part of it. I.e., $(\exists x)[x \in S \ \& \ (y)(y \in S \rightarrow y \sqsubset x)]$.

DEFINITION 1.3 The universal individual introduced by Postulate 1.2 is called *the world* and is denoted by \square .

Remark 1 Note again that the world, i.e. \square , is an individual not to be confused with the set S of all individuals, which is a concept not a physical object. (Bunge, 1977: 30)

The symbol \square is a construct, but what that symbol denotes is not a construct, it’s the Universe, which is identical to reality itself, according to Definition 3.30. And, according to Postulate 1.2, every concrete object is a part of the Universe. Here’s the problem: if the reality of an object consists of being a part of the Universe, then this contradicts the idea that the part-whole relation is fictional. How can it be fictional, if it’s supposed to guarantee the reality of every concrete object, insofar as every concrete object is a part of the Universe?

This isn’t the only contradiction in Bunge’s ontology. Despite the admiration and respect that I have for him and his work, there are

some problems with some of his ideas. Consider, for example, his comments on geometrical shapes:

Another obvious consequence of the preceding considerations is that concrete objects (things) have no intrinsic conceptual properties, in particular no mathematical features. This last statement goes against the grain of objective idealism, from Plato through Hegel to Husserl, according to which all objects, in particular material things, have ideal features such as shape and number. What is true is that some of our *ideas* about the world, when detached from their factual reference, can be dealt with by mathematics. (For example, by analysis and abstraction we can extract the constructs “two” and “sphere” from the proposition “That iron sphere is composed of two halves”.) In particular, mathematics helps us to study the (mathematical) form of substantial properties. In short, not the world but some of our ideas about the world are mathematical. (Bunge, 1977: 118, emphasis in the original)

In other words, Bunge is saying that concrete objects do not have shapes, since shapes are mathematical objects (specifically, they’re geometrical objects), and he says that such objects are constructs. Yet this contradicts another passage from the same book, in which he says that shapes are real:

Remark 3 Shape, hardly a property of basic things, emerges rather definitely at the macromolecular level and becomes the more definite, the bulkier the thing. It is therefore a derivative property. Moreover it emerges from nongeometric characteristics. Thus the helicoidal configuration of a DNA molecule results from chemical forces such as the hydrogen bonds between an NH group and a carbonyl group, and it is influenced by the environment of the molecule—to the point that the pattern disintegrates at high temperatures. Likewise the shape of a macrobody is determined jointly by the inner stresses and the external forces. In general, shape or geometric pattern, when it exists at all, is an outcome of the interplay of internal forces and environmental constraints. *Remark 4* Although shape is a secondary property, once acquired, it conditions the acquisition or loss of further properties, which are called *steric properties*. Suffice it to recall that the specific activity of enzymes depends upon their shape. (Bunge, 1977: 294, emphasis in the original)

The contradiction here is quite evident. On page 118 he suggests that concrete objects do not have geometric shapes, while on page 294 he says that shape is a derivative property that emerges from nongeometric characteristics.

Another contradiction arises from the passage on animal societies that you quoted, from the fourth volume of the *Treatise*, on page 5. I've quoted this passage myself in my article on Harman's philosophy and materialism (Orensanz 2024). But before recalling it here, the contradiction that I mentioned is the following one: if the part-whole relation is fictional, then this contradicts the claim that a system has an atomic composition. How can it be the case that the brain of an animal is one of its parts if the part-whole relation is fictional?

As for the problem that I pointed out in my discussion with Harman, it can be summarized as a question: does an animal have molecules? The answer is obviously affirmative. Yet, if the animal's brain is not part of a social system, then why are the molecules part of the animal's body? Unless an explanation is given for this differential treatment, then this is just metaphysical arbitrariness. To be coherent, we would have to say an animal body does not have molecules, since molecules are not part of what Bunge calls the "atomic composition" of the animal's body. The genuine parts would be, for example, the animal's brain, limbs, stomach, etc., but not the molecules. So, if we want to say that molecules are parts of an animal's body, then we also have to say that the animal's brain (and tongue, and elbows, if it has any) are parts of the animal's society. To put it more succinctly: If the Supreme Court does not have tongues, then an individual judge does not have molecules. And if the judge in question has molecules, then the Supreme Court has tongues.

I believe that these contradictions arise because Bunge usually wants to have his cake and eat it too. He wants to say that the part-whole relation is fictional, but at the same time he wants to use that relation to define the reality of concrete objects. Likewise, he wants to say that shapes are fictional (because they're geometrical concepts) and at the same time he wants to say that they're real (because they arise from nongeometric characteristics).

