

**This is a heavily revised version of my earlier paper on
Meillassoux. As always, comments are welcome!**

Science, Realism and Correlationism. A Phenomenological Critique of Meillassoux' Argument from Ancestrality

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ABSTRACT: In a widely discussed essay that was originally published in 2006, Quentin Meillassoux launches a sweeping attack against “correlationism”. Correlationism is an umbrella term for any philosophical system that is based on “the idea [that] we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other” (Meillassoux 2012, p. 5). Thus construed, Meillassoux' critique is indeed a sweeping one: It comprises major parts of the philosophical tradition since Kant, both in its more continental and in its more analytical outlooks. In light of this critique, the aim of this paper is twofold: On the one hand, I shall defend phenomenology against Meillassoux' main argument, the “argument from ancestrality”. On the other hand, I will argue that this argument, albeit unsuccessful in its original form, can be modified to pose a more serious threat. Although this modified version can also be circumvented, it forces phenomenologists to clarify their stance towards the natural sciences.

Keywords: Quentin Meillassoux, scientific realism, Edmund Husserl, phenomenology, continental philosophy of science

1. Introduction

In a widely discussed essay that was originally published in 2006 and translated to English in 2008, Quentin Meillassoux launches a sweeping attack against what he calls “correlationism”. Correlationism is the meta-epistemological position according to which there is no “view from nowhere” that represents reality “as it is”, independently of any perspective towards the world. Rather, according to correlationism, our cognitive contact with reality is always shaped by a correlation within which the world appears. Since Kant, different philosophical projects have emerged from different attempts to specify the nature of the respective *relata* (e.g. consciousness/world, language/world, paradigm/world etc.). But in all of these cases, the basic idea is that it is impossible to address one side of the correlation independently from the other. As a consequence, any reference to the self, to others or to the world necessarily presupposes a correlation within which the objects of our intentions appear.

Meillassoux' thesis is that correlationism – in all of its historical or contemporary instantiations – is a mistake. It is a mistake because it makes it impossible for us to address the *absolute*. What is the *absolute*? It is “the *great outdoors*, the *absolute* outside of pre-critical thinkers: that outside which was not relative to us, and which was given as indifferent to its own givenness to be what it is, existing in itself regardless of whether we are thinking of it or not” (Meillassoux 2012, p. 7). So, Meillassoux' main complaint is that correlationism prevents us from addressing reality as it is, independently of any correlation, attitude, perspective, conceptual scheme or paradigm.

His aim is thus to “wak[e] us from our correlationist slumber” (Meillassoux 2012, p. 128) and to free us from the “strange feeling of imprisonment or enclosure” (Meillassoux 2012, p. 7) that is, on his view, a natural consequence of correlationism.

In what follows, I will not be concerned with the constructive part of Meillassoux’ project. That is, I shall not delve into an exposition of how a non- or post-correlationist philosophy might look like. Rather, my efforts are focused on the destructive part of Meillassoux’ position, i.e. on his critique of correlationism. I shall proceed as follows: In sections 2 and 3, I give the basic outlines of Meillassoux argument. I shall then go on to comment on its premises in sections 4 to 7. The aim in section 8 is to show that Meillassoux’ original argument fails because it trades on an empirically questionable notion of observation. However, as I shall argue in section 9, Meillassoux’ initial argument can be modified so as to become a more serious challenge for phenomenology. After meeting two objections against my modified version of Meillassoux’ argument in section 10, I will propose a final solution in section 11.

Before turning to details, two general remarks about the scope of this paper are in order. The first concerns my understanding of the term “phenomenology”: In a similar sense in which there is not just *one* analytic movement, but rather a number of individuals working in roughly the same philosophical spirit, there is also not one phenomenological approach. In this paper, “phenomenology” thus refers to a way of doing philosophy that loosely¹ follows Edmund Husserl’s pioneering work. My second remark concerns the infamous analytic/continental-distinction: Although it has become a commonplace to regard the distinction as being of limited philosophical relevance, the reality is still that many philosophers who associate themselves with one tradition tend to ignore the other. My paper is intended to show that this mutual ignorance is not only unfortunate, but also unproductive. While Meillassoux’ work illustrates that philosophy from outside the Anglo-American mainstream is far less remote than is sometimes assumed, continental philosophers could profit from realizing that analytic philosophy of science, far from being an austere exercise in logic-chopping, has advanced our understanding of science immensely.

2. The Dilemma of Ancestrality

The starting point of Meillassoux’ argument against correlationism is the seemingly uncontroversial view that contemporary science is a rational enterprise that aims at true descriptions of the empirical world. Of course, we may sometimes be in no epistemic position to determine the truth-values of particular scientific statements. Or we may sometimes fail in our efforts to do so. But Meillassoux follows the current realist trend to claim that, by and large, our mature scientific theories generate (approximately) true statements about the empirical world. In addition to this, the scope of scientific theories is said to be unrestricted, both temporally and spatially. This holds true, in particular, of the physical laws that are expressed in these theories: Physicists postulate laws that are supposed to hold everywhere, and at any time.

¹ My focus in this paper is not historical or exegetical. Rather than pursuing the almost impossible aim of figuring out the “real” Husserl, my interest is to carve out a position that is, first, philosophically defensible and, second, true to the spirit of phenomenological methodology.

² For reasons that will become clear, I am assuming that dinosaurs lacked consciousness in the relevant sense of the term.

³ On my understanding, the “rational character” of an assertion must be distinguished from what could be

Meillassoux emphasizes another seemingly uncontroversial truth about the modern sciences: It is part of their daily business to generate statements about objects that do not become consciously present in acts of direct observation. As we shall see in section 7, there are quite different reasons why objects are observationally inaccessible. However, of special interest for Meillassoux' purposes are objects that are observationally inaccessible because they existed a very long time ago. In particular, Meillassoux focuses on "ancestral objects", i.e. on objects that existed prior to all life and prior to all consciousness. One well-known example of an ancestral object is the asteroid that hit the earth 66 million years ago and that caused the extinction of the dinosaurs;² another ancestral event is the Big Bang.

What is so special about ancestral objects and events? Well, if we accept our current cosmological knowledge about, say, the Big Bang, we have to acknowledge that, for instance, the four fundamental forces collapsed into just one due to the extremely high temperatures right after the birth of the universe. But, following Meillassoux, statements such as these confront correlationism with a dilemma: "How are we to grasp the *meaning* of scientific statements bearing explicitly upon a manifestation of the world that is posited as anterior to the emergence of thought and even of life – *posited, that is, anterior to every form of human relation to the world?*" (Meillassoux 2012, pp. 9-10) The problem to which Meillassoux alludes to is this: According to correlationism, the only way to get in touch with reality is through a correlation between acts that are directed towards the world and the world that appears in these acts. But doesn't cosmology (and various other scientific disciplines) violate this condition by making assertions about ancestral objects that, by their very definition, existed prior to any possible correlation between subject and world? If this is indeed the case, then correlationists seem to face a dilemma: They may either uphold correlationism at the cost of thereby declaring huge parts of modern science as irrational or nonsensical. Or they may accept ancestral statements at the cost of thereby jeopardizing the coherence of their own position. I shall call this the *dilemma of ancestrality* (or DA, for short).

3. Reconstructing DA

The objective of the previous section was to give a flavour of the argument that Meillassoux advances. However, since my strategy against DA will be to scrutinize some of its implicit premises, it is necessary to give a clearer account of its structure. The best way to come to grips with DA is, I think, to cast it as a *reductio ad absurdum*:

- P1: In order for assertions about objects to be rational in character, it must be possible for these objects to become present within a correlation between subject and world.
- P2: Natural science is a rational enterprise.
- P3: Scientific theories are universal in the sense that their scope is unrestricted with respect to time, distance and size.
- P4: It is due to their unrestricted scope that scientific theories make rational assertions about objects that could not become present within a correlation between subject and world.
- C1: P1 and P4 conflict.
- C2: Therefore, since P2, P3 and P4 are beyond doubt, P1 has to be rejected.

