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Kripkean Essentialist Argument and Its Generalization

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ABSTRACT: In this paper I examine the argument by H. Beebee and N. Sabbarton-Leary that Brian Ellis's scientific essentialism is based on the "abuse" of the necessary *a posteriori*. I will first briefly survey various attempts to resist what I will call the "Kripkean essentialist argument" to locate Beebee's and Sabbarton-Leary's position properly. After that I will argue that Beebee's and Sabbarton-Leary's argument is not successful; in particular, I will argue that under the most natural interpretation of their position it is not internally coherent, and that their argument is based on a superficial understanding of Kripkean necessity *a posteriori*.

KEYWORDS: Analyticity – Kripkean essentialist argument – natural kind – necessity a posteriori.

1. Kripkean essentialist argument

In this paper I will use "the Kripkean essentialist argument" (KE) as an overarching term that embraces both "the general version of Kripkean essentialist argument" (GKE) and "the special version of Kripkean essentialist argument" (SKE). GKE has the following components.

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(1) "Water is H_2O" is *a posteriori*.

(2) "Water is H_2O" is necessary.

(3) "Water is H_2O" is necessary *a posteriori*. [from (1), (2)]

(4) Water is essentially H_2O.[2]

(5) This (type of) argument can be applied to all natural kinds.

The role of (5) here is to generalize the argument expressed in (1) – (4). This embedded argument is what I will call "the special version of the Kripkean essentialist argument" (SKE).

Philosophers have resisted KE in various ways. Some philosophers deny (1). For example, J. LaPorte argues that "Water is H_2O" is necessary but not *a posteriori* (see LaPorte 2004). According to him, when scientists discovered the chemical constitution of water, they stipulated thereby that water is H_2O. Therefore, "Water is H_2O" is indeed necessary; however, since this necessity comes from the stipulation, it is not *a posteriori*.

Other philosophers cast doubt on (2). For example, some experimental philosophers think that the Kripke/Putnam-style intuition beyond (2) is dubious (see Machery et al. 2004 and Weinberg 2007). Since, *pace* LaPorte, "Water is H_2O" is not analytic, its necessity should be shown by something like Putnam's Twin Earth argument and these philosophers argue that the anti-descriptivist intuition appealed to in Putnam-style arguments is significantly weak among East Asians, which casts doubt on the reliability of this intuition.

Still other philosophers deny that (4) follows from (3) (or that (4) is equivalent to (2)). In other words, these philosophers think that Kripkean necessity *a posteriori* has no metaphysical implications. For example, Alan Sidelle argues that although we should accept that there is such a thing as necessity *a posteriori*, Kripkean necessity *a posteriori* is a mere consequence of linguistic convention or linguistic decision (see Sidelle 2002, 310). According to him, "Water is H_2O" is necessary *a posteriori* simply because we have agreed collectively to use "water" as a rigid designator.

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[2] There might be different justifications concerning (4). One might think that (4) follows from (3). Others might think that (4) follows directly from (2), because what Kripke means by "necessity" in (2) is a metaphysical one. I think that this difference does not make any big difference in my arguments below.

This is a mere linguistic decision. If we had decided to use "water" as a descriptor, "water is H_2O" would not have been necessary. Since linguistic decisions do not change the world, Kripkean necessity *a posteriori* has no metaphysical implications, which means that we cannot infer (4) from (3) (or from (2)).

Unlike these arguments, the argument by H. Beebee and N. Sabbarton-Leary (henceforth BS),[3] which is the main topic of this paper, seems to focus on (5). They say, "Even if we accept that Kripke's story holds for proper names and natural kind terms, it can by no means be taken for granted that the story extends to cover other cases. This paper rehearses the general argument that such arguments are indeed required, and discusses in detail one examples of abuse of the necessary *a posteriori*: Brian Ellis's 'scientific essentialism'" (Beebee & Sabbarton-Leary 2010, 159).[4] Given this, it is natural to think that BS have no explicit objection to SKE. If this is correct, their argument is intended to be distinct from the above three types of arguments in terms of its target.[5]

2. BS's argument

BS's main example for their claim that (5) is false is that of ununbium. "Ununbium" is a temporary designator for element 112, which was first discovered (created) by Sigurd Hoffman and his team in the mid-1990s (and has now been formally recognized by the International Union of Pure and Applied Chemistry (IUPAC) and given the permanent name Copernicium). According to the standard system for temporary naming used by

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[3] See Beebee & Sabbarton-Leary (2010). For Ellis's scientific essentialism, see Ellis (2001; 2002).

