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A PUZZLE ABOUT KINDS

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1. The Puzzle

In this paper I present a puzzle having to do with kinds and—to some extent at least—the ways in which we talk about them. First I present the puzzle. Then I discuss some possible solutions to it. By the end of the paper, it will be clear which solution I currently favor, but I stress that I consider the work here to be at most a preliminary and tentative defense of that solution. My primary concern is simply to show that the puzzle is puzzling.

Consider the natural kind (the substance) *water*. We know a lot about this kind. We know, for example, that all instances of it are composed basically of two parts H and one part O. That is evidently something we learned empirically. Moreover, it is something that we could not have learned any other way. Yet, I will argue, this claim conflicts with a set of claims each of which is independently plausible. Therein lies the puzzle.

Presented in more detail, we have this.

(1) Sameness of metaphysical intension is sufficient for sameness of kind.
(That is to say, if *k* and *k'* are kinds such that it is metaphysically impossible for something to be an instance of one but not the other, then they (*k* and *k'*) are really the same kind.)

(2) The metaphysical intension of the kind *water* is the same as the metaphysical intension of the kind *matter homogeneously composed basically of two parts H and one part O*.[1]
(That is to say, it is metaphysically impossible for the kinds *water* and *matter homogeneously composed basically of two parts H and one part O* to differ in their instances.)

So (3) The kind *water* is the same as the kind *matter homogeneously composed basically of two parts H and one part O*.
(from (1) and (2) by universal instantiation and *modus ponens*)

(4) One can know *a priori* of the kind *matter homogeneously composed basically of two parts H and one part O* that all instances of it are composed basically of two parts H and one part O.

So (5) One can know *a priori* of the kind *water* that all instances of it are composed basically of two parts H and one part O.
(from (3) and (4) by Leibniz's Law)
But (6) One cannot know *a priori* of the kind *water* that all instances of it are composed basically of two parts H and one part O.

In my favored formulation of (1)—the formulation that is not in parentheses—I adopt the terminology of the *metaphysical* extension/intension of a *kind* from Nathan Salmon's *Reference and Essence* ([1981] 2005, pp. 46–47). The idea is that whatever kinds are, they are universals of some sort—things that have instances. Those instances are the things that we say are (instances) "of" the kind or that we say "belong to" the kind. The metaphysical extension of a kind (at a world *w*) is simply the set of its instances (at *w*); the metaphysical intension of a kind is then the function that assigns to any possible world the metaphysical extension of that kind at that world.

We need to keep three things distinct in our thinking: a kind, a kind term, and a kind term's corresponding predicate. Few would confuse a kind with a kind term. Just to be explicit, let me say that I take a kind term to be any expression that designates a kind—whether that expression is a single word ('pencil'), a compound common noun phrase ('guy who won't take no for an answer'), or a general definite description ('the colorless, odorless, thirst-quenching liquid that fills the lakes and streams'); whether that expression is rigid (like 'titanium') or non-rigid (like 'the most commonly used metal in dental implants'); and whether the kind designated is natural (like *guy who won't take no for an answer*; *the colorless, odorless, thirst-quenching liquid that fills the lakes and streams*; *titanium*; and *the most commonly used metal in dental implants*) or not (like *pencil*). I take it that 'the' in kind terms functions pretty much the way it does in singular terms, so that the (natural) kind term 'the most commonly used metal in dental implants' refers to (or "denotes" in Russell's sense) *titanium* because titanium is the only instance of the (non-natural) kind *most commonly used metal in dental implants*. (I will typically make the anti-Russellian assumption that descriptions refer/designate rather than merely denote, since it eases exposition and accords with (my) intuition. This choice does not materially affect my points.) It is not uncommon to consider a kind term a predicate, but it is evidently mistaken to do so.[2] Again, just to be explicit, let me say that I take a predicate corresponding to a kind term to be a predicate formed from the kind term together with the 'is' (or 'is a' as the case may be) of predication. Just to fix ideas, it's probably worth mentioning at this point that the metaphysical intension of the kind designated by a kind term need not be the semantic intension of that kind term's corresponding predicate: the metaphysical intension of *the color of the sky* (that is, of *blue*) is not the semantic intension of the predicate 'is the color of the sky'. Since *the color of the sky* is *blue*, the metaphysical intension of *the color of the sky* is the metaphysical intension of *blue*—the function from possible worlds, *w*, to the set of blue things at *w*. So, at a world in which the sky is green, the *metaphysical*

