

A Priori and A Posteriori Metaphysical Necessity

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Abstract

In *The Possibility of Metaphysics*, E.J. Lowe offers the statement “Water is H₂O” as an example of a metaphysical necessity, but most scientists would regard it as an empirical contingency. I attempt to resolve this conflict by applying a conventionalist account of natural kind terms, according to which statements like “Water is H₂O” acquire their necessity not from something metaphysically necessary about the world, but from the way our concepts about names and natural kinds happen to be structured. On this account, it is an *a priori* conceptual truth that the reference of a chemical natural kind term is determined by its microstructure, where the microstructure is a blank to be filled in by *a posteriori* investigation. I argue that it is an *a priori* conceptual necessity that water is whatever its microstructure turns out to be, but a contingent fact that the microstructure happens to be H₂O. If this is correct, then the extent to which “Water is H₂O” is an apparent necessity is limited to the conceptual necessity. And, if that is the case, then metaphysical truths are really not of two epistemic types after all, but one type only — *a priori* — thereby resolving the conflict between science and metaphysics over the epistemic status of “Water is H₂O.”

A Priori and A Posteriori Metaphysical Necessity

In *The Possibility of Metaphysics*,¹ E. J. Lowe characterizes metaphysics as being concerned with *metaphysical necessity*. The task of metaphysics is to discover true modal statements about reality. Among the examples Lowe gives of metaphysical necessities are, (1) “Nothing can be both red and green all over at the same time” and (2) “Water is H₂O.”

One feature of these examples that immediately attracts attention is that they are epistemically distinct. The first is frequently cited as a paradigm case of *a priori* knowledge,² while the second is clearly *a posteriori* — it took quite a bit of empirical investigation to establish that water is indeed H₂O. The second example strikes me as odd, for it seems unlikely that the scientists who discovered the chemical formula of water envisioned themselves as discovering a metaphysical necessity. In my own scientific investigations, it has always been my understanding that I am discovering contingent truths about my own particular world — or, more specifically, the bits of it that I am working with at the time. To generalize my conclusions over the entire world would seem risky and to generalize them over all possible worlds would be unthinkable, but this is what Lowe’s conception of metaphysical necessity suggests that I ought to be able to do. How is it, then, that science and metaphysics can have such vastly differing conceptions of the modal status of a statement like “Water is H₂O”?

¹ E. J. Lowe, *The Possibility of Metaphysics* (New York: Oxford University Press, 1998), chapter 1.

² Laurence Bonjour, *In Defense of Pure Reason* (New York: Cambridge University Press, 1998).

The idea of *a posteriori* metaphysical necessity is, of course, not a new one. It comes to us from Kripke and Putnam, whose idea was that the epistemic status of a statement is independent of its metaphysical status.³ In other words, it is possible to have statements that are epistemically *a posteriori* but metaphysically necessary: the most popular example being the one already cited, “Water is H₂O.” One of the things I will attempt to do in this essay is to show how the apparent conflict between science and metaphysics over the modal status of this statement might be resolved. I will offer a conventionalist account of natural kind terms, according to which statements like “Water is H₂O” acquire their necessity not from something metaphysically necessary about the world, but from the way our concepts about the names of natural kinds happen to be structured. On this account, it is an *a priori* conceptual truth that the reference of a chemical natural kind term is determined by its microstructure, where the microstructure is a blank to be filled in by *a posteriori* investigation. In other words, I shall argue that it is an *a priori* conceptual necessity that water is whatever its microstructure turns out to be, but a contingent fact that the microstructure happens to be H₂O. If this is correct, then the extent to which “Water is H₂O” is a metaphysical necessity is limited to the conceptual necessity. And, if that is the case, then Lowe’s examples of metaphysical truths are really not of two epistemic types after all, but one type only — *a priori* — thereby resolving the apparent conflict between science and metaphysics over the epistemic status of “Water is H₂O.” I will then offer some comments about what sort of conception of metaphysics this sort of conventionalism points us toward.

