Kripke on the necessary a posteriori III: theoretical identities

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Kripke thinks that theoretical identities in science are a third source of necessary a posteriori truths. (He discusses this mainly in Lecture III, pp. 116-144. This view is connected with certain theses about natural kind terms, and their similarity to proper names.

1 Analogies between proper names and natural kind terms

1.1 Natural kind terms and descriptions

The first similarity between names and natural kind terms comes in their relations to various associated definite descriptions. Just as names are associated with various definite descriptions — e.g., 'Aristotle' with 'the greatest philosopher of antiquity', 'the teacher of Alexander', etc. — so natural kind terms are associated with various descriptions — among the examples Kripke discusses are 'gold' and 'the yellow metal', 'heat' and 'the cause of sensation S, 'water' and 'the clear drinkable liquid', 'tiger' and 'the striped quadrupedal carnivorous feline.'

Just as Kripke argued that names are not synonymous with the descriptions associated with them, so he argues that natural kind terms are not synonymous with the descriptions associated with them. This is the point of the discussion of Kant's idea that 'Gold is a yellow metal' is analytic, and that we can imagine seeing a three-legged tiger.

Kripke concludes that the role that such descriptions play in the case of natural kind terms is analogous to the role that they play in the case of names. The idea there was that a description might be used initially to fix the reference of a name, but typically need not be known by users later in the history of the name. Kripke thinks the same

about natural kind terms. We might have introduced the natural kind term 'water' via the description 'the clear liquid over there', but this neither gives the meaning of 'water' nor need be recognized by later speakers who understand the term.

1.2 Natural kind terms and rigid designation

Kripke thinks that the similarities between names and kind terms extend beyond their 'nondescriptionality.' He further thinks that natural kind terms, like names, are rigid designators.

One of Kripke's aims is to show that theoretical identity sentences are necessary, if true. Recall that he established a similar thesis about identity sentences involving names. Because ordinary proper names are rigid designators, he said, any true identity sentence of the form 'n is m' will be a necessary truth.

It is clear that he thinks that we can give a similar explanation of the necessity of theoretical identities. He says,

> "Theoretical identities, according to the conception I advocate, are generally identities involving two rigid designators and therefore are examples of the necessary *a posteriori*." (140)

Among the theoretical identity statements which Kripke thinks to be necessary for this reason are:

> Water is H_2O.
>
> Lightning is electricity.
>
> Heat is molecular motion.
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> Gold is the element with atomic number 79.
>
> Cats are animals.

We have an understanding of why identity sentences involving two coreferential rigidly designating singular terms are necessary if true. What we now have to ask is: how does this explanation carry over to the case of theoretical identities? There are two reasons to be skeptical that it does: (1) these 'theoretical identities' do not appear to be identity statements, and (2) we have no grip yet on what it means for a general term like 'water' to be a rigid designator.

1.3 Are theoretical identities really identity statements?

In the case of identity sentences like 'Hesperus is Phosphorus' we have a claim that the object which is the referent of 'Hesperus' stands in the identity relation to the object which is the referent of 'Phosphorus.' If we were to apply this paradigm to, e.g., 'Water

is H_2O', this would mean that the claim is true iff the referent of 'water' stands in the identity relation to the referent of 'H_2O.'

Supposing that the referents of these general terms are the sets of objects to which they apply, an obvious problem for this view is that it does not apply to some of the above examples; for example, not all electricity is lightning, so the referents of 'lightning' and 'electricity' will *not* stand in the identity relation. The same goes for 'Cats are animals.'

An alternate reading of the logical forms of theoretical identities: they are not identity statements, but universally quantified conditionals and biconditionals. E.g.:

$\forall x$ (x is water $\equiv$ x is H_2O)

$\forall x$ (x is a cat $\rightarrow$ x is an animal)

1.4 What would it mean for natural kind terms to be rigid designators?

Still, you might think, we can give an explanation of why these conditionals and biconditionals are necessary if true using the notion of rigid designation. But here we run into further problems; Kripke never explains what it would mean for a general term, as opposed to a proper name, to be a rigid designator.