² For reasons that will become clear, I am assuming that dinosaurs lacked consciousness in the relevant sense of the term.

Let me now take a closer look at each of the four premises.

4. Phenomenology and Correlationism

P1 expresses what could be called the “principle zero” of correlationism. But is it correct to attribute this principle to phenomenology? The probably most defining insight in all of phenomenology is that the essential feature of conscious experiences is their intentionality, their *being about something*, their *being conscious of something*. I do not merely see, doubt, think etc. When I see, I always see *something*, for instance, my bike; my perception is thus a perception *of* something, namely of my bike. When I doubt, I always doubt *something*, for instance, that the sun will turn into a supernova tomorrow. Hence, my doubt is *about* something, namely the sun’s gloomy future.

The point is that every intentional experience is, first, an experience of a certain type (seeing, doubting etc.) and, second, an experience of a certain object (my bike, the sun etc.). One way to express this is to say that there are two aspects to every intentional experience: the intentional *quality* that determines the experience as a particular type of experience; and the intentional *matter* that specifies what the experience is about (Husserl 2001b, pp. 119-122). Intentional matter and quality must be held distinct because different intentional qualities can be combined with the same intentional matter and different intentional matters can be combined with the same intentional quality. But, and this is crucial, intentional matter and quality are nevertheless *essentially correlated*. In a similar sense in which there is no tone without a pitch, there is no intentional experience that involves only intentional quality without intentional matter, or only intentional matter without intentional quality. This insight has far-reaching consequences: It is due to its intentional structure that consciousness cannot be viewed as if it were detached from the world towards which it is always already directed. But, for the very same reason, it is equally questionable to make assertions about objects that could not, in principle, be accessed through intentional acts in which these objects are given. This, for instance, is the reason why phenomenologists do not accept Kantian things-in-themselves. Since they are objects that can only be posited, but that, by their very definition, could not become present in intentional experiences, phenomenologists reject things-in-themselves as “mythical constructions” (Husserl 1970, §30).

It is only through intentionality that the world becomes present to us. Just how deeply rooted this insight is in phenomenology becomes clear when we take a look at the phenomenological understanding of reason and rationality. For instance, in *Ideas 1*, Husserl writes that “*the posited characteristic has as its own a specific rational character [...] if and only if it is a position on the basis of a fulfilled, originally presentive sense and not merely on the basis of just any sense*” (Husserl 1983, p. 327). This passage again underscores the significance of intentionality for the entire phenomenological project: Assertions about objects have a rational character if and only if the objects about which something is asserted can become immediately present in appropriate intentional acts.³

³ On my understanding, the “rational character” of an assertion must be distinguished from what could be called its “concrete rationality”. What I mean is this: It is a necessary as well as a sufficient condition for the *rational character* of an assertion that the object about which something is asserted can become present in conscious experience. However, rational character alone does not guarantee concrete rationality. That the former is only a necessary, but not a sufficient condition for the latter can easily be

As a consequence (and in a sense that will be specified in more detail below), assertions about a reality that is in principle inaccessible through intentional acts lie beyond the reach of rational discourse. This, however, has not only consequences for the appraisal of genuinely philosophical notions such as the Kantian thing-in-itself. It also affects how phenomenologists think of more mundane concepts such as the notion of physical thinghood. For instance, in the *Logical Investigations*, Husserl defines a physical thing “as the possible object of a straightforward percept” (Husserl 2001b, p. 285). Hence, it is part of their essence that physical things “can be given [...] sensuously in sensuous ‘modes of appearance’” (Husserl 1983, p. 120), that they are “essentially *capable of being perceived*” (Husserl 1983, p. 99). In full agreement with the earlier remarks about reason and rationality, Husserl claims that these determinations are “implicit in experience’s own *essence* [...] which functions as the absolute norm for all rational discourse about physical things” (Husserl 1983, p. 118; my emphasis).

It should have become clear by now that Meillassoux correctly identifies phenomenology as a form of correlationism. It is indeed crucial to the phenomenological program that the rational character of assertions about objects is tied to the possibility of these objects becoming present in appropriate intentional acts. I shall say more about this below.

5. Science, Meaning, and Truth

What about P2? On the most fundamental level, P2 merely expresses a general pro-scientific attitude. P2 confirms that, even though there may be other legitimate ways to make sense of the world, science is one of them. Thus construed, it is hard to imagine how phenomenology could seriously take exception to P2. Admittedly, the history of the phenomenological movement also comprises tendencies of a more distanced, sometimes even hostile stance towards the sciences. But in light of the current trends to advance closer collaborations between phenomenology and various kinds of empirical research, it appears spurious to not embrace this broad understanding of P2.

However, it is also clear that DA depends on an interpretation of the natural sciences that goes well beyond this rather innocent understanding of P2. Although Meillassoux is not very specific about the details of his own philosophy of science, there is no denying that he is committed to a robust version of scientific realism. Since I will examine this point more closely in section 11, I restrict myself to a few basic remarks here: To interpret P2 realistically is to claim that scientific theories aim at an unconditionally true story about their respective domains of investigation. Of course, scientific realists, Meillassoux included (2012, p. 12), have taken the lesson of fallibilism to heart. That is, they do not deny that scientific claims are always open for further revision and refinement. Yet, they still insist that the aim of the natural sciences is to advance truth in a correspondence-theoretical sense and that, by and large, scientists are successful in achieving this aim.

6. The Scope of Scientific Theories

shown by means of an example: Consider a person who has a perfectly good understanding of the laws of refraction, but who nevertheless asserts that a stick that appears bent when half-submerged into water really is bent. What the person asserts is not irrational because it lacks rational character. Rather, the person is irrational because she asserts something despite strong evidence to the contrary. In this paper, I am only concerned with the rational character of assertions and not with their concrete rationality.

P3 concerns a capacity of theories that is usually regarded to be essential to the very idea of modern natural science: Once the general scope of applicability is determined, the validity of a theory is ideally unrestricted with regard to time, space and size (cf., e.g., Husserl 2001c, §2, pp. 180-190). Without going into details here (cf. e.g. Earman 1978), the basic idea is this: Imagine the ideal situation in which we are in possession of a theory that expresses the one and only law of gravity. If we do so and if we also have the relevant empirical data at our disposal, we are in a position to account for the behaviour of each and every physical thing that, qua definition, falls under the scope of our theory. It doesn't matter (pun intended) whether we're making a *prediction* about the behaviour of a physical thing *in the future* or a *retrodiction* about the behaviour of a physical thing *in the past*. From the perspective of our theory, it also doesn't matter whether we are talking about something incredibly small or something incredibly big, about something that exists on our desk or something that exists at the far end of our galaxy. The only condition an object must fulfill to fall under our ideal gravitational theory is that it instantiates the property of having mass. Other than that, our theory is *universal* with regard to space, time and size.

7. Going Beyond the Correlation

In light of what has been said so far, it is obvious that P4 is a direct consequence of P3: It is due to their universality that scientific theories make assertions about physical things, events and processes that cannot become present in conscious experiences and thus within a correlation between subject and world. Let us call these things, events and processes *unobservables*. On closer inspection, however, the entirety of unobservables does not form a homogeneous class: There are at least three kinds of unobservables, and it is important for what follows to acknowledge their differences.