[4] Here what BS mean by "other cases" is the cases of such natural kinds as ununbium which do not have Kripkean natural kind term.

[5] BS might claim that my interpretation misrepresents their intention. All they want to say is, they might claim, that Ellis needs an argument for (5) and that he failed to provide one. Under the current context, the correctness of my interpretation is not very important. If what BS want to show is that (5) needs an argument rather than that (5) is false, then my criticism of BS in this paper can be regarded as an argument BS requires.

IUPAC, element 112 becomes "ununbium": un(1) + un(1) + bi(2) + (i)um. From this example, BS conclude as follows.

> [What the example of ununbium illustrates is] that some – and indeed clearly most – chemical names are not introduced using a Kripke-style name-acquiring transaction. Rather, they are generated using a complex set of rules and grammar, and clearly encode descriptive information. In other words, they are descriptors. As a result, a theoretical identity sentence such as 'ununbium is the element with atomic number 112' […] is something a chemist can come to know *a priori*. (Beebee & Sabbarton-Leary 2010, 165)

If this conclusion is correct, as BS argue, (5) is false. One might think, however, that the mere fact that (5) is false does not by itself undermine Ellis' scientific essentialism because it does not follow from the fact that "ununbium is the element with atomic number 112" is *a priori* (or analytic) that it is not the case that ununbium is essentially the element with atomic number 112.[6] After all, what Ellis really wants to show is that his scientific essentialism is true rather than that "ununbium is the element with atomic number 112" is necessary *a posteriori*. Even if the latter turns out to be false, as long as his scientific essentialism is intact, the situation is not very painful for Ellis.

However, BS argue that the situation is much worse than this because, given that GKE does not work, there is no way for Ellis to show that ununbium is essentially the element with atomic number 112.[7] So the falsity of (5) has the consequence that we have no good reason to accept Ellis's scientific essentialism either.

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[6] I am not saying that this is what Ellis actually thinks. BS claim that Ellis "is committed to the view that analytic truths cannot be truths about essences" (Beebee & Sabbarton-Leary 2010, 173).

[7] In fact, the story is much more complicated than this. Ellis does provide his own criterion for distinguishing analytic necessity from metaphysical necessity and it does not directly appeal to GKE. But BS convincingly argue that this criterion does not work (Beebee & Sabbarton-Leary 2010, 173-174).

3. Two problems with BS's argument

I think there are at least two problems with BS's argument. The first is that BS's position is extremely unstable and its internal coherence is dubious. Let me assume that the main target of BS's argument is (5) and that they have no explicit objection to (1) – (4); as I said before, this is the most natural interpretation of their position. Let me assume further that their argument is successful. Then it seems that they should say something like this.

(6) While (as Kripke claims) gold is essentially the element with atomic number 79, it is not the case (or at least there is no reason to think) that ununbium is essentially the element with atomic number 112.

"Gold" is similar to such a proper name as "Nixon" in that it is non-descriptive and rigid. So there is no problem with applying the Kripke-style argument we find in (1) – (4) to "gold". But unlike "gold," according to BS, "ununbium" is a descriptor. In this case, no Kripke-style argument is applicable to "ununbium". Given what BS say, there is no other way to show that ununbium is essentially the element with atomic number 112. So we are left with (6).

This is a weird conclusion. If we can say that gold is essentially the element with atomic number 79, why is it not allowed to say that ununbium is essentially the element with atomic number 112? The lack of homogeneity in the metaphysical picture this conclusion implies is extremely unsatisfactory and should be avoided, if possible. There seem to be two potential ways to avoid it. The first is to use some kind of inductive generalization. We know that gold has its atomic number essentially. We know iron has its atomic number essentially. We know copper has its atomic number essentially. So, we have an inductive generalization: all elements have their atomic numbers essentially. Since ununbium is an element, and its atomic number is 112, ununbium is essentially the element with atomic number 112. In short, we can show that ununbium is essentially the element with the atomic number 112 without applying the Kripke-style argument directly to "ununbium". If this is correct, BS's claim that there is no other way to show that ununbium is essentially the element with atomic number

112 is wrong. Since what Ellis really wants to show is that scientific essentialism is true rather than that (5) is true, BS's argument that (5) is false is not particularly painful for Ellis.

