Are Natural Kind Terms Special?

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1. Introduction

These days we speak freely of 'natural kind terms', indicating that they constitute a special, semantic category of terms. It was not always so. Indeed, prior to Putnam and Kripke's writings from the 1970's, the label 'natural kind term' seems not to have been employed at all. In his well-known paper 'The Analytic and the Synthetic' (1962), Putnam does set out to draw some distinctions among the general terms that he takes to be of semantic significance. In particular he wishes to distinguish so-called one-criterion terms, such as 'bachelor', from cluster terms, such as 'man' or 'crow', where the meaning is given by a cluster of associated properties, none of which are immune from revision. Among the cluster terms, Putnam also suggests, there is a set of terms of special interest to science, the 'law-cluster terms', such as 'energy'. These are set apart by what goes into the cluster, in particular laws and general principles. In his paper 'Is Semantics Possible?' (1970), however, natural kind terms appear on the scene. As in the earlier paper, Putnam draws a distinction among the general terms between one-criterion terms and others, but he now drops the talk of law cluster terms in favour of that of natural kind terms:

> A natural kind *term*...is a term that plays a special kind of role. If I describe something as a *lemon*, or as an *acid*, I indicate that it is likely to share certain characteristics (yellow peel, or sour taste in dilute water solution, as the case may be); but I also indicate that the presence of those characteristics, if they are present, is likely to be

accounted for by some 'essential nature' which the thing shares with other members of the kind. What the essential nature is is not a matter of language analysis but of scientific construction. (1970; 140)

Putnam's formulation captures the central elements of the contemporary notion of a natural kind term: the idea that these terms pick out not superficial, macrolevel properties, but underlying, essential properties the nature of which it is up to science to establish. The notion took on quickly, in particular after the appearance of Kripke's 'Naming and Necessity' (1972).[1] By suggesting that natural kind terms, like names, are rigid designators, Kripke seemed to provide the semantic tools for separating out the natural kind terms from other kind terms. The suggested candidates included a rather diverse set of terms: Mass terms ('water', 'gold'), count nouns ('tiger', 'whale') as well as adjectives ('hot', 'loud'). What sets these terms apart, Kripke suggested, is their 'name-like' semantic behavior. In addition, Putnam presented his Twin Earth thought experiment which was also taken to indicate that natural kind terms are set apart: The meanings of these terms are not 'in the head', but have to be given an externalist account (1975). Thus, the idea emerged that natural kind terms are semantically special.[2]

This idea has stayed with us. In the contemporary discussion the notion of a natural kind term plays a prominent role. At the same time, it is recognized that things are more complicated than initially thought. For instance, Kripke and Putnam's discussions were based on rather naive metaphysical (and scientific) assumptions about natural kinds, assumptions that have since been challenged. It also turns out that the semantic issues are less straightforward than assumed – in particular, it is far from clear what it might mean to say that a *kind* term is rigid. Strikingly, however, these worries have not done much to undermine the

[1] In the paper page references will be to the 1980 edition of Kripke's book.
[2] In 1977, for instance, Goosens writes that natural kind terms "form a distinctive semantic kind"(149).

assumption that natural kind terms form a special semantic category. Indeed, a number of people have recently written on natural kind terms with the mission of spelling out exactly why they are, after all, special.[3] Although the resulting suggestions vary a great deal it is agreed that there is *something* special about these terms.

In this paper I try to shake that confidence. I argue that the time has come to question the assumption that natural kind terms form a separate semantic category among the kind terms.[4] The semantic and metaphysical difficulties noted in the contemporary debate should be taken seriously, and cannot be dismissed as mere wrinkles. Indeed, a serious problem with the contemporary discussion is the assumption that the semantics of natural kind terms can be conducted independently of the metaphysical and scientific issues surrounding these kinds. It may of course be suggested that this is as it should be: We should be able to do our semantics independently of metaphysics and science. However, in the case of natural kind terms, at least, this is a dubious policy. The reason is simple: If it is distinctive of these terms that they pick out natural kinds, the essences of which have to be decided by science, then the metaphysics and science of natural kinds cannot be ignored.

