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## General-term rigidity is meaning constancy

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### 1. Introduction

Proper names are rigid designators. It is often thought that some general terms or kind terms, in particular natural kind terms, are rigid as well. In modal contexts, proper names and natural kind terms exhibit similarities in behaviour, and for proper names that behaviour can at least partially be explained by rigidity. For instance, that ‘Hesperus’ and ‘Phosphorus’ are rigid entails that ‘Hesperus = Phosphorus’ is necessarily true and, insofar as it can be known to be true only a posteriori, that certain necessary truths involving names are a posteriori (Kripke 1972). Moreover, since ‘Hesperus’ is rigid and a description of the referent in wholly general terms, such as ‘the first heavenly body visible in the evening’, is not, rigidity entails that at least naïve descriptivist theories of meaning are wrong. Analogously, theoretical identity sentences such as ‘water is H<sub>2</sub>O’ are necessarily true but can be known to be true only a posteriori, and naïve description theories about natural kind terms are wrong since ‘water’ is not equivalent to descriptions of water’s appearance or functional properties, such as ‘clear stuff that fills lakes and rivers’. It is therefore tempting to think that rigidity plays a role explaining the modal behaviour of natural kind terms as well.

Problems arise when we try to make this idea precise. Consider a standard definition of singular-term rigidity:

(RD) A designator  $d$  of  $x$  is rigid if it designates  $x$  with respect to all possible worlds where  $x$  exists and never designates something other than  $x$  with respect to any possible world. (Kaplan 1989 [1977]: 569)

One might have expected that just as ‘Aristotle’ designates Aristotle, ‘tiger’ designates tigers. But if ‘ $x$ ’ in (RD) ranges over extensions, individuals or collections of individuals, then general terms, perhaps apart from a few special cases like ‘prime number’, are non-rigid insofar as they have different extensions in different possible worlds. If we want *rigidity* to play a role in explaining the modal status of theoretical identities like ‘water is  $H_2O$ ’ or ‘tigers are animals with genetic structure  $X$ ’, we need something else.

The most popular option is to let ‘ $x$ ’ in (RD) range over kinds rather than extensions. ‘Water’ is a rigid designator of the kind *water* and ‘ $H_2O$ ’ a rigid designator of  $H_2O$ , and since *water* =  $H_2O$ , the sentence ‘water is  $H_2O$ ’ is necessarily true. The obvious concern is that if kind terms designate kinds and ‘water’ rigidly designates *water*, then it seems that ‘clear stuff that fills lakes and rivers’ (henceforth ‘watery stuff’) should be a rigid designator of the kind *watery stuff*. Indeed, it is hard to see how kind terms could fail to be rigid in this sense. To evaluate ‘water could have failed to be watery stuff’ we must consider worlds where water fails to have the property of being *watery stuff*, so even to determine the sentence’s truth-conditions we must, if general terms designate kinds, assume that ‘watery stuff’ picks out *watery stuff* with respect to all worlds. That is, rigidity seems required even to provide an *interpretation* of ‘watery stuff’ in modal contexts. I will refer to this requirement as the *meaning constancy* requirement:

(MC) If general terms designate kinds, then the interpretation of sentences containing general terms requires that those terms designate the kinds we identify by disquotation with respect to all worlds.

Schwartz, for instance, suggests that advocates of general-term rigidity seem to be ‘confusing rigidity with consistency of meaning’ (2002: 272). After all, if general-term rigidity is just meaning constancy, then all general terms are trivially rigid, and a property that applies to every expression cannot help explain why ‘water is  $H_2O$ ’ is necessarily true and ‘water is watery stuff’ is not.

## 2. *Salvage attempts*

Of course, that there is a sense – meaning constancy – in which all general terms are rigid does not mean that there is not a different sense in which they are not. There have been multiple attempts to define a rigid/non-rigid distinction that could do significant explanatory work.