As far as I can see, the best strategy for resolving these contradictions is to trace a distinction between conceptual parthood and real parthood, and between conceptual shapes and real shapes. This

would be similar to the distinction that Bunge already traces between conceptual existence and real existence. So, for example, we can say that an iron sphere does indeed have a real shape (which is something that you once suggested to me in an email, but I wasn't entirely sure about it at that moment. Now I'm inclined to agree with you). It's not a perfect sphere, but it's close enough. The same goes for parthood. You can say that conceptual parthood is fictional, it's a construct, but that construct denotes a real relation, just as the symbol \sqsubset is a construct that denotes a real thing (the Universe).

But if this is so, then we're back at the beginning of our discussion about parts and wholes. Specifically, is it true that an individual on our planet and another one in a distant galaxy can associate to compose a third individual, as Bunge says? I think that is not true. You might say, in Bunge's defense, that Chapter 1 of the third volume of the *Treatise* deals with abstractions, since it's mostly about bare individuals. But the problem with that idea is that in Chapter 3, which is dedicated to fully qualified real things, he says that the postulates and theorems about bare individuals apply to fully qualified real things as well, and this includes what he had previously said about association and composition. In his own words:

We can retrieve for things everything we defined or proved for bare individuals (or things deprived of their properties other than the property of associating and the properties, such as composition, derived from associability). (Bunge, 1977: 114)

So, his ideas about any two objects composing a third are not limited to his discussion on bare individuals. They also apply to his ideas on fully qualified real things. And this, to me, is highly questionable. It's the same claim that analytic permissivists make when they say that a trout and a turkey compose a troukey, or that a tree and a dog compose a trog. Perhaps Bunge was not fully aware of all of the ramifications and consequences of his ideas on composition, just as he probably was not aware of the contradictions that I mentioned before. But that is one of the reasons why we're having this conversation in the first place: to correct any mistakes that Bunge might have made, so that we can advance his program even further. We're both Bungeans, you and I, though I'm admittedly less orthodox. But we both admire his work, and we agree with most of his ideas. To use a metaphor, Bunge's *oeuvre* is like a good car that just

happens to have a few problems. We don't need to replace the entire car, all that we have to do is to lift the hood and look at the engine and the other components and replace just a few faulty pieces. At least that's my opinion. How about you? Do you think that Bunge's ideas need some replacements and corrections, or do you think that he hasn't made any mistakes and that we should instead focus on adding more ideas?

F. M.: It's clear that Bunge hasn't said everything, that he's made mistakes, and that his thinking contains inconsistencies and contradictions. But what struck me most about Bunge was the way he reasoned. Bunge doesn't problematize conceptual problems inherent in science in the same way that philosophers do. He attacks these problems in the same way as scientists would if they took the trouble to do so explicitly. Not that scientists don't solve conceptual problems, but they often do so informally, on the spot, without elaborating on how to go about it. Many philosophers have claimed to take care of this or to take science into account, but most of the time it's either wishful thinking, a naive approach, a bad joke, or an intellectual scam. In short, they problematize the conceptual problems of the sciences as philosophers, which is of no use in understanding science and building a general picture of the world based on scientific knowledge.

Now, what's the best way to introduce the concept of a thing or concrete object, or the richer concept of a concrete system? I'm not in the best position to resolve this question, and many others related to it, but here are a few remarks and suggestions, in order to help in the constitution of a Bungean program, or, better yet for me, a metascientific research program.

The difference between a scientific representation and a metascientific representation is that the former refers to real things or concrete objects, while the latter refers to scientific constructs, whether these are explicit, like the concept of mass of a particular theory, or implicit, like the concept of property used by all sciences. There are other cases, such as the implicit general postulates upheld by scientists, e.g., that objects obey laws, that these objects really exist, not just in a metaphysical world, that they are knowable and representable up to a certain point, and so on. What I'm getting at is that all Bungean constructs, and therefore metascientific constructs for my part, refer to other constructs. It's not the role of the

metasciences to refer to concrete objects, it's the role of the factual sciences. Thus, metascience is a system of representation that studies another system of representation, science, while the latter studies concrete reality. This paragraph describes a situation which, and you mentioned it in your last intervention above, derives from the dichotomy between real existence and conceptual existence, between the thing and the concept, between reality and fiction, or between reality and the representation of it. This is fundamental. Either a construct refers to another construct or it refers to a concrete object. There is no room, of course, for ghosts and gods, but neither for any metaphysical entity imagined by philosophers. But it is difficult to keep a cool head and not slip between reality and fiction by creating a fictional reality, a metaphysical world, which would reconcile reality and the conceptual representation of it.