At this point, BS might argue that the above inductive generalization is not justified. They might claim that while "gold", "iron", and "copper" are all introduced using a Kripke-style name-acquiring transaction, "ununbium" is introduced in a completely different way, and that this difference blocks the inductive generalization. They might go on to say that in such a case, the only justifiable inductive generalization is that all elements *whose name is introduced using a Kripke-style name-acquiring transaction* have their atomic numbers essentially. This is the point where the second way to avoid the lack of homogeneity in our metaphysical picture comes into our story. To say that this is the only justifiable generalization is to say that the way the name of an element is introduced is critical in deciding whether something similar to SKE is applicable to that element. However, the way a name is introduced does not change the world. To make this clear, consider the following.

(7) Ununbium does not have its atomic number essentially. But if the name of ununbium had been introduced using a Kripke-style name-acquiring transaction, then ununbium would have its atomic number essentially.

Obviously (7) is not acceptable. Given this, the best thing BS can do is to say that Kripkean necessity *a posteriori* has no metaphysical implications. In this case, we are not allowed to infer (4) from (3) (or from (2)), which means that BS's argument is not very different from Sidelle's argument explained above. In other words, in this case, contrary to appearances, the main target of BS's argument is not (5) but the inference (4) from (3) (or from (2)).

To summarize, BS need to clarify their position, and it seem that they have three options. The first is to embrace a nonhomogeneous metaphysical picture: Gold is essentially the element with the atomic number 79 but ununbium is not essentially the element with the atomic number 112. The second is to say that their argument that (5) is false has no relevant metaphysical implications and that Ellis' scientific essentialism is still tenable. The third is to say that contrary to appearances, what their argument shows

is something very similar to Sidelle's claim that Kripkean necessity *a posteriori* is just a linguistic phenomenon with no metaphysical implications.

I believe that none of them is satisfactory to BS. The metaphysical picture the first option requires is too weird to accept when there are other pictures that do not have such a consequence. The second option deprives BS's argument of its teeth: Their argument might be sound. But it does not undermine Ellis' scientific essentialism. The third option is not satisfactory either, because it makes BS's argument into a not particularly novel one that merely pretends to novelty.

The second problem, which I find more serious, is that it is not clear whether BS's argument succeeds in showing that (5) is false. Even if it does succeed in showing this, I am pretty sure that it cannot show that the following variation of (5) is false.

(5′) This argument, *or something very similar to this argument*, can be applied to all natural kinds.

Here is my argument. First imagine an Earth-like planet (call it "U-Earth") where ununbium is as abundant as water on our Earth. In addition, imagine that the people who live on that planet call ununbium "unux" and that this name is introduced using a Kripke-style name-acquiring transaction. Now we can make the following argument.

(1′) "Unux is the element with atomic number 112" is *a posteriori* on U-Earth.

(2′) "Unux is the element with atomic number 112" is necessary on U-Earth.

(3′) "Unux is the element with atomic number 112" is necessary *a posteriori* on U-Earth. [from (1′), (2′)]

(4′) Unux is essentially the element with atomic number 112 on U-Earth. [from (3′)]

(4″) Ununbium is essentially the element with atomic number 112 *on our Earth*. [from (4′)[8]]

[8] The inference (4″) from (4′) is based on the assumption that accessibility relation between possible worlds is transitive. Some philosophers, for example N. Salmon, deny

This argument is very similar to SKE and seems to appeal to the same intuition. But, unlike SKE, this argument works even if "ununbium" is *not* introduced using a Kripke-style name-acquiring transaction. Therefore, even if BS's argument is successful in showing that (5) is false, it cannot show that (5′) is false.

BS might claim that this argument does not work because it uses U-Earth English in (1′) – (4′) but uses our English in (4″). However, I think that (1′) – (3′) are clearly sentences in our English. Of course, these sentences contain a U-Earth English sentence, namely "Unux is the element with atomic number 112". But this sentence is not used but mentioned. What is problematic is (4′). I concede that it is natural to think (4′) is a U-Earth English sentence, but I believe that this does not make any difference. If we want to be consistent, we may use the following instead of (4′).

(4‴) "Unux is essentially the element with the atomic number 112" is true on U-Earth.