One observation that has been taken to be pertinent is that, in the case of singular terms, we distinguish names and definite descriptions, and it is not controversial that ‘Aristotle’ and ‘the teacher of Alexander’ are rigid and non-rigid designators of Aristotle, respectively. The meaning constancy requirement might require that ‘teacher of Alexander’ rigidly designates the property of *being a teacher of Alexander* (and ‘the’ perhaps a higher-order cardinality restrictor on the expression’s extension), but that does not prevent the description from *also* being a non-rigid designator of the extension, Aristotle, that contingently satisfies the property. (The name, meanwhile, designates the extension rigidly.) A similar distinction could be drawn between kind terms that function, in relevant respects, as names for kinds and predicative uses of definite descriptions that contingently denote those kinds (see e.g. Salmon 2005 and LaPorte 2012). ‘Water is the most commonly consumed chemical’, for instance, is contingent insofar as ‘water’ designates *water* rigidly and ‘the most commonly consumed chemical’ designates *water* only with respect to some worlds. By contrast, ‘water is H<sub>2</sub>O’ may be necessarily true because it is an identity statement involving expressions that rigidly denote the same kind.

These examples do indeed suggest that general-term rigidity may play a role in certain cases. But the examples are importantly different from the purported theoretical identity statements we are usually interested in, which involve water and watery stuff and tigers and genetic structures. The phrase ‘is the most commonly consumed chemical’ is a kind-selecting, or second-order, predicate. It expresses a condition, identified by disquotation – *being the most commonly consumed chemical* – that is satisfied by *kinds* or *properties* or *universals* themselves, and not the things that instantiate those properties or are members of those kinds at any possible world: ‘is the most commonly consumed chemical’ has the kind *water* contingently in its *extension*. Rigidity in this sense is, I suggest, also straightforwardly an instance of meaning constancy: like all predicates, kind-selecting predicates have a constant meaning – they rigidly refer to properties identified through disquotation – which determines different extensions at different possible worlds.

The problem is that examples involving the kind-selecting predicates do not even begin to help us understand what is going on in most of the cases we have traditionally been interested in. For instance, we wish to know why ‘tigers are striped carnivores’ is contingent and ‘tigers are animals with genetic structure X’ is necessary. But ‘are striped carnivores’ and ‘are animals with genetic structure X’ are not kind-level predicates: they are satisfied by tigers, not by the kind *tiger*. Indeed, it is unclear how ‘striped carnivores’ could be a non-rigid designator of the kind *tiger* because it is unclear how it could be a designator of that kind at all, rather than – at the actual world – an extension consisting of individual tigers. Similarly with ‘water is the clear stuff that fills lakes and rivers’: *being stuff that fills lakes and rivers* is something done by the

stuff that is water and presumably not by the kind, *water*. In fact, the majority of theoretical identity cases do not seem to involve kind-level predicates, and it is rather notable that, for instance, when LaPorte replies to Schwarz's suggestion that general-term rigidity is meaning constancy (LaPorte 2012: 36–37), he exclusively appeals to clear cases of kind-level predication – his go-to example is ‘the colour of Antarctica’, which designates the kind or property *white* – and offers no systematic explanation of how to extend what he says about kind-level predicates to the vast majority of interesting cases, which involve object-level predication.

Furthermore, whereas ‘water is  $H_2O$ ’ may be a kind-identity statement, and the fact that it is necessarily true explained by appealing to rigidity, ‘all water is  $H_2O$ ’ is not; rather, it predicates ‘is  $H_2O$ ’ of the appropriate portion of the extension of ‘water’. No appeal to parallel expressions involving singular terms will tell us why this second sentence is necessary. Moreover, it would be *prima facie* surprising if the explanation for why ‘all water is  $H_2O$ ’ is necessary is systematically different from the explanation for why ‘water is  $H_2O$ ’ is necessary.

Other suggestions for drawing a robust rigid/non-rigid distinction for general terms include essentialist views that distinguish between predicates that apply to individuals in all worlds in which those individuals exist and those that do not (see e.g. Devitt 2005), and interpretations of kind terms as descriptions rigidified by certain modal indexing devices (see e.g. Jackson 1998) that might be involved in the analysis of certain kind terms and not others. Martí and Martínez-Fernández (2011), meanwhile, associate predicates with two levels of intension: in accordance with meaning constancy, a general term expresses a *semantic intension* that assigns a kind to the expression relative to each world; that kind, then, is represented as what we might call the expression's *metaphysical intension*, the role of which is to determine an extension at each world. A rigid predicate such as ‘is water’ ostensibly designates the same kind in all worlds: its *semantic intension* assigns the same *metaphysical intension* – the same function from worlds to extensions – at every world. Allegedly *non-rigid* designators, such as ‘is watery stuff’, designate different kinds at different worlds: the *semantic intension* assigns different *metaphysical intensions* to the predicate, depending on which kind is watery stuff in those worlds.