extension of *the color of the sky* is the set of blue things at that world. The semantic intension of the predicate 'is the color of the sky' is the function from possible worlds, *w*, to the set of things to which the predicate correctly applies with respect to *w*. So, with respect to possible worlds in which the sky is green, the semantic extension of the predicate 'is the color of the sky' is the set of things that are green at those worlds.[3]

Premise (1) has a reasonable degree of intuitive support. Scott Soames in "What Are Natural Kinds" (2007, p. 338) says, speaking there specifically of *natural* kinds of course, "It is hard to imagine two distinct species of animal, two distinct substances, or two distinct colors which have precisely the same instances in every possible world-state." And in that paper, Soames in fact endorses a version of (1) that is restricted to natural kinds on the basis of this intuition about species, substances, and colors.[4] About thirty years before Soames's endorsement, Salmon mentioned in *Reference and Essence* that the view has some intuitive support when he said, "[I]t is not implausible that kinds having the same metaphysical intension are identical, so that the metaphysical intension of a kind uniquely determines the kind in question" (Salmon [1981] 2005, p. 53, n. 9). Of course, that's a long way from an *endorsement* of (1)—and Salmon did not take a stand at the time—but it does suggest that (1) has some degree of intuitive support.[5]

Premise (2) assumes that we can designate kinds both by single-word common noun phrases and by compound common noun phrases. It is relatively uncontroversial that certain single-word common noun "phrases" designate kinds. Take 'vixen' or 'bachelor' for example. It is also relatively uncontroversial that those kinds are also designated by the compound common noun phrases 'female fox' and 'unmarried man' respectively. And each of the two italicized common noun phrases in (2) at very least appears to designate a kind. (2) assumes of course the current conventional philosophical wisdom—in the wake of Kripke [1972] 1980 and Putnam 1973—about water's having its chemical composition necessarily.

The inference from (1) and (2) to (3), involves only universal instantiation and *modus ponens*. It is impeccable.

Reasonable questions can be raised concerning (4)—I will turn to those in a moment—but for now I want to emphasize (4)'s *prima facie* plausibility. Just think about other cases. One can know *a priori* of the kind *bachelor* that all of its instances are unmarried. One can know *a priori* of the kind *female fox* that all of its instances are female. One can know *a priori* of the kind *brown-eyed girl* that all of its instances are brown-eyed. (4) is just another instance of this general phenomenon.

Because (4) involves *de re* knowledge, the inference from (3) and (4) to (5) is licensed by Leibniz's Law (the Indiscernibility of Identicals). I'm a big fan of Leibniz's Law. It is hard to do philosophy fruitfully without it. (It is hard to do philosophy in any case, but it is a little less so with recourse to Leibniz's Law.) Enuf said.

But (5) conflicts with (6), which was the observation with which I started—namely that the only way we could have learned of the kind *water* that all its instances are composed of two parts H and one part O is empirically. I think this is puzzle enough, since I have a very strong intuition that the only way to have the *de re* knowledge in question is through experience. (The strength of your own intuition about this is revealed by whether you were inclined to balk at the second paragraph of this paper.) But, we can extend the puzzle by adding in a little plausible semantics. Let's add in that 'water' is a Millian term for *water*—that is, that the semantic content of 'water' is simply its referent, *water*. (Mill himself was not, in the intended sense, a "Millian" about general terms, since he thought that all general terms have "connotation" (descriptive content) as well as "denotation" (reference).) Given the plausibility of the claim that any Millian term is importable into the context 'one can know *a priori* that', this leads to the counterintuitive result that one can know *a priori* that all instances of water are composed basically of two parts H and one part O.