When discussing the special status of natural kind terms, it is important to separate two ways in which a term may be semantically special: the term may have a special type of *semantics*, or the term may have a special *metasemantics* or foundational semantics – that is, there may be something special about how the meaning or semantic content of these terms are *determined*. For instance, when it is claimed that natural kind terms are special because they are rigid, this is a claim of the first sort, whereas when it is claimed that natural kind terms are special because their meaning is determined externalistically, it is a claim of

[3] See for instance Haukioja 2006, Glüer & Pagin (forthcoming), LaPorte 2004, Schwarz 2002 and Soames 2002.
[4] Bach is an early skeptic, suggesting that 'Putnam is implicitly making the undefended assumption that because a term applies to a natural kind, it belongs to a special semantic category, the category of natural-kind terms' (1987: 290).

the second sort. Although often conflated in the debate, the claims are quite independent of one another – for example, it may be that the meaning of natural kind terms is determined externalistically, and that this sets natural kind terms apart from other kind terms, even though natural kind terms have the same type of semantic content as other kind terms.[5] I shall therefore discuss the semantic and the metasemantic issues separately. In section 3, I discuss the two leading attempts to single out natural kind terms from other kind terms at the level of semantics: by appealing to rigidity and by appealing to non-descriptionality. Section 4 discusses the proposal that natural kind terms have a special metasemantics.

First, however, a prior question has to be addressed: What determines whether a term is a natural kind term in the first place?

2. Which terms are natural kind terms?

In the case of names, it seems that we have a fairly clear pre-theoretical conception of how to identify them: a term is a name, roughly, if it is used to refer to a particular individual. Thus, the suggestion that names constitute a special semantic category can draw on the intuition that names are easily separated from other terms of the language. In the case of natural kind terms, matters are more complicated since natural kind terms form a subgroup among the larger group of kind terms. We therefore need to know how to separate out this subgroup.

According to one proposal, whether or not something is a natural kind term depends on our *semantic intentions*. Determining whether a term is a natural kind term is therefore something that can be done a priori, by consulting one's intentions. For instance, there is the idea that what is distinctive of natural kind terms is that they (like indexicals) are associated with a semantic rule (character) that serves to fix the property (and hence the

[5] I discuss this further in Wikforss 2008.

content) picked out by the term in a given context.[6] The rule in question utilizes the macrophysical properties associated with the term, but the essential property picked out is assumed to be an underlying, non-manifest one.[7] This type of proposal is driven by the conviction that there must be something about our use of the term, something that is a priori available and makes it the special kind of term it is (just like there is something about our use of an indexical, that is a priori available and sets it apart from other terms). Another apparent advantage is that the proposal avoids making semantics hostage to metaphysics: Since the semantic status of a term as a natural kind term depends wholly on the speaker's intentions, we can do the semantics of these terms, it seems, without having to worry about the metaphysics (and science) of natural kinds.

However, while it can be known a priori, on this view, whether a term is a natural kind term it cannot be known a priori whether it succeeds in picking out a natural kind. The question therefore arises how to account for cases where a purported natural kind term fails to pick out a natural kind. Such examples are legion, at least if we rely on the micro-structural conception of natural kinds (as people in the Kripke-Putnam tradition tend to), according to which the essential properties of natural kinds are microstructural: in many cases of purported natural kind terms there is not a unifying microstructural property of the sort required. A well-known example is 'jade' but similar problems arise for 'sugar', 'air', 'sand', and a multitude of names for plants, animals and diseases.[8] And it may of course turn out that we are mistaken about there being such a property even in the case of 'water'.[9] On the

[6] See for instance Donnellan 1993, Haukioja 2006 and McKinsey 1987. Another version of the a priori proposal can be found in Glüer & Pagin, forthcoming.
[7] Haukioja, for instance, suggests that what characterizes natural kind terms is that although their normal application is based on *manifest* properties, 'they all possess criteria of correct application having to do with, for example, genetics or microphysical constitution, which are *non*-manifest and stable across worlds' (2006: 163).
[8] For examples of this sort see for instance Ben-Yami 2001 and Wilkerson 1993.
[9] As several people have pointed out there is in fact no unifying *microstructural* property of water or chemical kinds in general (see Needham 2000).

proposal under consideration it would seem that in such a scenario the rule fails to pick out a property and thus determine a content, and hence that statements involving the term in question would fail to express anything. This type of problem is not unique to natural kind terms of course; we are familiar with the problem of non-referring names. However, it would seem to constitute a more serious problem in the case of natural kind terms. After all, terms such as 'water' and 'air' play an absolutely central role in our lives and practices and we simply cannot accept a theory that has the implication that all such discourse lacks content if it turns out that the term in question fails to pick out a unified, underlying structure. As Scott Soames puts it, this conclusion 'seems harsh' since "during the period in question, speakers used sentences containing the term to convey lots of information" (2002; 281-282).[10]