Consider the following possible interpretations of the claim that natural kind terms are rigid designators, and the reasons why they are unsuccessful:

- *A predicate is a rigid designator iff it has the same reference with respect to every possible world.* On this characterization, virtually no predicates, and none of Kripke's examples, will be rigid. Consider 'cat'. Surely there is a possible world w in which there are no cats; but then there is a possible world with respect to which 'cat' has a different referent than it does with respect to the actual world.
- *A predicate is a rigid designator iff it corresponds to a property which determines a referent with respect to every possible world.* This would make all predicates rigid designators; but not all universally quantified conditionals and biconditionals involving any predicates are necessary if true.
- *A predicate is a rigid designator iff if the predicate applies to an object in at least one possible world, it applies to that object with respect to every possible world.* Though this is a plausible-sounding extension of the idea of rigidity for singular terms, it fails to explain why statements like the above are necessary if true.

It is an open question whether there is any understanding of what it means for a predicate to be a rigid designator which both fits well with Kripke's text and explains why he thinks that theoretical identities of the sort listed above are necessary, if true. The leading discussion of this question is Scott Soames's *Beyond Rigidity*, from which the above three alternatives are drawn.

2 A neo-Kripkean explanation of the necessity of theoretical identities

The seeming failure of Kripke's explanation of the modal status of theoretical identities does not decide the question of whether Kripke's claim that such sentences are necessary if true is correct. Questions about rigid designation aside, his claim that these claims are necessary has some plausibility. Consider what he says about 'Gold is the element with atomic number 79':

> "Gold apparently has the atomic number 79. Is it a necessary or a contingent property of gold that it has the atomic number 79? ... Suppose we now find some other yellow metal, or some other yellow thing, with all the properties by which we originally identified gold, and many of the additional ones that we have discovered later. An example of one with many of the initial properties is iron pyrites, 'fool's gold.' As I have said, we wouldn't say that this substance is gold. So far we are speaking of the actual world. Now consider a possible world. Consider a counterfactual situation in which, let us say, fool's gold or iron pyrites was actually found in various mountains of the United States, or in areas of South Africa and the Soviet Union. Suppose that all the areas which actually contain gold now, contained iron pyrites instead, or some other substance which counterfeited the superficial properties of gold but lacked its atomic structure. Would we say, of this counterfactual situation, that in that situation gold would not have been an element (because pyrites is not an element)? It seems to me that we would not. We would instead describe this as a situation in which a substance, say iron pyrites, which is not gold, would have been found in the very mountains which actually contain gold and would have had the very properties by which we commonly identify gold. But it would not be gold; it would be something else. ... (Once again, whether people counterfactually would have *called* it 'gold' is irrelevant. ...) ... Given that gold *is* this element, any other substance, even though it looks like gold and is found in the very places where we in fact find gold, would not be gold." (123-125)

Similar arguments in the case of other theoretical identities. The idea that these necessities are to be explained in terms of metaphysical claims about kinds along with facts about the kinds of predicates natural kind terms are and the way that they are introduced.

3 Kripke's explanation of the illusion of contingency

Suppose that we grant that these theoretical identities really are necessary truths. This seems to run into the following objection, which is familiar from our discussion of the necessity of identity statements involving proper names: it seems clear that heat might not have turned out to be molecular motion, and that gold might not have turned out to be the element with atomic number 79. But when we say this, we seem to be affirming the possibility of something: namely, the possibility that heat is not molecular motion, and the possibility that gold is not the element with atomic number 79. But the possibility of these claims being true straightforwardly conflicts with Kripke's claim that the above

theoretical identities are necessarily true, since 'Necessarily p' and 'Possibly not-p' are inconsistent. (See pp. 141 ff for Kripke's discussion of this.) What's going on?

Kripke thinks that this appearance that theoretical identities are contingent is an illusion, and his aim is to to explain it away:

> "The general answer to the objector can be stated, then, as follows: Any necessary truth, whether *a priori* or *a posteriori*, could not have turned out otherwise. In the case of some necessary *a posteriori* truths, however, we can say that under appropriate qualitatively identical evidential situations, an appropriate corresponding qualitative statement might have been false. The loose and inaccurate statement that gold might have turned out to be a compound should be replaced (roughly) by the statement that it is logically possible that there should have been a compound with all the properties originally known to hold of gold." (142-143)

Why this is a plausible re-description of the intuition behind 'Gold might not have turned out to have atomic number 79'; what we are imagining when we are imagining gold turning out to have a different atomic number.

It is important to be clear about why this explanation works: we are supposing that we have in mind a situation which is like the actual world in respect of how things appear to us, but different in respect of how things are. What we will see later is that there are special reasons why this explanation will not work in the case of mind-body identities; and this is crucial to Kripke's argument that the mind is not identical to the body.