This last thought may encourage one to think that the puzzle that I am raising is of a piece with familiar arguments that use substitution failures against hypotheses about the semantic content of proper names. But this puzzle is not like the Fregean argument against Millianism about proper names, where the substituted terms are assumed (for *reductio*) to have the same semantic content. Nor is it like a Kripkean argument against descriptivism about proper names where the substituted terms are again assumed (for *reductio*) to have the same semantic content. The (un-extended) puzzle makes no assumptions about the semantic content of 'water' or of 'matter homogeneously composed basically of two parts H and one part O'. The extended puzzle, though it makes an assumption about the semantic content of 'water', makes no assumption about the semantic content of 'matter homogeneously composed basically of two parts H and one part O'. The puzzle should be puzzling regardless of whether one thinks that 'matter homogeneously composed basically of two parts H and one part O' has descriptive content or not. (This matter will be further discussed below.)

The solution to the puzzle lies in rejecting (at least) one of the following: (1), (2), the inference to (3), (4), the inference to (5), or (6). In what follows, I won't bother considering the solutions that involve rejecting the inferences, since the inferences are legitimate. I will consider the other possibilities in what I (at least currently) take to be the order of increasing plausibility.

2. Rejecting (2)

Some philosophers may find it tempting to reject (2) on the ground that at least one of the (at least alleged) kind terms fails to designate a kind. The idea would be that '*matter homogeneously composed basically of two parts H and one*

part O' fails to designate a kind because kinds just aren't gerrymandered entities of the sort they would have to be if it did.

I don't myself have any such minimalist tendencies. I don't have a theory of kinds, but I suspect that a proper theory of kinds will look something like set theory.[6] For example, I think that for any two kinds there is a kind that is the "kind-intersection" of those two kinds: if there's the kind *girl* and the kind *brown-eyed (thing)*, then there's the kind *brown-eyed girl*. I don't think that there's a kind corresponding to every common noun phrase: just as there's no "Russell set" (the set of sets that are not members of themselves), there's no kind corresponding to the common noun phrase 'kind that is not an instance of itself'. Of course a proper theory of kinds won't include an analog of Extensionality—according to which sets having all and only the same members are the same—since the coextensional kinds *creature with a heart* and *creature with a kidney* are distinct. I think of (2) as assuming an analog of Restricted Comprehension (that is, Separation)—roughly that for any kind and for any way of restricting that kind, there's a kind of the restricted sort—and that there's a kind *matter*, so that the kind *matter homogeneously composed basically of two parts H and one part O* is a kind that can be "obtained" by restricting the kind *matter*. And of course (2) also assumes that there is a kind *water*.

Although I recognize that I tend to be fairly liberal ontologically, I doubt that rejecting (2) is all that tempting even to those who are a little more ontologically conservative than I am. It might be that there are some bizarre kinds that conservatives want to say no to—like "*Member of a Species that Serves as Mascot for Princeton University*" (Salmon [1981] 2005, p. 52), where the quoted phrase is a rigid designator for a kind whose metaphysical intension is a function that when "fed" the actual world "returns" the set of instances of the kind *tiger* and when "fed" a possible world in which Princeton's mascot is a raccoon "returns" the set of instances of the kind *raccoon* and so on. But surely it's one thing to say no to that kind and it's another thing to say no to a kind like *matter homogeneously composed basically of two parts H and one part O*.