A concern with Martí and Martínez-Fernández's account is that it does not obviously matter to the truth-conditions of ‘water is watery stuff’, even if modal operators are added to the sentence, whether we read ‘watery stuff’ as a rigid designator of the kind (metaphysical intension) *watery stuff* or a non-rigid designator of *water*. And, if it does not matter, they have not succeeded in defining a notion of general-term rigidity that can do any explanatory work not done by a simpler account according to which general terms are trivially rigid in accordance with (MC), and ‘water’ and ‘watery stuff’ designate different kinds but determine extensions that overlap in some worlds but not others.

All these approaches have generated considerable discussion, and answers have been suggested to the concerns mentioned. In the rest of this article I argue that those answers are moot. Instead of going into details of the different responses, I identify some crucial asymmetries between a posteriori necessary truths involving names and a posteriori necessary truths involving general terms, and argue that once we pay attention to these we see that general-term rigidity is a red herring for explaining theoretical identity statements and that any attempt to draw a substantial rigid/non-rigid distinction for general terms is bound to fail to give us the answers we seek. As opposed to proper names, what distinguishes natural kind terms from other expressions, and what is really needed to explain theoretical identity statements, has little to do with modality. And once we identify these non-modal features, the trivial meaning constancy requirement will be sufficient to account for their modal behaviour.

### 3. *Twin Earth*

Consider Twin Earth, where the watery stuff has the chemical composition XYZ but otherwise behaves exactly like water, as in Putnam's classic example (Putnam 1975). XYZ is watery stuff but not water, and what we need to explain is what it is about our concept – or the metaphysics – of water that leads us to conclude that XYZ is not water. This explanation must be non-modal. Twin Earths are regions of the actual world – or, more precisely, *intra*world scenarios – not different possible worlds, or *inter*world scenarios. Twin Earth examples let us make the non-modal observation that XYZ, despite being watery stuff, *is not* water, but not the modal observation that XYZ *could not have been* water. Since the relationship between *water*,  $H_2O$ , XYZ and *watery stuff* can be brought out in *intra*world Twin Earth scenarios, the modal notion of *rigidity*, which only tracks *inter*world behaviour, will not help explain the relationship. This simple point is, it seems to me, remarkably overlooked in the literature.

A better explanation for the relationship, and why it can be illustrated in Twin Earth scenarios, is that 'watery stuff', insofar as it designates a kind, designates *watery stuff*, which is a different kind than *water* (and XYZ). It is not a designator of *water* at all, neither on Earth nor on Twin Earth, but designates a property instantiated by the things or stuff that instantiates *water* on Earth and XYZ on Twin Earth. Rigidity thus plays no role in explaining why 'water' and 'watery stuff' come apart in modal or non-modal contexts any more than it plays a part in explaining why 'Aristotle' cannot be substituted with 'Plato'.

Of course, this is not to say that observations made using Twin Earth scenarios have no modal import; rather, the modal consequences are side effects generated by the meaning constancy requirement on the basis of non-modal