³ Saul A. Kripke, *Naming and Necessity* (Cambridge: Harvard University Press, 1980) and Hillary Putnam, “The Meaning of Meaning,” in *Language, Mind, and Knowledge*, ed. Keith Gunderson

***A Priori and A Posteriori* Necessity**

For the sake of convenience, and to avoid prejudging whether truths of either epistemic type discussed above are metaphysical necessities, I shall refer to *a priori* truths, like “Nothing can be both red and green all over at the same time,” as type (1) statements, and *a posteriori* truths, like “Water is H₂O,” as type (2) statements. Let me begin with statements of type (1). How is it that we can have *a priori* knowledge of their truth?

Answers to this question fall into three broad categories: radical empiricism, moderate empiricism, and rationalism.⁴ Radical empiricists, like Hume, deny that we have any *a priori* knowledge of type (1) truths. We know such things, if we know them at all, only through observation. Thus, for the radical empiricist, truths of type (1) collapse to type (2).

Moderate empiricists allow that we do have knowledge of such truths, but they minimize the significance of such knowledge. Such truths, they say, are merely analytic, or “true in virtue of meaning.” Given our understanding of “red all over” and “green all over,” it does seem necessary that no object can be both red all over and green all over at the same time, but the moderate empiricist would maintain that this statement still tells us nothing about the world because its truth is entirely dependent on concepts, and there is nothing to guarantee that these concepts correspond to anything real in the world. For the moderate empiricist, then, there is a sense in which

(Minneapolis: University of Minnesota Press, 1975).

⁴ I omit here the Kantian account of synthetic *a priori* statements. Few contemporary philosophers would agree that it makes sense to talk about *a priori* statements in these terms. Moreover, Kant would himself deny that such statements tell us anything about things in themselves or reality as such,

type (1) statements are necessary, but it's not what Lowe means by “*metaphysically* necessary.”⁵

Lowe's sense of metaphysical necessity corresponds most closely to the rationalist interpretation of type (1) statements. Rationalists draw a distinction between simple *a priori* truths like “A bachelor is an unmarried male,” which they would say are analytic and uninformative, and *a priori* truths like “Nothing can be red all over and green all over.” The latter, they would claim, is more than a mere logical or conceptual truth, it tells us something that is necessarily true about all possible worlds. The debate, then, between the moderate empiricists and the rationalists is over what these statements tell us. Do they merely tell us what is entailed by our concepts, or do they tell us about necessary features of reality? Lowe holds the latter view, but the above analysis makes it clear that his view of metaphysics depends on the empiricists being wrong about type (1) truths. If the empiricists are right, then it would seem that metaphysics really is about concepts and not about reality, as Lowe wishes to claim.

In addition to the *a priori* truths treated above, Lowe claims that type (2) truths such as “Water is H₂O” and “Hesperus is Phosphorus” are *also* metaphysically necessary. It is clear that such truths are *a posteriori*, because it is inconceivable that we could know them without recourse to observation. But why should we think of them as being metaphysically necessary?

and since Lowe's conception of metaphysics is of a science that tells us about reality, it isn't clear how Kant's category of synthetic *a priori* statements would be helpful.

⁵ For a summary of the moderate empiricist position, see Bonjour, ch. 2.

Lowe's answer to this question depends on a view of modal properties introduced by Kripke and Putnam. According to Kripke, when we refer to water, we are not referring to it by the properties by which we normally identify it — i.e., that it is clear, wet, falls from clouds, and comes out of the tap when we open it — we are referring to it by its *essential* properties. And what is essential to water, and other chemical kinds, is its microstructure. So, when we say 'water', we are referring to a particular chemical compound that is identical with the stuff that has the microstructure of paradigm cases of water. We do not, however, need to know what this microstructure is in order to successfully refer to the substance. This is because the name refers to the substance by its microstructure — whatever that microstructure is later identified to be. This is what makes it an *a posteriori* truth that water is H₂O. We must discover, *a posteriori*, the microstructure that is the essential property of the substance. What makes it a *necessary* truth is that the property of being H₂O is essential to water. Because it is an essential property, water cannot fail to have it. Therefore it is metaphysically necessary — true in all possible worlds — that water is H₂O.