Some things are unobservable due to their location in space, relative to the spatial location of the observing subject. Let us call these unobservables *l-unobservables*. Examples for l-unobservables (relative to my current location) are the Mount Everest or the planet Jupiter. Other things are unobservable due to their position in time, relative to the temporal position of the observing subject. Let us call these unobservables *t-unobservables*. Examples for t-unobservables are the vase that fell to the ground yesterday while no one was watching or the asteroid that caused the extinction of the dinosaurs. Still other things are unobservable due to their size. Let us call these unobservables *s-unobservables*. Examples for s-unobservables are atoms, quarks or genes.⁴

Making these distinctions explicit is important because it is not implausible to take different epistemic stances towards different kinds of unobservables. Consider the case of l-unobservables: Given my current spatial location, a great many of the things I claim to know are l-unobservable. For instance, I claim to have perfectly good knowledge of my bike. But since I left it at home today, my bike is currently l-unobservable. Another way to put this is to say that, as things stand now, my bike cannot become sensuously present in appropriate intentional experiences.

⁴ Of course, my distinction between l-, t- and s-unobservables is neither excluding nor exhaustive. For instance, a radioactive nucleus that decayed millions of years ago at the far end of our galaxy would fall into all three categories at once. Hence, it is for purely pragmatic reasons that the following discussion is restricted to *macroscopic* l- and t-unobservables.

At first glance, one could be led to believe that cases of l-unobservability pose a problem for phenomenology. As I have pointed out in section 4, phenomenologists tie the rational character of assertions about objects to the possibility of these objects becoming present in appropriate intentional acts. Hence, since it is impossible for my bike to become consciously present due to its l-unobservability, one could suppose that assertions about my bike are somehow suspect by phenomenological standards. However, as Meillassoux also acknowledges (2002, pp. 18-22), this suspicion can easily be dispelled: Even if we ignore for the moment that my knowledge about my bike stems from previous perceptual encounters with my bike, I know that I could simply change my spatial location: If I were at home right now, nothing would prevent my bike from becoming present in appropriate intentional experiences. What is more, the rational character of assertions about my bike also does not depend on whether the bike can become consciously present *to me*. As far as their rational character is concerned, it suffices that the object about which something is asserted can become consciously present *to me or any member of my epistemic community* (Husserl 1970, §47). Finally, the rational character of an assertion about an object also does not depend on whether the object in question is or has been consciously present to someone *in fact*. Of course, a rock that is currently located on a distant planet at the far end of our galaxy is l-unobservable. It seems unreasonable, however, that this kind of l-unobservability has any bearing on questions concerning meaningfulness or rationality. As far as meaningfulness or rationality is concerned, all we seem to require is that the following counterfactual conditional is true: *if a member of my epistemic community was suitably located, then the object in question would become present in appropriate intentional acts.*

The point of these considerations is to show that l-observables present no threat to correlationism in general or phenomenology in particular. It is true that phenomenologists tie the rational character of assertions about objects to the possibility of these objects becoming present in conscious experience. But nothing prevents the phenomenologist from employing a counterfactual strategy in order to deal with cases of l-observability. It may be the case that a physical thing cannot become consciously present due to its spatial location. Yet, as long as the thing *would* become present in conscious experience *if* a bodily situated observer was suitably located, there is nothing objectionable *per se* in making assertions about the thing. As mentioned before, this is also acknowledged by Meillassoux (2012, pp. 18-22).

But can the same counterfactual strategy also be applied to t-unobservables, i.e. to things and events that are unobservable due to their position in time? Following Meillassoux, the answer is: it depends. Consider first the case of a vase that fell to the ground yesterday while no one was watching. Apparently, since we can't go back in time, this event is t-unobservable. Yet, there seems to be no deeper reason not to employ the same counterfactual strategy that we were prepared to accept before. Of course, the falling of the vase was un-witnessed *in fact*. But so is the rock that is currently located on a distant planet at the far end of our galaxy. If we agree that the counterfactual solution works in the case of the rock, then there is no compelling reason why it shouldn't also work in the case of the vase (Meillassoux 2012, pp. 19-20).

So far, so good. But, and this is the point of DA, the situation is entirely different when we consider *ancestral* things and events. Remember that Meillassoux defines ancestral things as those things that existed prior to life and consciousness. So it appears that, by

definition, ancestral things and events weren't consciously present to anyone at the time they existed or occurred. But not only that: Unlike in the case of the vase, *we seem to know that it was in fact impossible for ancestral things and events to become present in conscious experiences. Why? Because life and consciousness did not yet exist.* And this is also the reason why, on Meillassoux' view, the counterfactual solution does not work if it is applied to ancestral things: Since we know for a fact that the if-clause cannot be true in the case of ancestral things (and since the counterfactual has to be interpreted as a biconditional), a counterfactual solution of DA is doomed right from the outset (Meillassoux 2012, pp. 20-21).

We are now in a position to put all the pieces together and appreciate the full scope of DA. As per P1, phenomenologists are committed to the correlationist maxim according to which the rational character of assertions about objects is tied to the possibility of these objects becoming present in conscious experience. As per P2, phenomenologists are committed to the view that science is a rational enterprise. As per P3, phenomenologists have to acknowledge that scientific theories are universal in scope. This leads to P4, which states that science produces statements about objects and events that, *pace* P1, could not become present in conscious experiences. While the tension between P1 and P4 can be resolved in the case of l-observables and more conventional cases of t-observables, a counterfactual strategy fails when applied to ancestral objects and events. Hence, since P2, P3 and P4 are all licensed by what Meillassoux considers to be prevailing facts about scientific theorizing, phenomenologists find themselves on a collision course with the authority of modern science. Facing this "aporia" (Harman 2011, p. 11), the only way out for phenomenologists is to directly oppose assertions about ancestral things (and thus huge parts of modern science) by declaring them as irrational or meaningless.

There may be different ways for phenomenologists to challenge DA (cf., e.g., Toadvine 2014). Yet, the strategy I will pursue in the next section is to meet Meillassoux on his own turf. As I shall argue, DA fails to establish the claim that phenomenology is at odds with science. But, and this is the nub, DA not only fails for genuinely philosophical reasons. Rather, DA trades on an *empirically* questionable concept of observation and must therefore be rejected for *scientific* reasons. Hence, in pressing DA against phenomenology, it is actually Meillassoux who finds himself on a collision course with science.

8. "Observing" the Ancestral

The objective world holds many surprises for us. For instance, if I submerge a straight stick into water, the stick appears bent at the point it enters the water. According to our empirically most adequate theories, this is because light travels through different media at different speeds, the result being an observable refraction effect. One crucial reason to accept these theories is their predictive success: Snell's Law allows for the calculation of the exact refraction angles before the stick even touches the water. Or consider a different example: When I observe a woman hammering some distance away, I hear the blows slightly later than I see the hammer strike. According to our empirically most adequate theories, this is because sound travels through the same medium significantly slower than light, the result being a noticeable discrepancy between properties perceived by different sensory modalities. Again, a crucial reason to accept these

theories is their predictive success: I could calculate the time-lag between sound and light before the woman even starts hammering.

Of course, since phenomenologists are primarily concerned with the reflective description of the “how” of experience, such examples are of limited significance for genuinely phenomenological purposes. However, they are relevant if we seek to gain a more refined understanding of the objective “what” of experience, i.e. the empirical world around us. What we can learn from the previous examples is, for instance, that information travels through different media at different speeds and that different kinds of information require different objective timespans to travel between places. Sound, for instance, propagates only at around 340 metres per second. We can thus experience the objective time it takes sound to travel from its source to a destination under normal life-world conditions. It is harder to undergo similar experiences in the case of light. Since light travels at around 300,000,000 metres per second, the time it requires light to travel between its source and a destination is inconsequential in most mundane contexts. The situation changes, however, if we consider more specific circumstances. For instance, according to our empirically most adequate theories, light requires a bit over eight minutes to travel from the sun to the earth. Hence, if the sun went supernova at this very moment, no one could possibly notice for another eight minutes. The situation is even more dramatic on cosmological scales. Since the North Star is about 323 light-years away from us, it takes light approximately 323 years to travel from the North Star to the earth. This means that the light we will see tonight when we watch Polaris left its source around the time Robert Boyle died. Our currently deepest look into the universe reveals objects that are located more than 13 billion light-years away (Illingworth et al. 2013). Hence, when we use our most powerful telescopes to observe these objects, we are not only “observing” something that is very far away. In fact, we are “observing” something that existed or occurred a very, very long time ago and that, in the meantime, may very well have ceased to exist. What follows from all this is that more powerful telescopes do not merely allow us to look deeper into space. Although it may sound odd at first, they also allow us to look farther back in time.