Of course, the a priori proposal is not wedded to any particular conception of natural kinds, such as the microstructural conception. However, it is clearly committed to *some* such conception. After all, whether a purported natural kind term fails to refer, on this view, depends both on how the relevant intention is spelled out and how the specific natural kinds (species, chemical kinds, minerals, plants, etc.) are to be understood. Here, it should be noted, there is an obvious danger. If the speaker's intention (the reference fixing rule) is vaguely specified then there will be massive reference failures. The intention, notice, is supposed to carry with it a uniqueness requirement: the term is intended to pick out *the* underlying kind, and since every object is an instance of an infinite number of kinds (including natural kinds) the uniqueness requirement will most likely fail if one sticks with vague conceptions such as 'natural kind' or 'underlying property'. One might try to remedy this

[10] Naturally, there are responses available on part of the a priori proposal. Most commonly, it is suggested that the macrolevel properties can be utilised – either by appealing to the idea that in bad scenarios the term retains its character, and hence its meaning (although a full content will not be expressed) or by suggesting that there are two intensions associated with natural kind terms, one relating to the macrolevel properties (see Glüer & Pagin, forthcoming). All such accounts, though, have to grant that the term in question (construed as a singular term) fails to have a reference in such a scenario.

by appealing to more specific notions, such as 'chemical composition', 'species', or 'mineral'. This causes obvious troubles if we look to the historical use of these terms, since these notions were not available until the development of modern science.[11] But the question also arises how the ordinary concepts of species, minerals, chemical kinds etc. correspond to those of science. If they do not correspond, it would seem that, again, there is a danger of massive reference failure – simply because the ordinary conception of essential properties do not line up with anything recognized as such by science.[12]

The problems caused by possible reference failures have led many people to abandon the a priori proposal in favor of an account according to which the status of a term as a natural kind term is a wholly a posteriori matter. On this view, whether a term is a natural kind term is not determined by our semantic intentions, but by the external world itself.[13] Although we believe 'water' to be a natural kind term, this belief will be mistaken if in fact 'water' fails to pick out a natural kind. In such a scenario the proper conclusion is not that the term fails to refer but, simply, that the term is not a natural kind term.

Now, if a term is a natural kind term only if it in fact picks out a natural kind, it becomes rather obvious that the metaphysical issues cannot be avoided if we are interested in saying something of interest about natural kind terms. What is needed, quite clearly, is a theory about what separates natural kinds from other kinds in order to determine which terms are natural kind terms. Unfortunately, there are several competing theories (the microstructural theory, the causal homeostasis account, promiscuous realism, and so on) and

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[11] Jessica Brown suggests that even in the pre-scientific community "it was part of the meaning of 'gold' that it applies only to stuff with a particular hidden internal structure" (1998:277). This seems rather doubtful, but even if it is granted it is unclear how the pre-scientific notion of a 'hidden internal structure' could the work required of picking out a unique underlying kind.

[12] After all, even philosophers writing on the topic of natural kind terms have been unable to distinguish microstructure from chemical composition, and many have suggested that the essential property of species is microstructural (as assumption rejected by contemporary biology).

[13] See for instance Brown 2004, Gallois 1996, McLaughlin & Tye 1998 and Korman 2006.

depending on which theory one adopts one will draw the distinction between natural kind terms and other kind terms differently.[14] On some accounts the natural kinds will be few (including, for instance, chemical kinds but not biological kinds) and hence the class of potential natural kind terms rather limited, whereas on less restrictive accounts this class will be rather large (including not just 'water' and 'gold' but also 'tiger', 'tree', 'pain', 'blue' and, even, 'capitalism'). And, clearly, it has to be assumed that there *are* natural kinds, that natural kinds are distinct from other kinds, or else the class of natural kind terms will be empty.[15]

Moreover, on this view whether a term is a natural kind term becomes not only a posteriori but something that cannot be established prior to detailed scientific investigations. For instance, assuming that the micro-structural conception of natural kinds is correct, determining whether 'water' is a natural kind term requires knowing something about the underlying structure of the liquid and that requires developed scientific theory and methods of empirical investigation.

In itself, this need not be problematic. It is perfectly innocuous to say that natural kind terms are terms that pick our natural kinds (just as artifact terms pick out artifacts and functional kind terms functional kinds) and, hence, that we typically do not know whether a term is a natural kind term prior to scientific investigations. However, it should be stressed what follows if we combine this idea with the claim that natural kind terms form a special semantic category: The upshot is that there is a category of terms that is special from a semantic point of view, even though identifying this category depends on the development of sophisticated empirical theories, such as contemporary chemistry or evolutionary theory.

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[14] For a discussion of these theories see for instance Griffiths 1987 and Häggqvist 2005.
[15] As De Sousa 1984 stresses, it would also have to be the case that there are *several* natural kinds, rather than just one or two, if the claim that there are natural kinds (and natural kind terms) is to be of any interest.