3. Rejecting (4)

What are the prospects for rejecting (4)? Someone attracted to this solution might say something like this. What one can know *a priori* is (the *de dicto* claim) that all instances of the kind *matter homogeneously composed basically of two parts H and one part O* are composed basically of two parts H and one part O. But just as one can know *a priori* (the *de dicto* claim) that the shortest spy is a spy (provided that there is exactly one spy shorter than all others) without knowing *a priori* of the shortest spy (even if there is exactly one spy shorter than all others and one is in a position to have *de re* thoughts about him) that he is a spy (provided that there is exactly one spy shorter than all others), so one can know *a priori* (the *de dicto* claim) that all instances of the kind *matter*

homogeneously composed basically of two parts H and one part O are composed basically of two parts H and one part O without knowing *a priori* of the kind *matter homogeneously composed basically of two parts H and one part O* that all instances of it are composed basically of two parts H and one part O.[7] According to this line of thought, (4) rests on the mistaken assumption that because one can know the corresponding *de dicto* claim *a priori*, the *de re* claim involved in (4) can also be known *a priori*.

First point. I didn't argue for (4) on the basis of exportation. In support of (4) I offered only that it seemed to be of a piece with a number of other cases—the kinds *bachelor*, *female fox*, and *brown-eyed girl*—in which we are intuitively inclined to say that we know *a priori* of a kind that all instances of it are a certain way.

Second point. It would have been fine if I had argued for (4) on the basis of exportation. The examples that I offered to lend support to (4) all have the feature of being *de re* claims that are (expressible by sentences that are) legitimately inferable by exportation from (sentences that express) the corresponding *de dicto* claims. Of course it is an interesting question just why exportation is legitimate here. I am extremely far from having a full-blown theory about this; nonetheless I have some tentative things to say.

It's pretty clear that common noun phrases that designate kinds have definite descriptions associated with them. For example, '*matter homogeneously composed basically of two parts H and one part O*' has associated with it some description like 'the kind-intersection of (the kind) *matter* and (the kind) *homogeneously composed basically of two parts H and one part O*'.[8] (Note that the description in question is not 'the matter homogeneously composed basically of two parts H and one part O', which does not pick out the kind in question. The latter description is improper, since there are many instances of the kind *matter homogeneously composed basically of two parts H and one part O*—exactly as many as there are instances of water.) It's plausible to think that a common noun phrase's associated definite description has one of two roles: either it merely fixes the referent (which referent is the semantic content of the common noun phrase) or it gives the semantic content of the noun phrase. (The first of these options is in line with Salmon 2012. The second with Soames 2007.)

Suppose that it is the former. In that case, the common noun phrase is Millian. It is relatively uncontroversial that it is legitimate to export a Millian term over the context 'one can know *a priori* that'.[9] If common noun phrases are Millian, then they are exportable (in the relevant way) and (4) should not be rejected.

Suppose instead that the associated description gives the semantic content of the common noun phrase. Let me first observe that it's pretty clear that some definite descriptions are exportable in *a priori* knowledge contexts—in particular certain definite descriptions that designate certain abstract entities are like this. Consider, for example, the description 'the set that has 0 as its only member'. One can know *a priori* (the *de dicto* claim) that the set that has 0 as its only

member has 0 as a member, and it follows from this that one can know *a priori* of that set that it has 0 as a member. Not all definite descriptions designating this set are exportable in this way. Let's imagine that my daughter, Yoko, has a favorite set, namely {0}, so that the definite descriptions 'the set that has 0 as its only member' and 'Yoko's favorite set' are codesignative. One can know *a priori* (the *de dicto* claim) that Yoko's favorite set is a favorite of Yoko (provided that there is exactly one set that is favored above all others by her), but it does not follow that one can know *a priori* of Yoko's favorite set (even if there is exactly one set that is favored above all others by her and one is in a position to have *de re* thoughts about it) that it is a favorite of Yoko (provided that there is exactly one set that is favored above all others by her).