In section 7 we took it for granted that l- and t-unobservability are distinct and hence require different epistemic treatments. Yet, on the basis of the foregoing empirical considerations, this assumption is not so obvious anymore: Instead of being neatly separated, the objective past and the objective distant now appear intimately connected. Or, to put it differently: Having existed or occurred a long time ago is, *per se*, no reason for unobservability (Turner 2007, 63). As a consequence, it is especially our notion of t-unobservability that has to be revised by including *both* temporal *and* spatial aspects. The asteroid that hit the earth 66 million years ago is unobservable not only because of its distance in time; it is unobservable due to its distance in time *and its nearness in space*. If the same asteroid had hit a planet 66 million light-years away from us, then, provided that we are in possession of a sufficiently powerful telescope, *it would be possible for this event to become present in conscious experiences*. Hence, in order to develop a satisfactory notion of t-unobservability it is not enough to just focus on temporal aspects. Since information requires time to travel between places, a viable concept of t-unobservability must comprise both temporal *and* spatial aspects.

I take it to be obvious that these results bear important consequences for the evaluation of DA. On Meillassoux’ view, ancestral things confront phenomenology with a dilemma due to the impossibility of them becoming present in conscious experience. But if the

argument in this section is correct, then Meillassoux' objection is simply not sound. Given the appropriate spatial location, we can and in fact do "observe" ancestral things. For instance, many of the objects and events we "see" through the Hubble Space Telescope ceased to exist or occurred prior to the existence of life and consciousness. And yet it is possible for these objects to become present in conscious experience.⁵

Before I move on, let me briefly anticipate a possible counter-objection. Even if one grants that the argument in this section is correct, one could still retort that it does not prove much. First, the argument only shows that it is possible for *some* ancestral things to become present in conscious experience, namely for those that are located sufficiently far away. But this means, secondly, that there still exists a plethora of ancestral things for which phenomenology seems unable to account. One could therefore conclude that ancestral things that existed in a nearby region of the universe (such as the asteroid that hit the earth 66 million years ago) undermine correlationism despite everything we have learned in this section.

Yet, this counter-objection misses the point. In order to see why, we only need to remember that, as Meillassoux acknowledges, cases of l-unobservability can easily be accommodated within a correlationist framework by employing counterfactual conditionals. Assertions about macroscopic l-observables are rational in character because they would become consciously present if an observing subject was suitably located in their vicinity. Of course, since the problem with ancestral things is *not* that they are too far away (quite the opposite is the case), it would not do to employ the same counterfactual conditional. But I see no reason why we should not be able to modify our counterfactual strategy in a way that allows us to meet Meillassoux' challenge: Assertions about ancestral things are rational in character because things such as the asteroid that hit earth 66 million years ago would become consciously present if an observing subject was suitably located 66 million light-years away from our current position. If we accept the counterfactual solution in the earlier case of a rock that is currently located on a planet at the far side of our galaxy, then it would be plainly ad hoc to dismiss the structurally equivalent strategy in the case of the ancestral.

9. From DA to DS

The goal of the previous section was to show that DA is not nearly as strong as it initially seems. Note that my argument, at this point, is not wedded to any particular philosophical view. All I have done is to show that DA misses its target for empirical reasons. However, the results of the previous section lead to an obvious question: Does the rejection of DA undermine the whole of Meillassoux' anti-correlationist argument? Or is there something that can be salvaged from the wreckage of DA? Indeed, I believe that the latter is the case. As I shall argue now, Meillassoux' argument can be modified in order to present a more serious challenge to phenomenology.

So far we have considered only two kinds of unobservables, l- and t-unobservables. And, as the argument in the previous section was supposed to show, neither presents a serious threat to phenomenology. But what about the third kind of unobservables? Do *s-unobservables* pose a challenge that is harder to meet for phenomenologists? Before I

⁵ My reasons for parenthesizing "seeing" and "observing" in this context will be explained in section 10.

attempt to show that this is indeed the case, let me specify briefly what I take s-unobservables to be.

As I have pointed out, it is a feature of virtually all mature scientific theories that they posit and make assertions about things, properties and mechanisms that cannot be perceived directly, i.e. by means of the unaided senses. In some cases, this has to do with their temporal and/or spatial position. In other cases, the reason for their unobservability is their size: atoms, genes or quarks cannot be observed because they are too tiny to be seen. At the same time, however, a literal interpretation of scientific theories seems to commit us to the belief that such s-unobservables are the real stuff that makes up reality. To invoke Arthur Eddington's famous example: Following my ordinary experience, I may describe the table in front of me as a solid object made of brown wood. But, at the same time, physics seems to tell me that these lifeworldly descriptions and folk-theoretical terms fail to cut nature at its joints. Things in the world may *appear* to be colored and solid. In reality, however, all there is are quanta and lots of empty space, sparsely occupied by interacting electrons, protons and neutrons.

I think that s-unobservables indeed pose a potential problem for phenomenology. In order to see why, remember what I have said earlier about the phenomenological conception of rationality: Phenomenologically construed, judgments about objects are rational in character if and only if it is possible in principle that these objects could become present in appropriate intentional acts. Applied to the discourse of the physical sciences, this principle suggests, then, that a judgment about a physical thing has a rational character if and only if the thing is a "possible object of a straightforward percept" (Husserl 2001b, p. 285), if it is in principle "*capable of being perceived*" (Husserl 1983, p. 95). Hence, the minimal condition for a judgment about a physical thing to count as rational is the possibility of situations in which we, as bodily situated subjects, could bring the thing to direct, immediate givenness. According to this view, then, there is nothing wrong with judgments about, say, the Yeti or the monster of Loch Ness. Of course, we know that these objects are exceptionally hard to track down. At the same time, however, we also know that they would become immediately present if a) they existed, if b) they exhibited the kinds of properties we believe them to possess, and if c) we stood in the right intentional relation to them. But things are different when we consider s-unobservables: Suppose that atoms, genes or quarks exist. And suppose that they also exhibit the kinds of properties we believe them to possess.⁶ If they do, then it is impossible for us, as bodily situated subjects, to bring these things to direct, immediate givenness. Wherever we may go, and whatever we may do, it is impossible for these things to become the object of a straightforward percept.