One possible objection to this theory is to claim that, while it may be necessary in our own actual world that water is H₂O, it doesn't seem necessary that it should be H₂O in every possible world. Couldn't there be a world in which there is a liquid with properties identical to H₂O that has a different chemical composition? And wouldn't this mean that water isn't necessarily H₂O after all? Putnam addresses this objection with a thought experiment in which we are asked to imagine a "Twin Earth," which is identical to Earth in every way except that the stuff that is clear, wet, falls from clouds, and is drinkable has the chemical formula "XYZ" instead of

H₂O. Putnam stipulates that XYZ has all the same properties as H₂O, and that residents of Twin Earth speak about it in exactly the same way that residents of Earth do. He then asks whether this is a possible world in which water is XYZ. His answer is that if we were somehow transported to Twin Earth we might *mistake* XYZ for water, but this substance would not *be* water, because what we really mean when we say ‘water’ is a substance with a particular microstructure, which we now know is H₂O.⁶

But Is Water Necessarily H₂O?

So far, we have characterized two kinds of metaphysical necessities: the first we have *a priori* knowledge of and the second we do not. This divergence is less than satisfying, not least because it puts us in a quandary with respect to methodology. If the goal of metaphysical inquiry is to discover modal truths about reality, then there is now a question as to how we should go about it. Should we analyze our rational insights in order to find *a priori* metaphysical truths? Or should we search for *a posteriori* metaphysical necessities in the chemical compositions of natural kinds?

As I have already noted, empiricists criticize Lowe’s notion of *a priori* metaphysical necessity on the grounds that it is merely analytic and therefore uninformative about the world. But if we accept the rationalist interpretation of type (1) statements, there is nothing out of the ordinary about the claim that metaphysics deals in *a priori* necessities. For good or ill, metaphysicians have been making these sorts of

⁶ Putnam, “The Meaning of Meaning,” 150.

claims from the beginning (e.g., Aristotle's ten categories of being). But *a posteriori* metaphysical necessity doesn't fit the traditional model of metaphysical knowledge. And if we add to this, the difficulty that this sort of metaphysical knowledge appears to overlap with scientific knowledge, then it appears we have adequate reason to be skeptical. What does *a posteriori* necessity really amount to metaphysically?

In light of these concerns, it is perhaps significant that at least one philosopher who was initially supportive of the idea of *a posteriori* metaphysical necessity has had second thoughts about it. In a subsequent paper, Putnam questions whether it is really necessary that water is H₂O.⁷ His question is based on a conflict that arises between the Kripkean view and his own principle that the reference of natural kind terms is fixed by a cluster of laws, such that “*x* is water... if and only if most of the [laws in the cluster] are obeyed...”⁸ In other words, the reference of a natural kind term depends not just upon its “deep structure” but also on its behavioral properties. It might be thought to follow from this principle that the behavior of water will everywhere be the same. But this would only be true if the same physical laws were in existence everywhere. Different worlds can surely have different physical laws, and so we have to ask whether H₂O would still be water if a change in physical laws caused it to have radically different behavioral properties.

Putnam's argument plays on our intuitions of what's really essential to water as a natural kind. Microstructure may be part of it, but what if the same microstructure behaves in radically different ways? This is what Putnam is getting at. What if, as is

⁷ Hillary Putnam, “Is Water Necessarily H₂O?” in *Realism with a Human Face*, ed. James Conant (Cambridge: Harvard University Press, 1990).

fancifully suggested by Barnett, H₂O in some possible world turns out to have a solid phase in which it takes the form of highly toxic mushrooms.⁹ Would this substance still be water? If “water” *means* H₂O, then diehard Kripkeans would have to bite the bullet and affirm that these toxic mushrooms are indeed water. But those more in tune with Putnam’s intuitions would not agree that this is what we mean by “water.”