What is so special about the description 'the set that has 0 as its only member'? Why is it that one is *de re a priori* knowledge connected to {0} through that description?[10] I'm not entirely sure, but one thing that jumps out is that if anything is going to get you "*en rapport*"—to use David Kaplan's phrase from "Quantifying In"—with this set, it is thinking of it *as* the set that has 0 as its only member. Suppose that I ask you to think of the set that has 0 as its only member. If I ask you to do this, and you understand my request, you are able to comply with it—indeed like it or not, you can hardly fail to comply. The description that I used to designate the set in some sense *gives you* the set. It *identifies* the set. It would make no sense for you to say to me, "Well, what set *is* the set that has 0 as its only member?" The description is a "buck-stopper" (as Kripke put it in his unpublished Whitehead Lectures). It is plausible that one is *de re a priori* knowledge connected to the referents of such identifying descriptions through those descriptions. Contrast this with the description 'Yoko's favorite set'. If I ask you to think of Yoko's favorite set, you might just happen to think of the right set, but your understanding my request does not lead to compliance with it in the way that your understanding my request to think of the set that has 0 as its only member does. The description 'Yoko's favorite set' does not *give you* the set. It doesn't reveal which set it refers to. It doesn't *identify* it. It makes perfectly good sense for you to ask in response to my request, "Well, what set *is* Yoko's favorite set?".

Kinds, whatever exactly they are, are naturally taken to be abstract entities. And certain definite descriptions that designate them seem to be relevantly like certain definite descriptions (like 'the set that has 0 as its only member') that designate at least certain other abstract entities. Suppose that I ask you to think about the kind-intersection of (the kind) *girl* and (the kind) *brown-eyed (thing)*. As long as you understand my request, you are able to comply with it. The description that I used to designate the kind in some sense *gives you* the kind. It *identifies* the kind. If you understand what kind-intersection is, and what the kinds *girl* and *brown-eyed (thing)* are, it would make no sense for you to say to me, "Well, which kind *is* the kind-intersection of (the kind) *girl* and (the kind) *brown-eyed (thing)*?". You've already been given a buck-stopping description. Again, a contrasting case is helpful. Consider the description 'Van's favorite

kind', which let's say designates the kind *brown-eyed girl*. If I ask you to think of Van's favorite kind, you might just happen to think of the right kind, but your understanding my request does not lead to compliance with it in the way that your understanding my request to think of the kind *brown-eyed girl* does. The description 'Van's favorite kind' does not *give you* the kind. It doesn't reveal which kind it refers to. It doesn't *identify* it. It makes perfectly good sense for you to ask in response to my request, "Well, what kind *is* Van's favorite kind?".

The point is that it at least seems plausible to think that the definite descriptions that are associated with common noun phrases are such as to *identify* the relevant kind. Thus it is plausible to think that these descriptions are exportable over 'one can know *a priori* that'. If that's right, then even though there is no reason to think that all general definite descriptions are exportable in such contexts, there is some reason to think that the ones that on this horn of our dilemma give the meaning of common noun phrases are and hence that common noun phrases are too. So either way—whether the definite description associated with a common noun phrase merely fixes the referent or more robustly gives the semantic content of the common noun phrase—there are strong reasons to think that common noun phrases are exportable in *a priori* knowledge contexts.

It is interesting that it is difficult to say how one would decide between the two horns of the dilemma. The standard arguments—the modal, epistemic, and semantic arguments—against descriptivism don't have any purchase in the case of common noun phrases.[11] The descriptions associated with common noun phrases are rigid, "a priori" (in a sense clarified below), and identifying, and hence the modal, epistemic, and semantic arguments (respectively) have no purchase.