We are now in a position to grasp what I consider to be the real challenge for phenomenology. On my view, Meillassoux is onto something when he zeroes in on the relation between the phenomenological conception of rationality on the one hand and the universalizing power of scientific theories on the other. Since theories are universal in scope, they make assertions about things, properties and processes that cannot be become present in appropriate intentional acts. And since phenomenology ties the rational character of judgments about things to the possibility of these things becoming

⁶ In order to get a feel for the dimensions we are dealing with, it might help to give a bit of context: One nanometer is one billionth of a meter. The diameter of an atom is about $\frac{1}{4}$ of a nanometer. In comparison, the diameter of a human hair is about 10.000 nanometers. So, the difference in diameter between atoms and human hair is comparable to the difference in diameter between donuts and the planet Earth.

present in appropriate intentional acts, a certain tension between science and phenomenology indeed arises. While Meillassoux is mistaken to assume that ancestral things are the focal point in this respect, one could easily modify his argument by shifting the focus to s-unobservables. On this modified view, then, it is not judgments about the ancestral that threaten to go beyond what phenomenologists are prepared to accept as rational. Rather, the real dilemma for phenomenology stems from the fact that mature scientific theories posit and make assertions about entities that could not become present in appropriate intentional acts due to their size. I shall call this dilemma the *dilemma of smallness* (or DS, for short).⁷

10. Two Objections

The rest of my paper will be an attempt to show that, on the correct interpretation of science, DS turns out to be no dilemma after all. Before I come to that, however, I want to anticipate two objections against the way in which I have set up DS. While the first objection concerns my understanding of counterfactual conditionals, the second concerns the role of scientific instruments.

10.1 Empty and Motivated Possibilities

The first objection that I want to consider goes as follows: I have pointed out that phenomenologists employ a counterfactual strategy in order to deal with cases of l- and t-unobservability. On the view that I have defended in sections 7 and 8, there is nothing wrong with assertions about, say, the rock that is currently located on a planet at the far end of our galaxy because the rock would become present in appropriate intentional acts if a perceiving subject was suitably located. But why is it that similar counterfactual conditionals could not also be used to deal with cases of s-unobservability? For instance, couldn't we say that assertions about s-unobservables are rational in character because we would observe them if they were significantly bigger, if we were significantly smaller or if our eyes worked like electron microscopes? Of course, such imaginary scenarios are fairly outlandish. But isn't it equally outlandish to imagine being located on a planet millions of light years away? Hence, the first objection amounts to the claim that there are no good reasons for phenomenologists to accept a counterfactual strategy in cases of l- and t-unobservability, but to reject it in cases of s-unobservability.⁸

Let me begin to meet this objection by putting the problem in a slightly different way. What is a phenomenological theory of rationality supposed to accomplish? Quite generally, the goal is to describe how rationality manifests itself in consciousness and to determine "what rational showing signifies, [...] of what *rational consciousness* consists" (Husserl 1983, p. 326). In light of this aim, it is natural to start with an ideal situation in which the rational character of an assertion would be beyond dispute. Phenomenologically construed, such an ideal situation would occur when the object one intends is given exactly as it is intended and when, additionally, the congruence between the object-as-it-is-intended and the object-as-it-is-given is registered by the experiencing subject. In this situation, it would border on countersense to not regard the beliefs about the object as rationally justified (Husserl 1983, p. 37).

⁷ The only difference between DS and DA is that the former focuses on s-unobservables. Other than that, DS is identical to the reconstruction of DA I gave in section 3.

⁸ Within the standard literature in the philosophy of science, versions of this objection have been raised, for instance, by Stathis Psillos (1999, 190, 193-200) and Paul Churchland (1985, p. 43-44).

But, of course, phenomenologists are aware of the fact that this ideal situation is hardly ever realized: Most of what we know stems from various indirect sources and not from the direct cognitive contact with the intended objects. Hence, since we should be hesitant about epistemological principles that render almost everything we think we know defective, a phenomenological condition of rationality must be liberalized by introducing a modal qualification: Phenomenologists do not make the absurdly strong claim that an assertion about an object is rational in character if and only if the object is present in appropriate intentional acts. All that is required for the rational character of an assertion is that it is *possible* for the object to become present in appropriate intentional acts. This, however, immediately leads to a follow-up question: What kind of possibility is being invoked here? What, exactly, is meant when phenomenologists tie the rational character of assertions about objects to the *possibility* of these objects becoming consciously present?

In order to answer this question, it is necessary to introduce a distinction that plays a prominent role in the phenomenological understanding of the concept of possibility. Perhaps the best way to make this distinction clear is by way of an example (Husserl 1983, p. 337): Suppose that I enter an unfamiliar room with a desk in it. The desk is positioned such that its underside is currently out of view. Now, the question arises: How many legs does the table have? While the answer “Hundred!” corresponds to an *empty possibility*, the answer “Four!” corresponds to what Husserl calls a *motivated possibility*. How is this distinction to be understood? Well, first of all, neither answer refers to a scenario that is logically impossible. Although we may have never actually seen such a thing, it is easily conceivable that the table will indeed reveal an underside with exactly one hundred legs. But, apart from this, there is a fundamental difference nonetheless: The difference lies in the fact that the projected scenario of the table’s four-leggedness is not only logically possible, but also probable in light of my previous encounters with tables. It is, to put it differently, only in the latter case that “*something speaks on behalf of the positum*” (Husserl 1983, p. 334) and that, consequently, the respective possibility has considerable epistemic weight. This is what the distinction between empty and motivated possibility is designed to express (cf. Husserl 2001a, §2, §3; Husserl 1983, §140; Husserl 1989, §56).

Let us now, with this distinction in hand, return to our earlier question: What kind of possibility is being invoked when phenomenologists tie the rational character of assertions about objects to the possibility of these objects becoming present in conscious experience? On the basis of the previous discussion, one option would be to understand the modal qualification in terms of the concept of empty possibility. But this, I claim, leads to very unsatisfactory results. One apparent consequence is that it would render the phenomenological condition of rationality vacuous: If the rational character of assertions was merely tied to the *empty* possibility of direct, immediate givenness, and if the concepts of logical possibility and empty possibility are co-extensional, then the only way for a subject to violate the phenomenological condition of rationality would be to assert something that is logically impossible. But this strikes me as wildly implausible: Applied to the discourse of the physical sciences, this conclusion would imply that no assertion about physical things lacks rational character – unless the idea of the thing about which something is asserted involves a formal contradiction. Since I take it for granted that a plausible conception of rationality (here understood in terms of rational character) should be less liberal than this (Husserl 1973, pp. 16-17), I conclude

that the modal qualification that operates at the heart of the phenomenological conception of rationality has to be understood in terms of the concept of motivated possibility: An assertion about an object is rational in character if and only if it is a *motivated possibility* that the object could become present in appropriate intentional acts.⁹

However, even if one grants that my interpretation is correct, it is not yet clear how it helps to answer the first objection. How exactly can the distinction between empty and motivated possibilities defuse the tentative incoherence of accepting counterfactual conditionals in the case of l- and t-unobservables, while rejecting them in the case of s-unobservables? In order to answer this question, consider again the earlier example of a rock that is currently located on a planet at the far side of our galaxy. I have argued that assertions about the rock are rational in character since it is possible for it to become consciously present if an experiencing subject was suitably located. But why is it that this possibility is a motivated rather than an empty one? Well, because the projected scenario is probable in light of our earlier encounters with rocks: We, as bodily situated subjects, have been standing in the right intentional relation to rocks and rock-like objects many times before. We are familiar with the kinds of experiences we were able to make in these situations. And, in light of these previous encounters, we are fairly confident to have ontological models at our disposal that are plausible, well-tested and in accordance with the relevant essential laws. It is for these reasons that we rightfully consider it a motivated possibility that as-yet unobserved rock-like objects will fit into our models too. Of course, it is logically possible that, contrary to our expectations, rocks at the far end of our galaxy will turn out to be radically different from the rocks we were able to observe so far. But while this possibility is merely an empty one, the expectation that our current ontological models will also work at the far end of our galaxy has enough epistemic weight to render the respective assertions rational in character.¹⁰ And, what is more, I see no reason why this explanation should not be extended to all kinds of macroscopic t-unobservables.