Consequently, which terms have this special semantic character (if any) cannot be known independently of detailed scientific investigations.[16]

There are therefore two competing conceptions of what makes a term a natural kind term in the first place: what I have called the a priori and the a posteriori proposal. Both illustrate the interaction of the semantic and metaphysical issues, although in different ways. The a priori proposal allows us to distinguish the natural kind terms prior to scientific investigations and in that sense ducks the metaphysical (and scientific) issues. However, the latter issues return once the question is raised whether these terms succeed in picking anything out. Since natural kind terms, on this view, pick out the kind intended there is the danger of a mismatch between intention and world, allowing for massive failure of reference. The a posteriori proposal avoids this difficulty by deferring to nature, as it were; letting nature, rather than the speaker's intentions, determine whether a term is a natural kind term. However, if one takes natural kind terms to be semantically special, this also means that the *semantics* of these terms is deferred to nature. Prima facie, this is a rather startling suggestion. Just how startling will depend on which semantic feature one takes to be the distinguishing characteristic of natural kind terms – to which I now turn.

3. The semantic content of natural kind terms

3.1 Rigidity

The first attempts to separate out natural kind terms from nominal kind terms turned on the idea that the latter terms can, while the former cannot, be given analytic definitions spelling out necessary and sufficient conditions.[17] However, the proposal stands and falls with the assumption that other kind terms can be given analytic definitions. Even if it is granted that Putnam's 'one-criterion terms' lend themselves to such definitions, most kind terms are not

[16] The consequences of this idea are discussed in some detail in Häggqvist & Wikforss 2007.
[17] See for instance Putnam 1970: 141, and Schwartz 1978.

like that. For instance, we would be hard pressed to find plausible necessary and sufficient conditions for terms such as 'sand', 'tree' and 'mud'. Indeed, it is precisely considerations of this sort that led people, including Putnam himself, to abandon traditional versions of descriptivist theories in favor of the cluster theory.

With the publication of 'Naming and Necessity' a more comprehensive attack on descriptivist theories was launched; an attack, moreover, that seemed to provide a clear sense in which natural kind terms are semantically special. Kripke not only provided a variety of arguments, most famously modal arguments, against descriptivist accounts of names, he also suggested that natural kind terms are closely related to proper names. Names, according to Kripke, are rigid designators: they designate the same object in every possible world (where the object exists). Descriptions, such as 'the president of the United States', are not rigid designators; hence, the content of a proper name cannot be understood in terms of such descriptions. Similarly, Kripke argued, natural kind terms are rigid designators and cannot be given a descriptivist account either, not even along the lines of the cluster theory.[18]

Although the notion of rigidity is relatively clear in the case of proper names, however, it is not clear how it is to be understood in the case of kind terms. Kind terms typically function as predicates and so one would have to explain how the notion of rigidity applies to predicates. Moreover, even if kind terms are construed as a form of singular term it is much disputed what it is that they designate. The question of how to extend the notion of rigidity to kind terms was raised in the 1980-s and 1990-s,[19] and it has come to be hotly debated the last few years as a result of Soames' influential book on Kripke (2002). Soames sets up three requirements on an interesting notion of kind term rigidity: It must be a natural extension of the notion of rigidity defined for singular terms; it must single out the natural kind terms; it must play a role in explaining the necessity of true theoretical identity sentences

[18] Kripke 1980: 116-143.
[19] See for instance Linksy 1984, LaPorte 2000 and Macbeth 1995.

(2002: 263). Soames considers a number of attempts to define a notion of rigidity for kind terms that meet these criteria, but argues that they all fail. He concludes that the notion of rigidity does not apply to kind terms.

The most obvious way of meeting the first requirement is to construe natural kind terms as a form of singular term. This, also, is the strategy employed by a number of writers. It is granted that natural kind terms also function as predicates, serving to classify objects, but the hope is that the singular term usage and the predicate usage can be shown to be appropriately related.[20] According to this view, then, a kind term **t** is rigid iff there is a unique property which it stands for that determines its extension at each possible world (Soames 2002: 250).[21] This also promises to meet Soames' third requirement of explaining the necessity of theoretical identity sentences, such as 'Water is H2O'. Assuming that such sentences are construed as proper identities, the fact that the terms flanking the identity sign are rigid designators ensures that the sentence is necessary, if true.