observations about what kinds these general terms actually designate. Insofar as Twin Earth examples show that ‘water’ and ‘watery stuff’ actually designate different kinds, then *water* and *watery stuff* must be different kinds, and it follows by meaning constancy that they necessarily designate different kinds. Meanwhile, insofar as Twin Earth examples show that ‘water’ and ‘H<sub>2</sub>O’ designate the same kind, it follows that ‘water’ and ‘H<sub>2</sub>O’ must be intensionally equivalent (Soames 2002: 310): by meaning constancy, we know that the intension of ‘is water’ picks out all (and only) stuff that has the property of being *water* and that the intension of ‘is H<sub>2</sub>O’ picks out all (and only) stuff that has the property of being H<sub>2</sub>O. But then, insofar as ‘water = H<sub>2</sub>O’ is a true identity statement linking those kinds, it follows by meaning constancy that the predicates are intensionally equivalent. In that case it also immediately follows that ‘all water is H<sub>2</sub>O’ is necessarily true. This is, of course, the result we wanted, but notice again that *rigidity* (beyond meaning constancy) plays no role in establishing it: the mere *truth* of ‘water = H<sub>2</sub>O’, which hinges on the metaphysics of the universals or properties, is sufficient to guarantee the necessity of ‘all water is H<sub>2</sub>O’; *rigidity*, beyond meaning constancy, is irrelevant.<sup>1</sup>

The observation that modality is irrelevant (trivial) to the explanation of theoretical identity statements, generalizes. For instance, the famous examples involving gold and atomic composition, lightning and electrical discharge or pain and C-fibres firing (Kripke 1972) concern primarily which of the proposed identity statements are *true*; necessary equivalence follows trivially if identity is established because all expressions, including ‘gold’, ‘particles with atomic no. 79’ and ‘yellow metal’, require meaning constancy. That the relevant scenarios involving these kinds can be run equally informatively as Twin Earth scenarios puts serious strain on the idea that rigidity, a modal notion, plays any non-trivial explanatory role in the thought experiments, the conclusions of which seem to concern the *actual* metaphysical relationships between certain kinds and the concepts we use to pick them out. Crucially, however, superficially similar examples involving proper names *cannot* be run as Twin Earth cases. That ‘Hesperus = Phosphorus’ is an a posteriori necessary truth is a consequence revealed only by considerations about what *could have* been the case. Similarly, that ‘Aristotle’ cannot in general be substituted with ‘the teacher of

1 We do not actually need to assume genuine property identities to get this result; certain reducibility or grounding relations between water and a proper composition of the kinds designated by ‘hydrogen’ and ‘oxygen’ suffice to ensure that ‘all water is H<sub>2</sub>O’ is necessarily true. Nor do we need ‘intensional equivalence’ to mean intensional identity. We could, following King (1995) or Soames (2007), take the intension expressed by ‘H<sub>2</sub>O’ to be more complex than the intension of ‘water’; ‘water is H<sub>2</sub>O’ is necessarily true insofar as the intensions determine the same extensions in all worlds. What ultimately matters is the metaphysical relationship between the kinds (or intensions), not the rigidity or not of expressions expressing them. Meanwhile, then, ‘water is watery stuff’ is contingent because of the metaphysical relationship between the designated kinds; rigidity is irrelevant.

Alexander' is revealed only by considering what Aristotle is up to in different possible worlds. There is no Twin Earth scenario in which Aristotle is not the teacher of Alexander, given that he actually is.

We are now in a position to pinpoint some crucial differences between a posteriori necessities involving names and a posteriori necessities involving general terms. First, in the case of names it was never controversial among contemporary philosophers that 'Hesperus = Phosphorus' is true. Rigidity entails that two names that designate the same thing necessarily do, so the rigidity of proper names was a significant discovery of which the consequence that 'Hesperus is Phosphorus' is necessarily true is a surprising consequence. For general terms, however, the central questions are *whether* and *in what sense* expressions like 'water' and 'H<sub>2</sub>O' in fact designate the same thing, not whether *if* they do, they do so necessarily – the meaning constancy requirement ensures the latter. That is why non-modal Twin Earth examples suffice as data; what Twin Earth examples show us is not that 'water = H<sub>2</sub>O' is necessary, but that it is *true*.

Conversely – and equally importantly – the purely modal rigid/non-rigid distinction would do little to predict our judgements about Twin Earth cases, since this distinction can be drawn only across possible worlds. Accordingly, attempts to account for the behaviour of natural kind terms for instance by analysing them as *actually* rigidified descriptions are futile. If 'water' were equivalent to 'the *actually* watery stuff', Twin Earth XYZ would still turn out to be water since XYZ is, in fact, stuff that is *actually* watery stuff. Nor would a distinction between levels of intensions, as discussed in the previous section, say anything about Twin Earth cases. In fact, if 'the watery stuff' were a non-rigid designator that assigned the metaphysical intension *water* with respect to the actual world, then Twin Earth cases should be inconceivable since Twin Earth cases are intraworld scenarios where watery stuff supposedly is not water. In short, general-term rigidity simply could not help explain our judgements about the relationships between water, H<sub>2</sub>O, watery stuff and XYZ in Twin Earth scenarios. A rigid/non-rigid distinction for general terms would accordingly – and strikingly – tell us exactly nothing about the observations that were originally used to suggest that there is something interesting about the semantics of natural kind terms.