Consider the modal and epistemic arguments. One argues that the meaning of 'Gödel' ('water') is not the same as that of 'the discoverer of the incompleteness of arithmetic' ('the colorless, odorless, thirst-quenching liquid that fills the lakes and streams') by pointing out that the proposition expressed by 'Gödel (if he exists) discovered the incompleteness of arithmetic' ('water (if it exists) fills the lakes and streams') is neither necessary nor knowable *a priori* whereas 'the discoverer of the incompleteness of arithmetic (if there is exactly one) discovered the incompleteness of arithmetic' ('the colorless, odorless, thirst-quenching liquid that fills the lakes and streams (if there is exactly one) fills the lakes and streams') is both. But one cannot argue similarly that the meaning of '*brown-eyed girl*' is not that of 'the kind-intersection of the kind *brown-eyed (thing)* and the kind *girl*', since the proposition expressed by 'all instances of the kind *brown-eyed girl* are brown-eyed' is necessary and knowable *a priori* just as 'all instances of the kind-intersection of the kind *brown-eyed (thing)* and the kind *girl* are brown-eyed' is. Now consider the semantic argument. One argues that the meaning of 'Gödel' is not the same as that of 'the discoverer of the incompleteness of arithmetic' by pointing out that if it turned out that Schmidt (and not Gödel) uniquely discovered the incompleteness of arithmetic, 'Gödel' would still refer to Gödel and not to the discoverer of the incompleteness of arithmetic (that is, not to Schmidt). Similarly, one argues that the meaning of 'water' is not the same

as that of 'the colorless, odorless, thirst-quenching liquid that fills the lakes and streams' by pointing out that if it turned out that methane (and not water) is the colorless, odorless, thirst-quenching liquid that fills the lakes and streams, 'water' would still refer to water and not to the colorless, odorless, thirst-quenching liquid that fills the lakes and streams (that is, not to methane). Since in the case of a common noun phrase, the associated description is an identifying description, it can't turn out that the common noun phrase refers to something other than the referent of the associated description. Hence the semantic argument against descriptivism about common noun phrases is not available.

It is worth reflecting on an important difference between this puzzle about kinds and Frege's puzzle—even when we extend the latter from singular to general terms, from informativeness to knowability *a priori*, and from identity statements to other statements (for example, 'Hesperus is a planet, if Hesperus is a planet' and 'Hesperus is a planet, if Phosphorus is a planet'). Frege's puzzle is a challenge to a view about the semantic content of 'Hesperus' and of 'Phosphorus', and so proceeds by making two crucial semantic assumptions—first that the semantic content of 'Hesperus' is Hesperus, and second that the semantic content of 'Phosphorus' is Phosphorus. (It's probably worth pointing out that it is absolutely uncontroversial on these assumptions that the semantic content of 'Hesperus' is the same as the semantic content of 'Phosphorus'.) While the extended puzzle makes an analogous assumption about the semantic content of 'water' (namely, that its semantic content is *water*), it makes no assumption about the semantic content of 'matter homogeneously composed basically of two parts H and one part O'. As we have seen, the puzzle could be run just as well with a definite description in place of the common noun phrase—something on the order of 'the kind-intersection of the kind *matter* and the kind *homogeneously composed basically of two parts H and one part O*'. What is crucial to the puzzle is that the relevant kind terms are *identifying* of their referents. Compare: The phrase 'the set whose sole member is 0' does not have its referent as its semantic content, but it is a description that *identifies* its referent.

In particular, it is important to bear in mind that the following kind term—one that pretty clearly refers to *water*—will not generate the puzzle: 'the substance instances of which are homogeneously composed basically of two parts H and one part O'.[12] This description is not a buck-stopper. It does make sense to ask, "Well, what kind is that?" (One can stop the buck by answering, "water", or by splashing water on the questioner and saying, "I got your answer for you right here".) The puzzle does not assume that these descriptions are exportable over 'one can know *a priori* that'. (The *embedded* common noun phrase does seem to be a buck-stopper—identifying a second-order kind. It is the kind *water*, and not any instance of *water*, that is an instance of the referent of the (second-order) kind term. Given that water is the only instance of *substance instances of which are homogeneously composed basically of two parts H and one part O*, it is the referent of '*the* substance instances of which are homogeneously composed basically of two parts H and one part O'. One can know *a priori* of the kind

substance instances of which are homogeneously composed basically of two parts H and one part O that each one of its instances is such that *its* instances are homogeneously composed basically of two parts H and one part O.)