However, Soames rejects this proposal on the grounds that it fails to meet the second requirement, that of singling out the natural kind terms. 'Water' picks out the same unique property in every world but so do 'philosopher' and 'chair'. It follows, it would seem, that no distinction at all could be drawn between rigid kind terms and non-rigid ones. This problem has come to be called the 'triviality problem', and it has elicited several responses. Joseph LaPorte, for instance, has suggested that although terms such as 'philosopher' and 'chair' designate the same abstract kind in every possible world, there are kind designators that do not and are, in that sense, non-rigid: for instance, 'The insect species that is typically farmed for honey'.[22] Marti, similarly, has argued that a distinction can still be drawn between simple, 'name-like' general terms (such as 'water', 'yellow' and 'philosopher') and complex

[20] For a discussion see for instance Salmon 2005 and Soames 2006.
[21] See for instance LaPorte 2000; Lopez de Sa 2008; Marti 2004; Salmon 2003 and 2005.
[22] LaPorte 2000: 296 and 2004.

general terms (such as 'Mary's favorite color'). The former terms are rigid in that they designate the same property in every possible world. The latter terms, however, are normally used non-rigidly. Thus, 'yellow' designates the same property in every possible world, whereas 'Mary's favorite color' designates different colors in different worlds. Complex general expressions *could* be used rigidly (as when 'Mary's favorite color' designates the higher order property of being Mary's favorite color), although this is less common, whereas simple general terms only have the rigid use.[23]

Now, it should be noted that there are, in fact, two triviality problems. First, there is the concern that all kind designators will come out as rigid, thus allowing no distinction between expressions such as 'water' and 'Granny's favourite drink'. Second, there is the concern that all simple general terms, natural and artificial kind terms alike, will be rigid.[24] Marti's and LaPorte's proposals address the first triviality problem but not the second one – that of separating out the natural kind terms among the rigid kind designators.

They are not unaware of this. LaPorte explicitly rejects the assumption that rigidity can be employed to show that there is an interesting distinction between natural kind terms and artificial kind terms:

> I cannot agree with various suggestions, then, that non-natural or nominal kind terms stand in contrast to natural kind terms over rigidity, just as descriptions like 'the inventor of bifocals' contrast as non-rigid designators with names, such as 'Ben Franklin'. The proper contrast over rigidity is that between non-rigid descriptions for kinds (either natural or artificial), on the one hand, and rigid names/descriptions for them on the other (2000: 299).

[23] Marti 2004. See also Linksy 1984 and 2006 where he stresses the difference between rigid kind designators (such as 'blue') and non-rigid descriptions such as 'the color of a cloudless sky at noon'.
[24] Lopez de Sa 2008 labels the second problem the 'over-generalization problem'.

Marti, similarly, denies that her notion of rigidity can be employed to separate out the natural kind terms. Indeed, Marti takes it to be an advantage of her position that it does *not* distinguish the natural kind terms from other simple general terms, such as 'philosopher': "Simple, name-like general terms display a similar semantic behavior and so they belong in the same semantic category, different from the category of complex general terms, precisely for the same reasons that proper names and singular terms with descriptive content belong in different categories" (2004: 133-134).[25]

According to this line of argument, therefore, there *is* an interesting notion of rigidity that applies to kind terms only it does not serve to single out the natural kind terms from other, name-like kind terms. That is, Soames second requirement is rejected.[26] Indeed, the upshot seems to be that natural kind terms and (simple) non-natural kind terms are more *closely* related than previously thought. In the case of Marti, at least, the notion of kind term rigidity goes hand-in-hand with non-descriptionality and this suggests that not only natural kind terms but also other (simple) kind terms are non-descriptional. This conclusion is explicitly drawn by Nathan Salmon. If simple kind terms ('water', 'blue', 'bachelor') all turn out to be rigid designators, he suggests, it follows that a term such as 'bachelor' functions like a logically proper name, rather than a description, of the gendered marital-status category, *Unmarried Man*: "If that is how it does function, then its rigidity is *de jure* and, contrary to the common view, it is not strictly synonymous with the corresponding description, even though it is closely tied to the description – as the name 'Hesperus' is closely tied to some description of the form 'the first heavenly body visible at dusk...' " (2003; 486-487)

On this view, therefore, applying rigidity to kind terms leads to a revisionary account of nominal kind terms such as 'bachelor' and 'chair'. However, this seems to be an

[25] See also Marti and Martinez (this volume).
[26] Recently, Soames himself seems to have given up on this requirement (2006 and forthcoming). Soames now accepts the notion of rigidity defended by Marti and others, and grants that it applies to simple non-natural kind terms as well, such as 'bachelor'.

unfortunate consequence. Although we may be happy to grant that nominal kind terms cannot be given analytic definitions, it is a big step from this to conclude that they lack all descriptive content. A common strategy, among anti-descriptivists, is to dismiss associated descriptions as 'mere reference fixers', and not figuring in the semantics of the terms, thereby indicating that all of these descriptions are disposable and may fail to hold of the objects in the extension. But it is difficult to see how the descriptions associated with 'chair', 'mud' and 'pencil' could be dismissed in this way. For instance, it is difficult to imagine a world in which there are chairs but where all of the descriptions normally associated with 'chair' fail to hold. In the case of these terms, something like the original cluster theory seems much more plausible.

