Does a type specimen necessarily or contingently belong to its species?

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Abstract. In a recent article, Alex Levine raises a paradox. It appears that, given some relatively uncontroversial premises about how a species term comes to refer to its species, a type specimen belongs necessarily and contingently to its species. According to Levine, this problem arises if species are individuals rather than natural kinds. I argue that the problem can be generalized: the problem also arises if species are kinds and type specimens are paradigmatic members used to baptize names for species. Indeed, the same problem arises with respect to kinds like gold and the samples used to ground names for them. After arguing that the paradox arises whether or not species are individuals, I attempt to show how the paradox can be resolved. Levine’s argument that a type specimen belongs necessarily to its species is specious. The appeal of the argument stems from a failure to distinguish between two different modal statements concerning type specimens, one de dicto and the other de re. Type specimens belong contingently to their respective species. Even so, they can be known a priori to belong to them: hence, that a particular type specimen belongs to its species is an example of contingent a priori knowledge.

In an interesting recent article, Alex Levine (2001: 332-6) raises a paradox. It seems that, given some relatively uncontroversial premises about how a species term comes to refer to its species, a type specimen belongs necessarily and contingently to its species. According to Levine, this problem arises if species are individuals like Mt. Rushmore rather than kinds like gold. I will argue that the problem can be generalized: the problem also arises if species are kinds and type specimens are paradigmatic members used to baptize names for species. Indeed, the same problem arises with respect to kinds like gold and the samples used to ground names for them. These samples serve the same role that type specimens do for species, at least if standard views about kind term reference are right.

Because the problem is more general than Levine indicates, it is also more threatening. It calls for attention. Fortunately, I will argue, the paradox can be resolved. Levine’s argument that a type specimen belongs necessarily to its species is specious. The appeal of the argument stems from a failure to distinguish between two different modal claims concerning type specimens. Type specimens belong contingently to their respective species, though they can be known a priori to belong to them.
On Contingently Belonging to a Species

It certainly seems to be a contingent matter that at least many of the individual organisms that belong to a species belong to it. By this I do not mean just that it would be possible for a species and the organisms belonging to it to fail to exist together, but something more interesting. First, a species could exist even if many of the particular organisms that happen in fact to belong to that species did not belong to it. Second, the organisms that do in fact belong to a species could, at least in some cases, exist without belonging to that species.

Let me address the first point first. It is clear that a species could exist even if many of the organisms that happen in fact to belong to it had never existed to belong to it. Take Canis familiaris. Rover belongs to this species. But surely Rover might never have existed. Rover’s mother might have been killed while standing duty as a guard dog before she conceived Rover: in that case, Rover would never have existed, but surely his species, Canis familiaris, would still have existed.

As for the second point that at least many of the organisms that do in fact belong to a given species could exist without belonging to that species, Levine (p. 335) thinks that this follows from species’ being individuals. After all, individuals can lose parts, and those parts can become parts of other individuals, as a spark plug does if it is moved from one automobile to another. It is not clear to me that just any individual’s parts could become parts of another individual: for example, if a biological family is an individual, it is hardly clear that anyone in such a family could become part of another biological family instead of her own. Even so, there are other, more compelling arguments that many of the organisms that do in fact belong to a given species could exist without belonging to that species. These arguments hinge on the delimiting features of species, rather than on reflections about individuals in general (LaPorte 1997; Okasha 2002).

It is not important for me to establish that the organisms that do in fact belong to a given species could exist without belonging to that species, so I will not attempt a defense of that claim here (again, for a defense, see LaPorte (1997), Okasha (2002)): the first point above, that a species could exist even if many organisms that happen in fact to belong to it had never existed, is enough to generate the paradox, and this first point seems as secure as any in philosophy. Although the second point is superfluous, it will do no harm to assume it for good measure. I turn now to a discussion of type specimens, which also seem to illustrate the above contingency with respect to their respective species.

Type Specimens

When biologists name a species, they collect a specimen. This specimen serves the same role that samples are supposed to serve in the naming of kinds on the usual view inherited from Kripke and Putnam (Kripke 1980; Putnam 1975). According to the usual view, when someone names a kind like gold, she points to a sample of gold and says something like this: “I hereby use the term ‘gold’ to refer to whatever shares the underlying essence of that sample.” Of course, the naming baptism need
not be so artificial. The theory must be refined to account for this, as well as to account for reference change, impurities in the original samples, and other potential sticking points (see, e.g., Boer (1985) for many such refinements). But it is now widely held that something close to this account of kind-term coining is right. And this account seems to work well for the coining of terms for biological species. Biologists collect a specimen, tag it, and save it in a museum for future reference. The newly coined species name is to refer to the species to which that type specimen belongs.