But now contrast this with the case of s-unobservables: Following the counterfactual strategy that we have successfully applied in the case of l- and t-unobservables, one might claim that assertions about, say, atoms are rational in character because it would be possible for atoms to become consciously present if atoms were significantly bigger, if we were significantly smaller or if our eyes worked like electron microscopes. However, on the basis of our earlier considerations, it should be apparent that this counterfactual conditional does not satisfy the conditions laid down in the phenomenological principle of rationality. For what we are dealing with here are merely

⁹ In order to show that this interpretation is in line with Husserl's view of the matter, let me quote just two telling passages from *Ideas 1*: "*Experientialness never means a mere logical possibility*, but rather a possibility *motivated* in the concatenations of experience. This concatenation itself is, through and through, one of 'motivation', always taking into itself new motivations and recasting those already formed." (Husserl 1983, pp. 106-107) "The hypothetical assumption of something real outside this world is, of course, 'logically' possible; obviously, it involves no formal contradiction. But when we ask about the essential conditions on which its validity would depend, about the mode of presentation taken universally essentially determined by the positing of something transcendent [...], we recognize that something transcendent necessarily must be experienceable *not merely by an Ego conceived as an empty logical possibility* [my emphasis] but by any *actual* Ego as a demonstrable unity relative to its concatenations of experience." (Husserl 1983, p. 108)

¹⁰ The idea behind this argument is similar to Rom Harré's "Principle of Conservation of Kinds", i.e. "the principle that the phenomena we cannot currently observe are likely to be of the same ontological categories [...] as those we can observe" (Harré 1996, p. 143).

empty possibilities that, although formally unobjectionable, lack sufficient epistemic weight. Following the discussion from before, it is also clear why this is so: We, as bodily situated subjects, have never been standing in the right intentional relation to atoms or atom-like objects. Hence, we are not familiar with the kinds of experiences that we would make in this situation. What is more, we are also not familiar with the kinds of experiences that we would make if electron microscopes were implanted in our eye-sockets. And, in light of the lack of previous encounters with atoms or atom-like objects, we have no plausible ontological model at our disposal that would render any of the indefinitely many formally possible models more probable than any of its rivals. The only thing that seems to be clear is that our well-established ontological models do not work for s-unobservables: whatever gases really are, they aren't clouds of tiny billiard balls; and whatever atoms really are, they aren't minute solar systems.

So, to sum up: Against the first objection I maintain that phenomenologists do have good reasons for accepting counterfactual conditionals in the case of l- and t-unobservables, but to reject them in the case of s-unobservables. Their main reason is that counterfactual conditionals are only epistemically relevant if the scenarios that are employed in the respective if-clauses represent motivated possibilities. And this, in turn, makes counterfactual conditionals about s-unobservables epistemically non-committing.

10.2 Scientific Instruments

Let me now come to the second objection. Assertions about physical things are rational in character if and only if it is possible to bring these things to givenness in acts of direct, immediate perception. Yet, as I have argued in section 9, this possibility is ruled out in the case of s-unobservables: Since they are too small, it is impossible for them to become present in acts of direct, immediate perception. This, in a nutshell, is the reason why I consider DS to be the real challenge for phenomenology.

However, one might claim that, as a matter of fact and contrary to what I have just said, it *is* possible for s-unobservables to become present in appropriate intentional acts (Harvey 1989, pp. 211-215). One could argue for this in the following way: Scientists not only invest their energy into the advancement of ever-new theories. Much of their effort also goes into the invention and improvement of scientific instruments. But isn't the purpose of many of these instruments to enhance our perceptual capabilities and thus to bring s-unobservables to direct givenness? For instance, don't we seem to *observe* a decaying kaon when we look at the screen of a cloud chamber? If true, this argument would undermine my claim that there is something inherently problematic about judgments concerning s-unobservables.

Yet, this objection misses the point. Let me, in order to show why, begin with a simple question: What do we mean by saying that we observe or perceive something? Well, unlike memory, phantasy or various forms of image-consciousness, perception is essentially *presentational* in character (Husserl 1997, §15). This is to say that perception is the mode of consciousness that gives its objects not only as present and factually existing, but also "in person" or "in the flesh" (cf., e.g., Husserl 2001d, p. 140).¹¹ What this

¹¹ In the contemporary analytic literature this quality is discussed under labels such as "presentational feel" (Foster 2000, p. 112), "scene-immediacy" (Sturgeon 2000, p. 24) or "presentational phenomenology" (Chudnoff 2013, chapter 1.2)

means can be explained by considering an example: Suppose I am watching a TV-documentary about the Leaning Tower of Pisa. All of a sudden, I am uttering: “The Tower of Pisa is lopsided.” In this situation, it is clear that I am intending the Tower of Pisa as factually existing. And, in a certain way, the Tower of Pisa is also present to me. But do I *perceive* the tower? Well, if at all, then only in a derivative sense. What I am actually perceiving is a *re-presentation* of the tower, namely its *image* on a TV-screen. The Leaning Tower would only become the object of a proper perception if it was given to me “in person” or “in the flesh”, i.e. if I were suitably located and could directly encounter the tower in its physicality. By analogy, if we declare to “observe” or “perceive” a decaying kaon on the screen of a cloud chamber, we are also using the notions of “observing” or “perceiving” in an improper sense. Here too, what we are actually observing are silver-grey lines on a screen that we postulate to *re-present* something else, namely a decaying kaon.

The point of the previous paragraph is to illustrate the difference between *presentational* and *re-presentational* modes of consciousness (cf. Marbach 1997) and to emphasize that instances of instrumentally mediated “seeing” clearly fall in the latter category. This, however, is not all. Consider another pair of examples (van Fraassen 1980, p. 17): First, seeing a vapor trail in sky, I report to my friend: “Look, there is a airplane!” Secondly, seeing a silver-grey line on the screen of a cloud chamber, I report to my friend: “Look, there is a decaying kaon!” What is common to these physically similar cases is that neither of the intended objects is given “in person” or “in the flesh”. Each object is intended through the presentational consciousness of some other distinct object, which means that neither case is an instance of perceptual or observational consciousness in the strict sense of the term. But now suppose that my friend responds by saying that while she is able to see the vapor trail/the silver-grey line, she is unable to see the airplane/the decaying kaon. What options do I have to justify my initial claim that what I see is an airplane/a decaying kaon? It is easy to find an answer in the first case. I could point ahead of the trail and direct my friend’s gaze to the airplane. Or I could wait for the airplane to land. But nothing similar is possible in the second case. There is nothing apart from the silver-grey lines to which I could point. And, as our empirically most adequate theories tell us, decaying kaons will also not land anytime soon. Hence, and this is my answer to the second objection, scientific instruments such as microscopes, cloud chamber or spectrographs *do not* widen the sphere of observability. We should not think of them in terms of “windows on the invisible world”, but rather in terms of “engines of creation”¹² (cf. van Fraassen 2008, ch. 4) – even more so when we adopt a phenomenological account of perception.

It is at this point, however, that one might accuse me of being self-contradictory: Much of my argument in section 8 relied on the view that telescopes make it possible to “observe” objects as exotic as ancestral things. But isn’t this view at odds with what I have just said about other instruments such as electron microscopes, cloud chambers or spectrographs? Isn’t it a blatant case of ad hocery to claim that we “observe” ancestral objects with the Hubble, but, at the same time, to deny that we observe decaying kaons with the aid of a cloud chamber?

¹² To think of instruments like microscopes, spectrographs or cloud chamber in terms of “engines of creation” means to consider it as their main function “[to create] new observable phenomena to be saved” (van Fraassen 2008, p. 100).