This suggests an alternative strategy if one wishes to single out the natural kind terms semantically: reject the idea that there is an interesting notion of rigidity that applies in the case of kind terms and appeal, instead, to the idea that natural kind terms, unlike nominal kind terms, are non-descriptional. This is the strategy endorsed by Soames 2002.

3.2 Non-descriptionality

According to Soames the most important semantic concept in Kripke is not rigidity but non-descriptionality. This, he suggests, is true in the case of names as well, and hence the suggested parallell between names and natural kind terms can be upheld even without the notion of rigidity.[27] Although speakers do associate descriptive properties with natural kind terms, Soames argues, these fail to provide necessary and sufficient conditions for something to be a member of a kind at a world, and sometimes the associated properties are not even true of actual instances of the kind – as for instance, when speakers took whales to be fish. Hence, he affirms, "the extension of a natural kind term is not semantically determined to be the set

[27] Soames 2002: 264.

of objects that satisfy, at that world, the descriptive characteristics we (actual-world) speakers associate with the predicate" (2002: 266).

Now, whether indeed natural kind terms are non-descriptional in this sense is too large an issue to be properly addressed here. However, let me express some misgivings about using non-descriptionality as the distinctive mark of natural kind terms.

First, there are terms that are both widely recognized to be natural kind terms and to have a descriptive content – namely theoretical terms, such as 'H2O'. Indeed, Soames himself suggests that unlike 'water', 'H2O' is semantically complex and synonymous with the description *something molecules of which consists of two hydrogen atoms and one oxygen atom* (2002: 308). It therefore has to be argued that non-descriptionality is the distinctive mark of *some* natural kind terms, but not all. But how is this category of non-descriptional natural kind terms to be singled out? This seems to be an even harder task. After all, the distinction between theoretical and non-theoretical terms is not that clear cut. Moreover, it is no good to appeal to the idea that it is the simple natural kind terms that lack descriptive content, since not all theoretical terms are complex (for instance, 'lepton').

Second, the claim that non-descriptionality is the distinctive mark of natural kind terms causes trouble when combined with the a posteriori proposal, according to which a term is a natural kind term only if it succeeds in picking out a natural kind.[28] It follows, from this combination of ideas, that it cannot be known whether a purported natural kind term has a descriptive content or not, prior to scientific investigation. If the liquid called 'water' has a unified, underlying structure then 'water' lacks all descriptive content; if the liquid does not have such a unified structure, 'water' functions much like 'bachelor' and has a descriptive content. This is a rather astounding conclusion. Not only is it difficult to understand how the

[28] And these two ideas are typically combined: Those who defend the a posteriori proposal tend to take natural kind terms to be wholly non-descriptional, whereas those who defend the a priori proposal take the meaning of natural kind terms to have a descriptional component (as on the reference-fixing proposal, mentioned above).

descriptionality of a term could, in this way, depend on the physical make-up of the world. The conclusion also introduces a problematic gap between how we use a given term (for instance, in reasoning) and its actual semantics.[29]

Third, there is a question concerning the motivations behind the claim that natural kind terms are non-descriptional. Although Kripke spends much effort arguing that names are non-descriptional, the arguments in the case of natural kind terms are much more swift and far less compelling. Take, for instance, Kripke's suggestion that just as all of the descriptions associated with 'Aristotle' may turn out to be false, so all of the descriptions associated with 'tiger' may turn out to be false. Since 'tiger' is used as a natural kind term, he suggests, we might find out that 'tigers had *none* of the properties by which we originally identified them. Perhaps *none* are quadrupedal, none tawny yellow, none carnivorous, and so on..." (1980; 121) But it is very difficult to understand what we are supposed to imagine here – something that is a tiger but has none of the properties ordinarily attributed to tigers? Biologists would certainly have difficulties imagining this, in particular since they reject the micro-essentialist account of species.[30] Similarly, although there are (many) cases where particular beliefs about instances of a kind turn out to be false (as in the case of whales not being fish), this does not even begin to show that *all* of the associated descriptions are disposable.