A type specimen need not be any special member or part of a species (see, e.g., Ereshefsky 2001: 257). Rover could do as a type specimen for *Canis familiaris*. Let us suppose that he is the type specimen. For reasons that I have already given, it is a contingent matter that *Canis familiaris* ever contained Rover: Rover might never have been born, for example. (As I use the expression “contains” here, a species contains a specimen just in case the species has the specimen as a part if the species is an individual, or the species has the specimen as a member or instance if the species is a kind.) Similarly, it is a contingent matter that the kind *gold* is instantiated by any given sample of gold, including that paradigmatic sample (or those paradigmatic samples) used to baptize the term ‘gold’. This sample could have failed to exist. If so, the kind *gold* would still have existed and may still have been instantiated by other bits of gold.

Although *Canis familiaris*’ ever having contained Rover is a contingent matter, Rover, like any type specimen, serves as a standard for the proper use of the species term he grounds, in this case ‘*Canis familiaris*’. To call a type specimen a “standard” is not to say that it must be a special or model or typical organism in a species: again, it can be just any organism in the species that happens to be collected. To say that it serves as a standard is only to say that it is what is used to establish reference, so that the dubber knows a priori and with certainty that this organism, along with every other organism that is appropriately related to it, is in the species named. As Hull writes, “The sole function of the type specimen is to be the name bearer for its species. No matter in which species the type specimen is placed, its name goes with it” (Hull 1982: 484; quoted in Levine: 328). Something similar can be said about paradigmatic samples of chemical kinds, at least on the standard view: they serve as a standard for the proper use of the kind terms they are used to baptize.

But here is where the paradox arises: since a type specimen serves as a standard for the use of its species’ name, it looks as if it is necessary that the type specimen belongs to the species for which it is the type specimen: it looks as if the type specimen belongs to that species in *every possible world in which either the species or the type specimen exists*. First, it looks as if any world in which the relevant species exists is a world in which the type specimen is contained in the species. After all, the species’ name refers by definition to the species containing that type specimen. And second, it looks as if any world in which the type specimen exists is a world in which it belongs to the species. Again, the species’ name refers by definition to the species containing this type specimen, so if the type specimen exists, it must belong to this species.

It looks as if the type specimen’s belonging to the species for which it serves as
the type specimen is necessary. But this is problematic. “This result flatly contradicts our earlier conclusion that the species membership of type specimens was, like that of . . . other organisms that might have been selected as type specimens, contingent” (Levine: 334).

A similar problem arises for kinds, at least given the standard causal theory of reference to them. Since ‘gold’ refers, with respect to any possible world, to the kind instantiated by the paradigmatic sample of gold used to baptize the term ‘gold’, it looks as if it is a matter of necessity that the kind has that sample for a member. But this should be a contingent matter.

The problem is a general one, then: it arises whether species are individuals or kinds, given the standard causal theory of reference. Hence, the problem is potentially more threatening than Levine suggests. It threatens not only the species-as-individuals thesis but also the causal theory of reference.

An anonymous referee has suggested to me that perhaps Levine is focusing on a restricted version of the problem that arises for philosophers who accept the species-as-individuals thesis but not the causal theory of reference. This interpretation of Levine seems to me to be problematic, but there is no need to settle this textual point: whether Levine fails to see the paradox’s generality or whether he sees the paradox’s generality and chooses to ignore it, it remains the case that the paradox is especially interesting for its generality. The paradox arises not only for those who endorse the species-as-individuals thesis, as Levine points out, but also for all those who endorse the widely accepted causal theory of reference.

A Resolution: De Dicto, De Re, and the Contingent A Priori

There must be a fallacy in the above reasoning. The fallacy seems to arise from two possible readings (or perhaps one reading and one misreading) of statements like ‘It is necessary that any species with a type specimen contains its type specimen’. Such statements are true on one reading and false on another. The two readings are the de dicto reading and the de re reading.

The de dicto reading of the statement in question would typically be expressed thus: “Necessarily, any species with a type specimen contains its type specimen.” The de re reading would be expressed: “Any species with a type specimen necessarily contains its type specimen.” Perhaps both of these sentences are ambiguous in ordinary English, despite philosophers’ distinguishing between them, in which case the selective use of these sentences can be helpful to philosophers who wish to keep the readings separate once the distinction is grasped, but it will not be of much use in explaining the distinction. In any case, the distinction can be explained easily enough. Consider this comparison. The de dicto sentence ‘Necessarily biologists are biologists’ is true, since in every possible world the biologists in that world are biologists in that world. The sentence ‘Biologists are biologists’ is true in all possible worlds, or necessarily true. But the de re sentence ‘Biologists are necessarily biologists’ is false, because we cannot say, of the biologists that there are, that they could not have taken on some other occupation instead: Steven J.
Gould, for instance, could have decided to become a professional musician instead of a biologist.