In order to answer this question, let us return to the distinction between presentational and re-presentational modes of consciousness. Having a direct, immediate perceptual experience of the Tower of Pisa is presentational in the sense that the experience gives its object not only as present and factually existing, but also “in person” or “in the flesh”. Seeing the Leaning Tower on TV, on the other hand, lacks this quality of originary givenness. The corresponding experience is thus to be considered re-presentational. Now, if this distinction between presentational and re-presentational modes of consciousness was all that mattered, the conclusion that telescopes and cloud chambers are on the same footing would indeed be justified: after all, neither gives its object “in person” or “in the flesh”. Yet, in order to see why telescopes and cloud chambers call for different epistemic treatments despite this similarity, consider yet another example (van Fraassen 2001, p. 160): Suppose that you are standing by a pond looking at a reflection of a tree in the water. What could justify your belief that you are really looking at a reflection of a tree and not at a painting of a tree that is swimming on the water? Well, one answer is that you have independent ways of checking up on the relations between yourself, the reflection and the tree: Not only that the geometrical relations between all three relata can be studied empirically. You can also convince yourself of the basic similarity between the tree and its reflection by simply turning your head. All this is possible because all three relata – you, the reflection and the tree – are observable.

The example I have just given provides an analogue for a large number of telescopic “observations”. On my view, our confidence in the reliability of telescopes is justified by the fact that we have independent ways of checking up on the relations between telescopic observers, the output of our telescopic devices and the intended objects. For instance, we can use smaller telescopes here on earth to convince ourselves that these devices deliver veridical re-presentations of mundane objects such as trees, mountains or the moon (Pitt 2011, p. 203). And this, together with the fact that telescopic “observations” do not aspire to go beyond our well-established ontological models for macroscopic objects, builds up confidence even for those cases where the intended objects cannot be observed without the aid of astronomical instruments.

However, does the example of the pond also provide an analogue for cloud chambers? To say that it does implies that, here too, we have independent ways of checking up on the relations between the observing subject, the output of the cloud chamber and the intended object. But this is clearly not the case: Since the intended object is not open to direct, immediate observation, we cannot empirically investigate the relations between the observing subject and the output of the cloud chamber on the one hand and the alleged s-unobservable on the other. Whatever we say about these relations is postulated rather than studied in a theory- or instrument-independent way. And this is also the reason why telescopes and cloud chamber do call for different epistemic treatments: Whether or not an instrument allows for observations even in a derivative sense of the term depends, I claim, on the availability of instrument- and theory-independent ways of checking up on the relations between the observer, the output of the device and the intended object. If no such independent ways exist, we are mistaken to speak of “observation” even in a derivative sense of the term.

11. Resisting DS

Having rebutted two objections against the way I have set up DS, I can now come to the final part of my paper. In what follows I shall present a solution to DS that a) remains

faithful to the spirit of phenomenological philosophy and that b) resolves the tension that, according to DS, exists between phenomenology and the physical sciences.

Let me begin by briefly recapping the structure of DS: As per P1, phenomenologists are committed to the correlationist maxim according to which the rational character of assertions about objects is tied to the possibility of these objects becoming present in conscious experience. As per P2, phenomenologists are committed to the view that science is a rational enterprise. As per P3, phenomenologists have to acknowledge that scientific theories are universal in scope. This leads to P4, which states that science produces statements about objects and events that, *pace* P1, could not become present in conscious experiences. While the tension between P1 and P4 can be resolved in the case of l- and t-observables, a counterfactual strategy fails when applied to s-unobservables. Hence, since P2, P3 and P4 are all licensed by what Meillassoux considers to be prevailing facts about scientific theorizing, an irresolvable tension between phenomenology and modern natural science seems to result.

As it stands, DS appears to have some plausibility. Quite generally, the strategy is to cash in on a pro-scientific attitude that is almost universally shared by scientists and philosophers alike. Starting with P2, we are confronted with a choice of either/or: Either we regard science as a rational enterprise or we do not. If we do, however, then we are also committed to believe in the universalizing powers of scientific theories (P3) and thus in their capacity to go beyond what phenomenologists are prepared to accept as rational (P4). Yet, the plausibility of DS is, I think, merely an apparent one; in large part, it stems from an ambiguity that is inherent in P2 and that needs to be unpacked if the real force of DS is to be determined. In particular, a fair assessment of DS calls for a closer analysis of the pro-scientific attitude that is appealed to in P2. So, the questions that must be addressed are: First, what does it mean to adopt a pro-scientific attitude? And secondly, is the choice of being pro-scientific really a matter of either/or?

I have already pointed out in section 5 that Meillassoux is not very explicit about the details of his philosophy of science. However, it becomes fairly clear from many of his remarks that being pro-scientific, on his view, implies a strong commitment to scientific realism. Instead of “‘compromising’ with science” (Meillassoux 2012, p. 122) by reinterpreting scientific statements according to a particular philosophical agenda, philosophers should take science at “face value”. This is to say, among other things, that “what [science] says is indeed the last word about what it says” (Meillassoux 2012, p. 122). This realist construal of science is, as Tom Sparrow adds, “what fidelity to science requires”: Scientific statements “are not merely true for us, for they do not merely refer to a reality that is the product of the subject/object dialogue or any other correlationist trope – they refer to a reality absolutely untethered from thought” (Sparrow 2014, p. 104).

At first glance, these remarks seem clear enough: Being pro-scientific, for Meillassoux, implies or is even identical with adopting a realist attitude towards science. On closer inspection, however, this allusion does not yet suffice for a concise understanding of what a pro-scientific attitude precisely is. The reason for this is that scientific realism, as it is usually understood (cf. e.g. Psillos 1999; Chakravartty 2007), is itself a conjunction of various sub-theses that need to be discussed separately. In the context of the present discussion, I regard three sub-theses as crucial. According to SR1, theories produce theoretical statements that intend to give a literally true description of empirical reality.

According to SR2, the acceptance of a theory involves the belief that the statements produced by the theory are literally true.¹³ And according to SR3, we are in fact justified in accepting our best current theories. Note that this three-tiered characterization cuts across two different dimensions: While SR1 expresses a semantic view about theories, SR2 and SR3 concern epistemological issues.

To distinguish between semantic and epistemological commitments of scientific realism is important for the ensuing discussion. This is not least because, throughout his essay, Meillassoux pays almost exclusive attention to the semantic level by concentrating on “the *meaning* of scientific statements” (Meillassoux 2012, p. 112; my emphasis) and on “the conditions [under which] these statements are *meaningful*” (Meillassoux 2012, p. 26; my emphasis). And, as far as I can tell, Meillassoux’ views are quite in harmony with the realist mainstream: According to semantic realism, the statements that are produced by our theories should be understood *literally*. This is to say that theoretical statements have irreducible truth-values and, consequently, are truth-apt. Furthermore, the truth-values are fixed by nothing other than the way things are in the world. So, if a theory produces the statement “Helium has the atomic weight of 4.002602”, then the statement is true if and only if helium atoms exist and if they have the atomic weight of 4.002602. According to Meillassoux, this is the only reasonable way to think about science: “[T]he realist meaning of [a scientific statement] is its *ultimate meaning* – [...] there is *no* other regime of meaning capable of deepening our understanding of it, and [...] consequently the philosopher’s codicil is irrelevant when it comes to analysing the signification of the statement” (Meillassoux 2012, p. 14).

Meillassoux’ preoccupation with the meaning of scientific statements makes it clear that he considers the tension between phenomenology and the sciences to be primarily a matter of semantics (cf. also Ennis 2011, pp. 10-14). He even goes so far as to claim that “no variety of correlationism [...] can admit that [the scientific] statement’s literal meaning is also its deepest meaning” (Meillassoux 2012, p. 122). I have to confess, however, that I am not quite sure why this should be so. Consider a phenomenologist who is confronted with the statement “Helium has the atomic weight of 4.002602”. The first thing she will notice is that the statement is well-formed: Unlike expressions such as “Green is or”, the statement is not nonsensical or meaningless; and unlike expressions such as “round square”, the statement is also not countersensical or absurd.¹⁴ In fact, if she is familiar with the relevant theories, the phenomenologist will have no more problems than anyone else with understanding either the concepts involved in the statement or the statement as a whole. By the same token, the phenomenologist will have no more problems than anyone else with determining the truth-conditions of the statement: The statement “Helium has the atomic weight of 4.002602” is true if and only if helium atoms exist and if they have the atomic weight of 4.002602.