Now, in the case of names Kripke's modal arguments play a central role in the rejection of descriptivism. However, it should be clear that Kripke's claims about a posteriori necessity are less compelling in the case of natural kind terms. They carry conviction in the case of proper names, since statements such as 'Hesperus = Phosphorus' are identity statements and as such necessary, if true. But it is a serious question whether so called theoretical identity sentences are to be construed as proper identity statements. Most naturally,

[29] See Häggqvist & Wikforss 2007 for further critical discussion.
[30] See LaPorte 2004. I return to the question of the individuation of species briefly below.

these sentences are construed as universally quantified conditionals (or biconditionals). What is required to get from such a statement to a proper identity statement is, first, that one appeals to the singular term use of these terms, rather than their predicative use. Second, we have to be given some reasons why the property identity statement should be accepted, and such reasons are not delivered by the acceptance of theoretical identity sentences within science.[31] What would have to be added are substantial, metaphysical assumptions about the identity of the *properties* involved (for instance the assumption that H2O = water) – assumptions that go well beyond what science establishes.[32] Hence, the parallel with names does not hold up. It cannot be argued that natural kind terms are non-descriptional simply on the grounds that we need a semantics of natural kind terms that secures the necessity of statements such as 'Water is H2O'. It would also have to be shown that there is any necessity involved here in the first place (beyond that of nomological necessity).

I take all this to indicate that we should reexamine the widely shared assumption that natural kind terms are non-descriptional. Of course, there are proposals that attempt to fit descriptionality within the Kripkean framework, for instance the reference-fixing proposal mentioned above as well as various versions of two-dimensionalism. However, I think that the considerations above indicate that we should look for a more radical alternative, one that involves a more comprehensive rejection of the Kripke-Putnam account of natural kind terms. If the arguments in the case of names do not carry over to the case of natural kind terms (when it comes to rigidity and necessity) and if there are reasons, both metaphysical and scientific, to question the Kripke-Putnam assumptions about the various kinds discussed

[31] Soames recognizes this (2002, p. 260): "For all x, x is P iff x is Q' is necessary, if true, on the assumption that the identity statement involving the corresponding singular terms (*the kind p*, *the substance p*, etc) is true: tp = tq." He the goes on to argue that the identity in question can be delivered on purely semantic grounds. However, as often noted in the literature, this is very questionable since it seems clear that metaphysical assumptions about the identity of the relevant properties must be made. See Marti 2004 and Salmon 2003.
[32] This is stressed by De Sousa 1984, Needham 2000 and Steward 1990.

(species, biological kinds, chemical kinds, etc.), it becomes unclear why we should remain fateful to the Kripke-Putnam framework in the case of natural kind terms.

Indeed, I take all this to suggest that Putnam was closer to the truth in his early discussions of law-cluster terms, before he introduced the talk of natural kind terms.[33] On this view, 'natural kind terms' do not have a different semantics than other kind terms – in both cases the cluster theory applies. The intuition that, even so, they differ from nominal kind terms is explained by appealing to what goes into the cluster of a natural kind term. Consider, again, chemical kinds. Paul Needham has suggested that the microessential conception of these kinds should be rejected, arguing that the microstuctrual level does not allow us to distinguish any nomologically interesting kinds. The question, he writes, is why the vast range of microscopic structures is associated with one and the same substance kind, rather than a genus of related substances:

> I suggest it is because macroscopic criteria determine sameness of substance kind, whose variable microstructure is then made the subject of scientific investigation ... A macroscopically oriented account of sameness of kind doesn't challenge the claim that quantities of water have some appropriate range of microfeatures under specified conditions. But recognizing microproperties is not to favour them as more essential than others. If water is necessarily H2O, it necessarily has its characteristic density too, characteristically reaching a local maximum at 4C, it necessarily freezes at 0 under normal atmospheric pressure, freezing at lower temperatures under higher pressures..., and so on for what science counts as water's essential macroscopic features. (2000: 21)[34]

[33] This is discussed further in Häggqvist & Wikforss, 'Natural Kind Terms: Resurrecting the Cluster Theory' (unpublished MS).
[34] See also Needham 'Microessentialism: What is the Argument?' (forthcoming), and Nigel Leary 'Isomerism and Isomorphism: Some Problems for Metaphysical Necessity' (unpublished MS).