What is *A Posteriori* Necessity?

The arguments of Putnam and Barnett attack the idea that natural kinds such as water have essential properties that are constant in all possible worlds. But even if they are successful, such arguments still do not address what is, to the empiricist, the most objectionable aspect of *a posteriori* metaphysical necessity: the claim that by investigating the chemical properties of water, we are learning about “metaphysical necessities,” and not just contingent features of the world in which we happen to live. It feels to the empiricist as though scientific claims are being stretched far beyond anything science itself would allow.

We saw earlier that *a priori* metaphysical necessities were vulnerable to empiricist attacks on the grounds that all such claims are analytic and hence uninformative about the world. I would now like to argue that *a posteriori* metaphysical necessities have the same vulnerabilities. What, for instance, does the fact that water turns out to be H₂O in this world really tell us about other possible worlds? On the face of it, all we would be justified in saying is that if H₂O turned up in another possible world, it would be necessary for us to call it water. Or, if we call something water,

⁸ *Ibid.*, 59.

then it can only be because we believe it to be H₂O. But this seems to be more about linguistic convention than it is about modal properties. In other words, it appears open for the empiricist to claim that if water is *necessarily* H₂O it is only because our naming convention *makes* it that way. It certainly isn't a necessary property of H₂O that we have to call it 'water.' Maybe it's a necessary property of the concept "water" that it has to mean H₂O but, again, that's not a property of something in the world, it's a property of our linguistic conventions.

Alan Sidelle¹⁰ gives a vigorous defense of conceptual conventionalism against *a posteriori* necessity that lends support to these arguments. The central tenet of Sidelle's position is that there is no necessity "out there." Necessity is grounded in our conventions, and if this isn't immediately apparent with respect to statements about natural kinds like water, it is only because our conventions in such cases are of a more complex sort. Sidelle observes that no one finds it metaphysically "deep" that a bachelor is an unmarried male. That's because it is straightforwardly a matter of convention that this is the case. But Sidelle points out that just as we can have conventions about *particular* situations, like the situation of being a bachelor, we can also have conventions about *general* situations, like the situation of being a natural kind. The convention might be a little more abstract, but it would still be a convention.

Sidelle's view is that our convention about natural kinds is simply that *whatever deep explanatory features natural kinds have, they have them necessarily*. In

⁹ David Barnett, "Is Water Necessarily Identical to H₂O?" *Philosophical Studies* 98 (2000): 99-112.

¹⁰ Alan Sidelle, *Necessity, Essence, and Individuation: A Defense of Conventionalism* (Ithaca: Cornell University Press, 1989).

other words, for any statement of *a posteriori* necessity about natural kinds, we can abstract away the particular predicate that is necessary, leaving us a form with a blank, and a constraint about how that blank is to be filled in. Thus, “Water is _____ (deep explanatory feature).” Or, “Margaret Truman’s biological origin was _____ (sources of gametes).” These sorts of conventions apply not to particular substances, like “water” or “Margaret Truman,” but to anything that fits the form. And although the convention is in an abstract form, and therefore harder to recognize, it is nonetheless there, just as it is in the convention about bachelors being unmarried males. Sidelle describes it this way:

[It] will be a matter of convention, say, that if something is a chemical kind, then it has its chemical microstructure necessarily. Thus, if we can add the ostensibly nonmodal ‘Water is a chemical kind’ and ‘The microstructure of water is (actually) H₂O,’ we will be able to derive that it is necessary that water is H₂O, and all the modal force of this conclusion will be derived from our general principle, which we are supposing to be analytic. Our necessary truth will be *a posteriori* because of the nature of our convention, which requires that it be supplemented by *a posteriori* matters of fact before yielding a particular necessary truth, specifying more precisely, or directly, what the essential features, or individuating criteria are, in any particular case. But the necessity to water of whatever is found out to be water’s microstructure is given by the convention, and is not something which is discovered. That water *is* H₂O is an empirical, worldly matter; that it is *necessarily* H₂O would result from our convention. The necessity here would be no deeper than the necessity that bachelors are unmarried, and the appearance that it was would result primarily from the fact that we would have a more complex sort of convention that specifies the parameters, rather than the values, for our linguistic behavior, leaving the values to be discovered.¹¹