4. Rejecting (6)

What are the prospects for simply accepting the argument to (5) or, in other words, rejecting the intuition that one cannot know *a priori* of the kind *water* that all its instances are composed of two parts H and one part O? It is after all, one thing to know *a priori that* Yoko's favorite set has 0 as its only member and quite another to know *a priori of* Yoko's favorite set that it has 0 as its only member. The first is objectionable, while the second is not, given that Yoko's favorite set is {0}. The problem with this thought is that 'Yoko's favorite set' is a descriptive term for Yoko's favorite set, whereas 'water' is a non-descriptive term for *water*. The case for the latter, which was reviewed in the previous section of this paper, is quite powerful. Given the plausibility of the claim that any non-descriptive term is Millian and the claim that any Millian term is importable into the context 'one can know *a priori* that', it is plausible that the only way to reject (6) is to accept that one can know *a priori* that all instances of water are composed basically of two parts H and one part O. And that's a tall order.

Perhaps though, it can be filled. I am not sanguine on the prospect that one can know *a priori* that all instances of water are composed basically of two parts H and one part O. But if 'water' is a Millian name for the kind-intersection of the kind *matter* and the kind *homogeneously composed basically of two parts H and one part O*, then this should be no more disturbing than the thought that if 'Buttercup' is a Millian name for Yoko's favorite set (that is, for {0}), then one can know *a priori* that Buttercup has as 0 as its sole member. There are familiar moves (for example, utilizing guises in the manner of Salmon 1986 to explain away our intuitions) to be made here. And so, I think the prospect of rejecting (6) must be taken seriously. Even so, I am not inclined toward this solution—mostly because it feels extreme when there is another reasonable way to solve the puzzle. To put the point in a Moorean way: I feel more sure that we cannot know *a priori* that all instances of water are composed basically of two parts H and one part O than I do that metaphysical intension is sufficient for sameness of kind.

5. Rejecting (1)

One might reject (1) while saving a version of it that is restricted to natural kinds by insisting that although *water* is a natural kind, *matter homogeneously composed basically of two parts H and one part O* is not. I am not myself attracted to this line, since I cannot find any principled reason to say that this kind is not a natural kind. It is however suggested by the picture advocated by Soames (2007).

Soames takes natural kinds to be coarse-grained properties (that is, intensions). These coarse-grained properties are thus by his lights the *referents* of natural kind terms. But, he acknowledges that there are finer-grained properties that are suited to be the *semantic contents* of definite descriptions that refer to those kinds. These finer-grained properties would not be natural kinds.

A variation on this theme is more attractive inasmuch as it would not resort to denying that the kind *matter homogeneously composed basically of two parts H and one part O* is a natural kind while still saving the intuition that motivated Soames to advocate a version of (1) that is restricted to natural kinds. That intuition was just that if species *k* and *k'* have the same metaphysical intention, they're the same species (and similarly for substances and colors). We could say that although the kind *water* and the kind *matter homogeneously composed basically of two parts H and one part O* are natural kinds that have the same metaphysical intension, the first is a substance, but the second one isn't. It does seem right that water is *the* substance instances of which are homogeneously composed basically of two parts H and one part O.

Although I do still think that (1) has a reasonable degree of intuitive support—enough that I am hesitant to reject it—Salmon (2012, pp. 478–479), responding to the puzzle presented here, has offered a number of examples of kinds that intuitively appear to be distinct in spite of their necessarily having exactly the same instances. Consider the kinds *gold atom with 47 protons* and *silver atom with 79 protons*. The intuitive pull of such an example gives some reason to think that the prospect of solving the puzzle by rejecting (1) is promising. Of course, it would take a great deal more investigation to substantiate this initial assessment.[13]