Science is a construction of the mind. All scientific knowledge is made up of constructs. So, if metascience studies scientific knowledge (explicit or implicit), then it only studies constructs and not concrete objects. And precisely, the concept of thing or concrete object that you mentioned, introduced by Bunge in chapter 3 of volume 3 of the *Treatise*, does not refer to concrete objects, but to other constructs, as in the case of the formal sciences, except that metascience is not a formal science (contrary to what Bunge thinks for its semantics, because the semantics of the factual sciences depends on the constructs of the sciences, whereas logic and mathematics are autonomous). Bunge has constructed a conceptual object, which he has named "thing", just as he has constructed an object named "property", "fact", "event" and so on. There is no general or universal thing, property, fact or event in nature, any more than in a metaphysical world. There are only singular things, properties, facts or events, which scientists try to represent by constructs (concept, proposition, classification, theory, model, etc.), but these constructs have to be worked out in such a way that they can be confronted with reality. If Bunge's theories were to refer to concrete objects, they would be empirically testable. In fact, Bunge maintains that it is not possible to test his own theories empirically.

So, you are right, "the best strategy for resolving these contradictions [in Bunge's ontology] is to trace a distinction between conceptual parthood and real parthood, and between conceptual shapes and real shapes." What form a solution should take, I do not know precisely. But it must necessarily exclude the possibility of

“troutkey” and “trog”. There is no scientific theory that makes the formation of such monsters possible by predicting the existence of such objects, just as gravitational waves were predicted long before they were detected. And if we think we don’t have scientific theories mature enough to settle the question, then let’s appeal to the expertise of scientists. I doubt we’ll find a single scientist who will take the existence of these monsters seriously. My point is that the question of the existence of concrete objects is best left to science, which is also Bunge’s position. Metascience should only deal with scientific knowledge, not with reality, and, above all, it must not invent a more fundamental “metaphysical reality”, which according to philosophers would make it possible to bridge the gap between concrete reality and the representation we have of it.

It is interesting that you quote the following passage from Bunge: “We can retrieve for things everything we defined or proved for bare individuals (or things deprived of their properties other than the property of associating and the properties, such as composition, derived from associability).” (Bunge, 1977: 114) It was this passage that first made me doubt about the necessity of chapters 1 and 2 of volume 3 of the *Treatise*. And while we’re at it, why not drop the notion of a concrete thing or object and move straight on to that of a concrete system? We could drop the notion of parthood, develop a notion of subsystem that takes into account the way scientists represent things, because my nose tells me that sociologists don’t consider the Supreme Court to have nine tongues, at least not in any interesting sociological sense. I know it’s not your position, but it’s a fine example of the kind of pseudo-problems decried by Bunge. If we look at dozens of examples from various scientific disciplines, we may realize that the relation “being a subsystem of” is not represented as transitive by scientists? Whatever solutions may be proposed by future metascientists, we must remember that when we encounter a paradoxical or strange situation, we must be wary not only of ourselves, but also of those who propose it. This is a heuristic rule that in no way guarantees the success of our research. It is simply the famous rule of reasonable doubt. But philosophers love paradoxes, they cultivate paradoxes, and the discovery of a paradox can be the high point of a philosophical career.

I don’t think Bunge’s contradictions arise from the fact that he wants his cake and eat it. It is simply difficult to maintain a clear separation between metadiscourse and discourse, between

metascience and science, between reality and its scientific representation, and between this scientific representation of the world and the metascientific representation of this representation. Not to mention that Bunge uses formal tools to elaborate his metadiscourse, just as science does to elaborate its discourse on reality. This makes it very easy to write ambiguous passages that mix metascientific, scientific and mathematical constructs. But of all the philosophers who have attempted to construct a metadiscourse on science, Bunge is by far the one who navigates best between levels of discourse, and who almost always keeps in mind the difference between reality and the representation of reality.

I understand that you are not a permissivist in analytic metaphysics, the view that “troutkey” and “trog” exist (Where? How? Permissivists don’t say), and you don’t believe that the Supreme Court has nine tongues. But if we come across paradoxical or contradictory results, the conclusion is that it’s quite possible that our metadiscourse doesn’t adequately account for scientific knowledge. So, the contradictions you point out in Bunge’s work are right, but they can’t be resolved by analytic metaphysics. At best, philosophers can inspire us with ideas. The only way to overcome the contradictions that arise in our metadiscourse on science is to keep in mind the difference between reality and its representation, not to mix metascience, science and formal science, and, very importantly, to study the sciences. But this is not the approach of analytic metaphysics in general, nor that of Korman in particular. It’s important to look at the notions of part-to-whole, composition, subsystems, etc., but Korman’s a priori, intuitive and commonsense approach, with the help of linguistic and grammatical categories, won’t provide interesting answers to the sciences.