(4‴) is clearly a sentence in our English. And we can infer (4″) from (4‴): If we know that "Wasser ist im Wesentlichen H_2O" is true in German, under the assumption that we understand this German sentence, we can safely conclude that water is essentially H_2O.

There is another argument that need not deal with this kind of complexity. It goes like this.

(a) If the name of ununbium had been "Unux" and it had been introduced using a Kripke-style name-acquiring transaction, "Unux is the element with atomic number 112" would be *a posteriori*.

(b) If the name of ununbium had been "Unux" and it had been introduced using a Kripke-style name-acquiring transaction, "Unux is the element with atomic number 112" would be necessary.

(c) If the name of ununbium had been "Unux" and it had been introduced using a Kripke-style name-acquiring transaction, "Unux

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this assumption. These philosophers might think that although it is possible that Ununbium is essentially the element with atomic number 112, it does not follow from that that Ununbium is essentially the element with atomic number 112. For Salmon's view and its problem see Roca-Royes (2016).

is the element with atomic number 112" would be necessary *a posteriori*. [from (a), (b)]

(d) If the name of ununbium had been "Unux" and it had been introduced using a Kripke-style name-acquiring transaction, "Unux is essentially the element with atomic number 112" would be true.

(e) The way a name is introduced does not change the world.

(f) Therefore, ununbium is essentially the element with the atomic number 112. [from (d), (e)]

Note that every sentence used in this argument is in our English.

If at least one of these two arguments is sound, BS's argument once again loses its teeth. Their argument might be able to show that (5) is false, but it does not show that (5′) is false; in fact, we have good reason to think (5′) is true. If so, there is no reason to think that BS's argument undermines Ellis' scientific essentialism.

4. Are analyticity and necessity *a posteriori* mutually exclusive?

The main idea behind BS's argument seems to be this.

(8) Analyticity and necessity *a posteriori* are mutually exclusive.

(9) "Ununbium is the element with atomic number 112" is analytic.

(10) So, this cannot be necessary *a posteriori*. [from (8), (9)]

(11) So, (5) is false.

(12) There is no other way for Ellis to justify his scientific essentialism.

(13) So, Ellis' scientific essentialism is not justified.

I have already argued that (12) is false, since Ellis can use (5′) instead of (5). In this section I will argue that (8) (and hence (10)) cannot be taken for granted. This is an important issue for both BS and Ellis. BS says "The first point that needs to be made about Ellis's position is that he simply takes it for granted that it is '*a posteriori* what properties are essential to a given

kind'" (Beebee & Sabbarton-Leary 2010, 163). The primary target of BS's ununbium example is Ellis's claim that all essence talk concerning natural kinds are necessary *a posteriori*.[9] If (8) (and hence (10)) is true, then this claim by Ellis must be false. I already said this result is not very problematic for Ellis as long as he can reject (13); but it is still problematic for him to some extent.

If my arguments in the previous section are correct, we may have a pretty good sense of a "necessity *a posteriori"* in which (8) is false. This seems to imply that we may have more than one senses of "necessity *a posteriori"*. Compare the following two definitions of "necessity *a posteriori*".

(Def1) S is necessary *a posteriori* iff S is necessary and its truth can be known *only* a *posteriori*.

(Def2) S is necessary *a posteriori* iff S is necessary and its *necessary* truth can be known *genuinely a posteriori*.

Some clarifications of (Def2) are in need. First, note that the presence of "only" is not the only difference between (Def1) and (Def2). In (Def2), we have "necessary truth" rather than "truth". This difference is important. If we use "truth" in (Def2), (Def2) becomes deeply unsatisfactory. Consider "all bachelors are unmarried men". The truth of this sentence can be known through an *a posteriori* method. Just examine a sample of bachelors and inductively generalize the observed regularity! In this light, we should say that this sentence is necessary *a posteriori*, which is absurd. However, our (Def2) does not have this problem. There is no (genuinely) *a posteriori* way to show the *necessary* truth of this sentence. Second, I need to explain why "genuinely" is required. Without this, one might think, even mathematical truths may become *necessary a posteriori*. Assume that S is a notorious mathematical proposition. Imagine that a famous mathematician finally proved S and that I read this in a newspaper. Now I know that S is true. But my knowledge seems to be *a posteriori*. This worry can be handled, however, if we insert "genuinely" in (Def2) and define this term as follows: The truth of a sentence is known *genuinely a posteriori* iff this knowledge is acquired *a posteriori* and it is not transmitted from someone

[9] This is why the title of their paper is "On the Abuse of the Necessary *a Posteriori*".

else's *a priori* knowledge of the truth of the sentence. Since my knowledge of S in the above example is transmitted from the *a priori* knowledge of the famous mathematician, it cannot be genuinely *a posteriori*.