The point of the previous paragraph is that I see no reason why the phenomenologist should violently oppose the claim that a non-revisionist semantics is part of the pro-scientific attitude that is appealed to in P2. As long as we restrict ourselves to the

¹³ Of course, most scientific realists would like to add that, since we only ever *tentatively* accept theories, our belief in their literal truth is also merely tentative. This could be specified in two ways: It either means that we are never fully confident when we accept a theory. Or it could mean that theory acceptance involves only the belief that theory is *approximately* true.

¹⁴ Cf. for the distinction between nonsense and countersense: Husserl 2001a, pp. 200-203; Husserl 2001b, pp. 67-68.

meaning of linguistic expressions, phenomenologists can happily accept the view according to which the statement “Helium has the atomic weight of 4.002602” is true if and only if the referent of the term “Helium” exists and is exactly like the theory – literally understood – describes it to be. Of course, since most phenomenologists will agree that not too much can be gained from merely analyzing the language of science, this concession is not particularly relevant for the overall phenomenological project. But, again, such reservations about the prospects of linguistic analysis do not force the phenomenologist into opposing semantic realism at any cost.

Hence, in marked contrast to Meillassoux, I do not think that it is the *semantics* of science that presents phenomenology with a challenge. On my view, the challenge is rather to be found on the *epistemological* level. In order to see why, consider again the two epistemological commitments of scientific realism. According to SR2, the acceptance of a theory involves the belief that the statements produced by the theory are literally true. And according to SR3, we are in fact justified in accepting our best current theories. So, realistically construed, adopting a pro-scientific attitude not only amounts to the approval of a non-revisionist semantics (SR1) and to the view that our best current theories ought to be accepted (SR3). Most importantly, it also amounts to the claim that if it is rational to accept these theories, it is equally rational to believe in their literal truth (SR2). It is precisely at this point that DS takes full effect: On a realist interpretation of the pro-scientific attitude appealed to in P2, the acceptance of our current physical theories about, say, the nature of matter involves the belief that statements such as “Helium has the atomic weight of 4.002602” are literally true and that, consequently, the s-unobservables posited by these theories do exist. This, however, flies in the face of the phenomenological condition of rationality. If P2 is really to be interpreted realistically, then phenomenologists who wish to accept our best current theories are indeed rationally compelled to believe something that, according to their own understanding of rationality, lacks rational character and is therefore irrational to believe.

How should phenomenologists react to this? I believe that they should react by dropping SR2 and thus by adopting a moderate form of scientific anti-realism. The view I find most congenial with the central tenets of phenomenological philosophy is that theory acceptance involves less than the belief that the theory is true; theory acceptance only involves the belief that the theory is *empirically adequate*, i.e. “that what the theory says *about what is observable* [...] is true” (van Fraassen 1980, p. 18). Or, to put it into a language compatible with a model-theoretic account of scientific theories: To accept a theory only involves the belief that the theory has one model with empirical substructures such that the empirical substructures match the observable world.¹⁵ Note that this understanding of theory acceptance does not lead to a traditional form of instrumentalism: To think of theory acceptance in terms of empirical adequacy is not to construe of science as a non-axiological enterprise devoid of any aspiration to truth. On the view I am proposing, truth still matters in science. Yet, the point is that truth only matters where it is also attainable in principle. Hence, one of the main advantages of the

¹⁵ As I have also argued in my 2012, the basic tenets of phenomenological philosophy indeed lead to a form of scientific anti-realism that bears close resemblances with Bas van Fraassen’s constructive empiricism. This, however, does not mean to ignore the fundamental differences that exist between phenomenology and van Fraassen’s brand of empiricism. On my view, phenomenologists can agree with van Fraassen’s interpretation of science without thereby accepting the rest of his philosophy such as his positivistic theory of perception (cf. Wiltsche 2012, pp. 120-124).

moderate anti-realism I am advocating is that it is much more modest than its realist rivals: According to scientific anti-realism, the aim of science is not to tell a literally true story about a peculiar micro-world that exists somewhere beyond our experiential grasp. The aim of science is rather to tell a literally true story about the observable world, “the universal field into which all our acts, whether of experiencing, of knowing or of outward action are directed” (Husserl 1970, p. 144).

So, my solution of DS mainly concerns P2 and consists in two moves. The first move is to deny that the choice of being pro-scientific is a matter of either/or: Even if we agree (as I think we should) that the adoption of a pro-scientific attitude is one of the distinguishing marks between responsible philosophizing and sophistry, we still have to acknowledge that the question of what a pro-scientific attitude actually is has no unequivocal answer. Any answer one might want to give depends on further considerations involving, for instance, reflections on the proper aim of scientific theorizing. This leads me to my second move: I agree with Meillassoux that one way to specify the pro-scientific attitude appealed to in P2 is to endorse scientific realism. However, for reasons discussed here and elsewhere (Wiltsche 2012, 2015), it is a road down which, on my view, no phenomenologist should wish to go. Hence, my second move consists in rejecting scientific realism and replacing it with a moderate form of scientific anti-realism. If this move is made, it becomes finally possible to circumvent DS: As per P1, phenomenologists are committed to the correlationist maxim according to which the rational character of assertions about objects is tied to the possibility of these objects becoming present in conscious experience. As per P2, phenomenologists are committed to a pro-scientific attitude that involves the approval of semantic realism, the view that our best current theories ought to be accepted and the claim that theory acceptance only implies the belief that the theory is empirically adequate. As per P3, phenomenologists have to acknowledge that scientific theories are universal in scope. This leads to P4 according to which scientific statements refer to objects and events that, *pace* P1, could not become present in conscious experiences. As far as macroscopic l- and t-unobservables are concerned, the tension between P1 and P4 can be resolved by means of a counterfactual strategy. In cases of s-unobservability, however, the tension between P1 and P4 does not even arise: Phenomenologists may very well admit that scientific theories intend to refer to objects, events and processes that are s-unobservable. But since the acceptance of these theories does not commit us to the belief that these assertions are also true in a correspondence-theoretical sense, not much follows. If P2 is understood anti-realistically, the appropriate stance towards claims about s-unobservables is a thoroughly agnostic one. And this is indeed enough to prevent DS from even arising: If the acceptance of scientific theories does not require us to believe in the literal truth of statements whose referents could not possibly become present in conscious experiences, then the worry that the basic tenets of phenomenological philosophy are at odds with the aspirations of modern science turns out to be unfounded.

So, in light of Meillassoux’ criticism of correlationism, my suggestion is to adopt a moderate form of scientific anti-realism. Of course, I am aware that this proposal is likely to be met with resistance. Given the dominance of scientific realism – also within phenomenological circles (cf., e.g. Vallor 2009; Hardy 2013) –, quite a few readers will find that my solution (even if successful) carries a price too high to pay. And since a general defense of scientific anti-realism lies beyond the scope this paper, there isn’t

much I can do to overcome these more general concerns.¹⁶ However, the very least that must be granted is that the ball is now in the court of those who think that phenomenology and scientific realism make a good match. The way I see it, Meillassoux' argument can be read as clear evidence to the contrary.

12. References

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¹⁶ However, I make no secret of the fact that I find scientific anti-realism to be the more appropriate stance towards science. On my view, it makes better sense of the historical record; it fares better with respect to actual or possible cases of underdetermination; it is metaphysically less demanding; and, as I have argued in my 2012 and 2015, it follows naturally from the basic tenets of phenomenological philosophy.

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