Notes

1. I use 'homogeneously' so that matter one contiguous part of which is composed of H atoms and another contiguous part of which is composed of half as many O atoms will not count as an instance of the kind referred to by the compound common noun phrase. I use 'basically' so that instances of rainwater with impurities will (but instances of coffee will not) count as instances of the relevant kind. I am not sure that the compound common noun phrase that I use captures exactly what I am aiming for, but some phrase along these lines should.
2. *Cf*. Salmon 2012.
3. I'm not sure what to say about the semantic extension/intension of a kind term. There are two reasonable positions: the extension of a kind term with respect to a world *w* is simply the term's referent with respect to *w* (which referent is a kind) or it's the metaphysical extension at *w* of the term's referent with respect to *w*. This might be merely a matter of terminology.
4. I base this attribution in part on email conversations with Soames. It may be that it is better to attribute to him something even weaker than a version of (1) that is restricted to natural kinds. In an earlier paper, "Knowledge of Manifest Natural Kinds", he endorsed the weaker view that sameness of metaphysical intension is

sufficient for sameness of what he calls "manifest natural kind", where manifest natural kinds are designated by terms like 'water', 'tiger', 'gold', 'green', and 'electricity'. Soames says, "Individual instances of these kinds are objects of our potential acquaintance about which we may have *de re* knowledge. Natural kinds of a more highly theoretical sort—like photons and neutrons—are not included in this category" (Soames 2004, p. 159). In any case, Soames (2007) does take both 'water' and 'H_2O' (the latter of which he takes as short for the description 'the substance (instances of which are) made up of molecules consisting of two hydrogen atoms and one oxygen atom') to designate the same natural kind. He takes that kind to be a coarse-grained property (that is, an intension).

5. More recently, Salmon (2012, p. 477, n. 5) reports that the puzzle that I am here presenting helped to persuade him that there are numerically distinct kinds that exactly coincide in metaphysical intension.
6. *Cf*. Salmon 2012, p. 472.
7. I include no pesky existence-clauses in the kinds case because I assume that the relevant kinds exist even if they have no instances. If that assumption bothers you, insert existence-clauses.
8. Salmon (2012, pp. 480-481) takes the description associated with a common noun phrase of the form ⌜thing α such that ϕ_α⌝ to be ⌜the kind appropriately determined by the propositional function indicated by ϕ_α⌝. In the usual cases in natural language, ϕ_α is a conjunction. Of course, one has to be careful with common noun phrases like '*toy duck*'.
9. Here I assume a simple form of Millianism.
10. I'll say that exportation over the operator 'one can know *a priori* that' (or 'it is knowable *a priori* that' and the like) is legitimate just in case one is "*de re a priori* knowledge connected" to the relevant individual/kind "through" the relevant singular/general term. I'll help myself to a family of related notions when (if) they are needed: *de re* knowledge connection, *de re* belief connection, *de re* assertion connection, and so on. I think it's a good idea to keep these separate since the conditions under which exportation is legitimate may be different for each of them. Using this terminology, Kaplan (1968) claims in "Quantifying In" that an agent is *de re* belief connected to an object *via* a term just in case the term represents (in Kaplan's sense) the object to the agent.
11. The modal and epistemic arguments are due to Kripke ([1972] 1980). The semantic argument is due to Donnellan (1972), Kaplan (1989), Kripke ([1972] 1980), and Putnam (1973). It is also plausible to construe the 'Dartmouth' argument given by Mill (1843, §5 of "Of Names") as a version of the semantic argument.
12. Similar remarks apply to 'the substance (instances of which are) made up of molecules consisting of two hydrogen atoms and one oxygen atom', a definite description that Soames (2007) takes to have the same semantic content as 'H_2O'.
13. I thank Nathan Salmon for years of philosophical conversation and encouragement about this topic as well as many others. I thank Scott Soames for discussion of this material. I also thank those who heard some version of this paper in 2010 and 2011 at the Society for Exact Philosophy; the University of California, Santa Barbara; the Universidad Nacional Autónoma de México; the Federal University of Paraná; the Federal University of Rio de Janeiro; and the University of Texas at Austin.

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