So what did the Twin Earth scenarios show us that was so surprising? Well at least these scenarios showed us that the semantic content of 'water' is equivalent to the content of an expression to which it is not a priori obvious that it is equivalent ('H<sub>2</sub>O'). And if expressions can be intensionally equivalent without speakers being aware that they are, then, as Putnam suggests, the meanings of expressions we use cannot be entirely 'in our heads'. It has, for instance, been argued that natural kind expressions contain covert indexical elements; perhaps the semantic content of 'water' is, or was, determined by equating it with a demonstration aimed at the (then) unknown inner structure

of some canonical sample of water (see Salmon 1982).<sup>2</sup> If this is correct, there are features that distinguish natural kind terms from other general terms. But such features alone do not suggest that the expressions track the kinds they designate in a different manner than other general terms in modal contexts, just that important conditions for determining whether they apply to particular instances might, for certain expressions, be cognitively unavailable even to competent language users. Now, indexicals may be rigid, but since meaning constancy ensures rigidity on its own, the significance of the indexical component would rather be to ensure that the application conditions for the expressions have the aforementioned external component, and hence that the relationship between, for example, *water* and its molecular structure, a relationship that meaning constancy guarantees is necessary, is knowable only a posteriori.

What names and natural kind terms have in common, then – and this is probably a source of confusion – is that the truth-conditions of claims involving them are individuated in terms of mind-independent features of reality; as a consequence, both names and natural kind terms occur in necessary a posteriori truths. But, for natural kind terms, that consequence has nothing to do with rigidity, which is at best trivially true of them.<sup>3</sup>

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2 Strictly speaking, Salmon modalizes the steps in his account to underpin the necessity of theoretical identity statements. However, what we really need is an account that makes the relationship between the semantic values of ‘water’ and ‘H<sub>2</sub>O’ sufficiently constitutively linked to explain Twin Earth scenarios (e.g. that they designate the same kind), and to do *that*, modalizing the steps makes, as we have argued, no difference. Haukioja (2012) develops an alternative relying on the metasemantic notion of *actuality-dependence*, but actuality-dependence is a purely modal notion and cannot account for Twin Earth scenarios either. An alternative option to Salmon’s that avoids special modal features is distinguishing a metasemantic category of *paradigm terms* (Nimtz 2019).

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## *Russell–Myhill and grounding*

BORIS KMENT

### 1. Introduction

Philosophers disagree on how finely propositions are individuated. Near the fine-grained end of the spectrum we find *structured views* (*structurism*). The Russell–Myhill paradox (RMP) shows that structurism is classically inconsistent with prima facie attractive ontological principles (Russell 1996 [1903]: 527, Myhill 1958). This observation can be used to argue that structurism should be rejected to avoid the paradox. Structurists can defang this argument by providing another solution to RMP that is consistent with structurism. They would not need to argue that their solution is the best possible one, but merely that it is no worse than the solution that consists in rejecting structurism. That would suffice to show that RMP provides no strong reason to abandon structurism. I will sketch part of such a defence of structurism about Russellian propositions.<sup>1</sup>

After describing structurism and RMP (§2), I will introduce assumptions about metaphysical grounding and argue that they yield a unified solution to many versions of RMP, by providing independent reasons to reject their underlying ontological assumptions (§3). However, there is another variant of RMP to which this solution cannot be applied (§4). While I believe that the grounding-based approach can be extended to this version, it is a task for another occasion to show this. Adopting different solutions to different

1 The distinctive feature of Russellian propositions is that they have the entities and pluralities they are about as constituents. My discussion will be restricted to such propositions.