The _de dicto_ sentence ‘Necessarily, any species with a type specimen contains its type specimen’ is true if and only if, with respect to any possible world, the following statement is true (as _we_ use the statement in the actual world): ‘Any species with a type specimen contains its type specimen’. This does seem to be true in any possible world: take any world, and if in that world a species has a type specimen, then in that world the species contains the type specimen.

The _de re_ sentence ‘Any species with a type specimen necessarily contains its type specimen’ is true if and only if any species with a type specimen in the _actual_ world contains that very type specimen in every _possible_ world. This reading does not seem to be true. Rover serves as a type specimen for _Canis familiaris_ in the actual world but there are worlds in which he is not in _Canis familiaris_, never having been born. It is contingent, not necessary, that _Canis familiaris_ contains Rover.

Although it is contingent that _Canis familiaris_ contains Rover, it is a priori certain that _Canis familiaris_ does contain Rover since Rover is, in the actual world, the type specimen for _Canis familiaris_. Therefore, this is an example of the contingent a priori, expounded at length by Kripke in _Naming and Necessity_. Similarly, although the kind _gold_ does not have any particular sample as a member in all possible worlds, because any sample could have failed to exist, we can know a priori that in the actual world _gold_ has this or that sample for a member, because we use the sample to define the word ‘gold’. It is a priori but contingent that the kind _gold_ is instantiated by our sample. We must subject other bits of matter to an empirical test to determine whether they measure up, but we know a priori that the bit of matter that we use to define the term measures up. (Here I ignore some fairly harmless complications regarding reference failure.) What I mean by ‘define’ in cases like this is _to fix the reference_: that is, when we say ‘gold is the kind exemplified by _that sample_’ (we point to the sample), there is no intention to establish _synonymy_ between ‘gold’ and ‘the kind exemplified by _that sample_’, since as we use ‘gold’ it applies in worlds without the sample.

The paradox here has been illuminated in a similar case by Kripke. Kripke considers the standard meter stick, which has been used to define the length of one meter. Someone decreed that the expression ‘one meter’ is to be used for the unit of length that is exemplified by that stick, perhaps at a certain time in the stick’s existence. The stick, which has been fashioned out of platinum and iridium, is kept in Paris.

The stick is analogous, in respects relevant here, to a type specimen used to baptize a species’ name. That stick, _S_, might never have been fashioned of platinum and iridium, though it is, as things are, used as a standard for determining how long a meter is. So the sentence ‘The length _one meter_ is instantiated by _S_ (at time _t_o_ )’ is true in the actual world but it is false in some possible worlds: it is contingently true. Yet _S_ has been used to _define_ ‘one meter’, in the sense that it fixes the reference (Kripke 1980: 54–6, 135), so the definers of ‘one meter’ know a priori the truth of the sentence ‘The length _one meter_ is instantiated by _S_ (at time _t_o_ ).’

Kripke seems to think that the reason the contingency of sentences like ‘The
length *one meter* is instantiated by *S*’ and ‘*Canis familiaris* contains Rover’ is hard to see is that people confuse what is known a priori, or what is known with certainty (1980: 34), with what is necessary. This is surely part of the problem and Levine, for one, does seem to fall into this confusion: he says, for instance, “if species membership is contingent, it is impossible to ascertain such membership with certainty” (p. 333).

But it seems to me that much of the reason the contingency of sentences like ‘*The length one meter* is instantiated by *S*’ and ‘*Canis familiaris* contains Rover’ is often not seen is that people run together *de dicto* and *de re* necessity: there are true statements of necessity in the neighborhood, but they are like the *de dicto* statement ‘Necessarily, any species with a type specimen contains its type specimen’. And it does not follow from the truth of such a *de dicto* statement that ‘*Canis familiaris* contains Rover’ is necessarily true, even given Rover’s role as a type specimen for *Canis familiaris*. Such necessity would follow only from the *de re* statement ‘Any species with a type specimen necessarily contains its type specimen’.

In conclusion, it seems that, given mainstream views about the reference of natural-kind terms, the paradox Levine raises is more general than he claims, and so potentially more troublesome. But it has a resolution. That resolution hinges on distinguishing between two different modal claims about type specimens, and it calls for a recognition of the contingent a priori.

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**References**