The same conclusion is reached by Jerry Fodor in a recent book review.¹² Fodor wants to know what it is about water that makes it necessary that water is H₂O.

¹¹ Ibid, 36-37.

¹² Jerry Fodor, “Water’s Water Everywhere,” review of *Kripke: Names, Necessity and Identity*, by Christopher Hughes, London Review of Books, October 21, 2004.

It can't be that all chemical substances are essentially their chemical formulas, because he observes that there are lots of other chemical substances for which this isn't the case. Coke, for example, has a particular formula, but if the makers of Coke decide to change the formula, the stuff with the new formula will still be Coke. Likewise, smog has a certain chemistry to it, but maybe someday we will find new chemicals with which to pollute the air, and that pollution will probably still be smog. So, he asks, what's the difference between water on one hand, and Coke and smog on the other? There is only one answer: that "water is necessarily H₂O" is a conceptual truth:

So then, what's the actual difference between water, on the one hand, and Coke and smog, on the other, that accounts for these modal differences? I can only think of one answer: if water is actually H₂O, then 'water is necessarily H₂O' is some kind of conceptual truth... In short, if K is the concept of a material kind, and if every actual thing that K applies to is made of n-stuff, then it's necessary that every thing that K (would) apply to is made of n-stuff... So it is, after all, our grasp of concepts (or our mastery of language) that underwrites the modal intuition that 'water is H₂O' is necessary. It's just like the old days, really.¹³

In other words, even when they are theorizing about *a posteriori* necessities, metaphysicians are still analyzing concepts, just like they've always done. Our modal intuitions about water are not intuitions about reality, they are intuitions about concept of water.

Conclusions

If Sidelle, Fodor, and the moderate empiricists are right, then the puzzle of the divergent examples of metaphysical necessity is solved. There is no divergence:

both types of metaphysical necessity are *a priori* and conceptual. An example of a type (1) claim would be, “Given that we have these concepts about colors, it is necessary that no object can be simultaneously red all over and green all over.” And an example of a type (2) claim would be, “Given that we have these concepts about water, it is necessary that water is _____”. The type (2) statement has a “blank” that needs to be filled in *a posteriori*, but in terms of form it is still an *a priori* claim about concepts.

If there is a metaphysically important difference between the two types of claims it is that type (2) claims are even less informative than type (1) claims. Suppose it *is* metaphysically necessary that water is H₂O. What follows? Not much, except that in any possible world where we encounter H₂O, we have to agree that it is the same thing we call “water” in the actual world. The import of the claim is about how we apply the word ‘water’, really. It’s no wonder, then, that metaphysicians have not all rushed to equip their offices with microscopes and spectrometers in order to discover new metaphysical necessities. What there is to be discovered is undoubtedly of great scientific interest, but it is of little interest to metaphysicians. They are chasing after bigger fish.

But are these *real* fish or are they *conceptual* fish? I have argued that in the case of *a posteriori* metaphysical necessity, the fish are conceptual. But if this is accepted, then there is good reason to believe that in the case of *a priori* necessity the fish are also conceptual. On a moderate empiricist account, at least, they are the same kind of fish. But perhaps we still have the inclination to say that statements

¹³ Ibid.

like “Nothing is both red all over and green all over” do tell us something metaphysically necessary. Can we make sense of this in terms of a moderate empiricist account?