Now, if we accept (Def1) what BS say is right: "Ununbium is the element with the atomic number 112" is not necessary *a posteriori*. If "ununbium" is a descriptor and hence this sentence is analytic, there is an *a priori* way to show the truth of this sentence, and it is automatically disqualified as a necessary *a posteriori* sentence. But if we accept (Def2), the story becomes completely different. Imagine that there is a chemist who is completely ignorant of the standard naming system of IUPAC but is familiar with the semantics and metaphysics of natural kind. He will not know whether "ununbium" is a descriptor or not, and so, he cannot know whether "ununbium is the element with atomic number 112" is analytic or not. But he can examine some samples of ununbium and find that ununbium is an element and that its atomic number is 112. After that, he can say like the following. I don't know whether the name of ununbium is introduced using a Kripke-style name-acquiring transaction, but I do know that if it had been introduced using a Kripke-style name-acquiring transaction, "Ununbium is the element with atomic number 112" would be necessary *a posteriori*. From this, I can know that ununbium is essentially the element with the atomic number 112. So, I can know that "Ununbium is the element with atomic number 112" is necessary. The method this chemist used is an *a posteriori* method. So, this story shows that even if "ununbium is the element with atomic number 112" is an analytic sentence, its necessary truth can be known *a posteriori*.[10] If we accept (Def2), this sentence is both analytic and necessary *a posteriori.* Thus, analyticity and necessity *a posteriori* are not mutually exclusive. A consequence of this is that Ellis's claim that all natural kinds produce necessity *a posteriori* is still tenable in the face of BS's ununbium example.

[10] An anonymous reviewer claimed that the chemist in my story uses "ununbium" in a different sense because she re-baptized ununbium. I disagree. It is quite uncontroversial that she *inherited* the name "ununbium" from other people in the Kripkean sense. One can inherit a name without knowing its etymology and Kripkean inheritance of name does not require this kind of knowledge either.

I believe that (Def2) is a pretty good way to define "necessity *a posteriori*" and that we cannot take it for granted that (Def1) is the right definition. This does not mean that there is no problem with (Def2). To be sure, it is not perfectly consistent with the conventional use of "a posteriori". For example, when we say "water is H_2O" is a posteriori, what we usually mean is that its truth can *only* be known *a posteriori*. Nevertheless, I think that there is a non-negligible motivation for (Def2) because, given my arguments in the previous section, (Def2) carves the joint of nature better than (Def1).[11] Once we accept (Def2), "necessity a posteriori" can subsume all essentialist claims about natural kinds. But if we accept (Def1), "necessity a posteriori" can subsume only a small part of these claims. For this reason, I think that BS were too quick in accepting (8).[12]

5. Conclusion

I think that many philosophers have underestimated the force of KE. As BS's case explicitly shows, philosophers have viewed the *actual* history of naming as crucial in KE. If this is true, I believe, KE is vulnerable to the Sidelle-style criticism that Kripkean necessity *a posteriori* is a mere linguistic phenomenon. However, if my arguments in this paper are correct, actual history of naming is not that important in KE at least as long as we accept SKE. I concede that it is important in some cases. As Kripke has shown plausibly, it is indeed important in the truth of such sentence as "Gödel was born in 1906" in the situation where not Gödel but Schmitt was the person who proved the incompleteness of arithmetic. However, once we assume that "ununbium" refers ununbium somehow, it is not important at all for the truth of "ununbium is essentially the element with atomic number 112" how this name is introduced. I believe that a moral we can

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[11] For the importance of "carving the joint of nature" in interpretation, see Sider (2011, 23-35) and Lewis (1983).

[12] In fact, as BS point out, Ellis himself seems to accept (8) too (Beebee & Sabbarton-Leary 2010, 173). So BS could say that the criticism should apply not to them but to Ellis. They could say that all they wanted to show is that Ellis' position is not internally coherent. Here I am not very interested in the question of who should be blamed; rather, I am more interested in whether (8) is true.

learn from the failure of BS's argument is that we should not conflate the cases where we are talking about reference and the cases where we are talking about essence.

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