I assume that the Supreme Court is a social system. It’s wrong then to claim that the Supreme Court is a plurality of objects, unless you maintain that “plurality of objects” is synonymous with “system”, but then the Supreme Court possesses properties that the judges do not, but in that case the Supreme Court cannot be identical to the nine judges. I don’t have a final answer here, but any metascientific solution must take into account the fact that there are systems composed of subsystems, and then study how scientists implicitly and explicitly account for the relationship between systems and subsystems. This is the opposite of an a priori approach

that defines, for example, the part-whole relation without taking scientific knowledge into account.

As far as matter is concerned, your Korman-inspired solution is to treat that word as a collective noun, which seems to me to be a category mistake since a collective noun is a linguistic or grammatical notion, which is not surprising since Korman is an analytic philosopher. Furthermore, we can't draw a parallel between matter and the Supreme Court, since the Supreme Court is clearly a social system, whereas matter doesn't refer to any particular system. So, it's easy here to treat the collective noun "Supreme Court" as denoting the concept "Supreme Court", which refers to the concrete object that is the Supreme Court, a social system. Now, does matter refer to a plurality of objects? I couldn't say. The way in which we express ourselves vaguely in everyday life by designating without too much precision certain groupings of objects is not an appropriate way to express ourselves in science and metascience. So, I don't know how to deal with a collective noun that doesn't refer to a concrete system, in a way that makes the concept relevant to science and metascience, other than to retain Bunge's solution of defining matter as the set of all concrete objects, which is only an operation of the mind, that of gathering all concrete objects into an abstract set. In short, a collective noun can be interpreted in a variety of ways in everyday life, and must be carefully interpreted when we want to extract from it a scientific or metascientific concept.

2] Concluding Remarks

Throughout the preceding dialogue, Maurice and Orensanz have discussed several topics which are important to both metascience as well as philosophy, such as the possibility (or impossibility) of proving that the external world exists, how best to conceptualize matter, the transitivity of the part-whole relation and its associated paradoxes, the difference between systems and assortments, the status and role of fictional objects in ontology, and Bunge's monumental contributions to the development of metascience. In the next part of this dialogue, to be published in a future volume, Maurice and Orensanz will continue their discussion of key topics for the advancement of the metascientific program.

References

- Bunge, M. (1967). *Scientific Research I: The Search for System*. Berlin-Heidelberg-New York: Springer-Verlag.
- Bunge, M. (1967). *Scientific Research II: The Search for Truth*. Berlin-Heidelberg-New York: Springer-Verlag.
- Bunge M. (1974). *Treatise on Basic Philosophy: Semantics I, Sense and Reference*, vol. 1. 8 vol. Dordrecht: Reidel.
- Bunge M. (1977). *Treatise on Basic Philosophy: Ontology I, the Furniture of the World*, vol. 3. 8 vol. Dordrecht: Reidel.
- Bunge M. (1979). *Treatise on Basic Philosophy: Ontology II, a World of Systems*, vol. 4. 8 vol. Dordrecht: Reidel.
- Bunge, M. (1981). *Scientific Materialism*. Dordrecht: Reidel.
- Bunge M. (1998). *Philosophy of Science I: From Problem to Theory*. New ed. of *Scientific Research I: The Search for System* (1967). New Brunswick, NJ: Transaction Publishers.
- Bunge M. (1998). *Philosophy of Science II: From Explanation to Justification*. New ed. of *Scientific Research II: The Search for Truth* (1967). New Brunswick, NJ: Transaction Publishers.
- Bunge, M. (2006). *Chasing Reality. Strife over Realism*. Toronto: University of Toronto Press.
- Bunge, M. (2003). *Philosophical Dictionary* (2nd ed.). Amherst: Prometheus Books.
- Bunge, M. (2012). *Evaluating Philosophies*. Dordrecht: Springer.
- Bunge, M. (2010). *Matter and Mind: A Philosophical Inquiry*. New York: Springer.
- Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS medicine*, 2(8), e124.
- Korman, D. Z. (2015). *Objects: Nothing Out of the Ordinary*. Oxford: Oxford University Press.
- Korman, D. Z. (2020). Conservatism, counterexamples and debunking. *Analysis*, 80(3), 558–574.
- Maurice, F. (2022). What is metascientific ontology? *Metascience* 2, 22-44.
- Orensanz, M. (2024). Object-Oriented Ontology and Materialism. *Metascience* 3.
- Pradeu, T., Lemoine M., Khelifaoui, M., Gingras, Y. (2021). Philosophy in Science: Can philosophers of science permeate through science and produce scientific knowledge? *The British Journal for the Philosophy of Science*, IN PRESS. <https://doi.org/10.1086/715518>.

COPYRIGHT AND DISTRIBUTION POLICY

This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material.

If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.