One way in which we might attempt to do it is to say that metaphysics is an analysis of the concepts in terms of which we view reality. In an indirect way, then, metaphysics would be concerned with reality, although not in the way in which Lowe would like it to be.

Let me explain. It seems to me, as it did to Kant, that we inevitably view the world in terms of concepts. Maybe it’s not the case that a particular set of concepts is necessary (as Kant believed), but our understanding of the world is inevitably a conceptual understanding. It is, after all, only in virtue of our concepts about color that we can say that nothing can be red all over and green all over at the same time. But, given a different set of concepts about color, this might not appear necessary at all. Given a conception of absolute time, it might well be necessary that there is a moment that corresponds to “now” in all possible worlds. But if we conceive of time relativistically, then that doesn’t even seem possible. According to this view, then, the business of metaphysics is to consider what the world would look like in terms of different sets of concepts. What metaphysicians do is to try on different sets of conceptual glasses and then attempt to pick out the necessary features of what they see. Metaphysics, then, as Lowe would agree, is concerned with possibility. Metaphysicians ask, “What conceptual frameworks for understanding the world are possible, and what are the necessary features of these frameworks?”

But Lowe makes two claims about science and metaphysics that, on this view, are contradictory: (1) that science presupposes metaphysics, and (2) that science tells

us which of these sets of possibilities are actualized. I take it that the sense in which science presupposes metaphysics is that scientists, too, must view the world in terms of concepts: they are also looking through conceptual glasses. Lowe would agree that the most basic concepts that scientists presuppose (substance, time, causality, etc.) are metaphysical in nature. But if science truly *presupposes* metaphysical concepts, then science itself has no way of either validating or falsifying these concepts. It would be like trying to use standard logic to prove the truth of the law of non-contradiction. The law of non-contradiction is presupposed by standard logic. The best you could do would be to attempt some sort of *reductio* to falsify the law, but it's hard to see how you could get very far with that project without the law of non-contradiction itself. Likewise, if science presupposes a metaphysical concept, then it cannot also be the case that science is capable of criticizing it. On the other hand, if science is able to tell us which set of metaphysical possibilities is actualized, then metaphysics would collapse to science, because then metaphysical truths would be under science's purview: i.e., it would no longer be true that science presupposes metaphysics.

This leaves us in a dilemma: either we say that metaphysical truths are conceptual and that science presupposes them, or we say that metaphysical truths are about reality and that science can criticize them. It seems to me that if we wish metaphysics to be more than the hypothesis generating arm of science, then we ought to prefer the first of these alternatives, but on the account I am describing this is no dishonor to metaphysics. Metaphysicians are not concerned with "mere analytic truths," as positivists would say, for the concepts that metaphysicians are concerned with are concepts we must inevitably presuppose in our interpretation of reality, and it would

appear to be a vital matter which of these concepts we choose to employ. Metaphysicians will be able to tell us which sets of concepts are possible and which are the most simple, elegant, and intuitive. Of course, the most elegant metaphysical concepts might not be those that we choose to employ in viewing reality because we may find that they just don't work very well. In this sense, then, science can influence our choice of metaphysical concepts, although it cannot verify or falsify them altogether.

This view can be compared to Quine's web of belief. Logical and metaphysical concepts would be at the center of the web, with empirical observations impinging on it from outside. Many sets of metaphysical concepts could be adapted to fit the empirical data but some will produce a simpler web, with fewer dangling threads. Lowe does not appear to agree with this view of metaphysics, but I think it addresses his concerns about metaphysics being an activity worthy of the name. It does prevent metaphysics from collapsing to "mere conceptual analysis" on one side and to science on the other; it reveals metaphysics as a central and indispensable activity; and it accounts for how metaphysics is presupposed by science. What it does not do is to make metaphysics directly concerned with reality, and this would probably dissatisfy Lowe. But on the empiricist view, reality does seem to be science's territory and, given all of the other territory metaphysics can lay claim to, maybe this is a claim that metaphysics can afford to give up.