This suggests that 'water' and other chemical kind terms, are more likely law-cluster term than anything else. The meaning of these terms should be understood in terms of a set of properties, including properties relating to law-like behavior, such that although not all of them can be rejected without a change in meaning, no single property (be it at the macro- or microlevel) can be singled out as the essential one.[35] Similar conclusions seem plausible when considering any of the specific kinds mentioned, such as biological kinds. For instance, species are not individuated by any underlying structural properties. Indeed, at this point there is little agreement on how to individuate species. As LaPorte notes, there are several competing conceptions of species, such as the biological species concept (which take interbreeding and reproductive isolation to be decisive) and the phylogenetic species concept (which appeals to ancestry and descent) which all divide the world into perfectly natural (but different) groups. Against this background, assumptions about the 'essence' or 'real nature' of species seem misguided. The picture that emerges, rather, is one that coheres with the cluster theory, where a set of interrelated properties (many of them easily observable) serve to delineate species.[36]

If I am right, therefore, we should reject the idea that there is a set among the kind terms, 'the natural kind terms', that are distinct from other kind terms at the level of semantic content. However, as noted in the introduction, it might be held that even if we cannot single out the natural kind terms as having a special *semantic content*, they can be singled out at the level of foundational semantics since their meaning is determined

[35] Needham (forthcoming) also suggests that we should take seriously the idea that chemical kind terms can be given an account along the lines of the cluster theory, where stereotypical properties of the sort appealed to by Putnam, together with the more precise macroscopic properties appealed to by scientists, go into the cluster.

[36] See also Dupré 1981. It should be noted that even on a cladistic classification, which is based on genealogy, macroscopic features play an essential role. For instance, as LaPorte stresses, there are intermediaries on the genealogical tree and decisions concerning these do turn on macroscopic similarities among the animals. There is also the question of how to delimit the beginning of a clade, and here systematists will appeal to various macrolevel features: such as the presence of feathers or the capacity of flight (LaPorte 2004: 84-85).

externalistically. The question is whether this could be defended once the above skepticism concerning the first project is taken seriously. Are the difficulties surrounding the Kripke-Putnam semantics limited to the level of semantic content or do they spread to foundational externalism as well? To (briefly) consider this question let us end by looking at one version of such a proposal, defended by LaPorte.

4. Externalism

As noted above, LaPorte denies that there is a difference between natural kind terms and nominal kind terms on the level of content. But he still holds that there is an important semantic distinction between natural kind terms and nominal kind terms: natural kind terms, unlike nominal kind terms, are linked to their referent (an abstract property) via causal contact with individual samples of the kind. Thus, they have their meaning determined externalistically:

> 'Whale' was baptized by a (probably informal) dubbing act: 'the term is to refer to *that* kind of thing' (the dubber points to some whales). On the causal theory what makes a thing belong to the extension of 'whale' will not be properties like *having a fish-like appearance* ... that a speaker associates with whales, but rather *underlying* properties and relations that guarantee sameness of kind (to paradigm samples) ... This stands in contrast to a term like 'bachelor', which is not causally grounded in sample bachelors. (1998: 304)[37]

'Externalism', in this sense, stands in opposition to the idea that meaning is determined by the internal states of the speaker, such as associated descriptions. It is not denied that descriptions play an important role in the determination of meaning. Indeed,

[37] Schwarz 2002 concurs: 'It is the causal theory that explains how a term like 'whale' is different from a term like "bachelor" ... ' (274). Kripke, of course, also suggests that this is one respect in which natural kind terms are similar to names: In both cases, reference is fixed by an initial baptism (1980: 135). See also Soames 2002: 265.

LaPorte argues that descriptions are necessary for the 'dubbing act' to work and hence cannot be disposed of entirely. Rather, the claim is that associated descriptions are not *sufficient* to determine meaning: what is required, in addition, is the contribution of some property of the samples in question.[38] This, of course, is the type of externalism originally defended by Putnam in his Twin Earth thought experiment. The meaning of 'water', according to Putnam, is determined through an ostensive definition, *this is water*, such that 'water' refers to whatever kind that stands in the relation 'same liquid' to the sample in question. Given that the liquid pointed to by Oscar is H2O, whereas the liquid pointed to by Toscar is XYZ, it follows (according to Putnam) that the term 'water' has a different meaning in Oscar's language than in Toscar's language – despite the fact that they associate all the same descriptions with the term.

According to this proposal, then, natural kind terms are distinct from nominal kind terms in how they receive their meaning – through a dubbing act – not in the semantic content expressed. Of course, nominal kind terms *could* be defined this way too. For example, it could be said that someone belongs to the kind 'swingle' if the person has the marital status of *these* people. In such a case, clearly, the external world contributes to determining the extension of 'swingle'. However, the idea is, in the case of natural kind terms the external world provides a more distinctive contribution – what matters is *underlying* properties, essences that *cannot* be understood in terms of macrolevel features.

However, it should be clear, this brings us back to the difficulties discussed above. What is the underlying, essential property of whales such that something is a whale if

[38] It should be stressed that this version of the reference-fixing proposal is distinct from that discussed above, in the context of the a priori conception of natural kind terms, since it is *not* a view about the meaning of natural kind terms but of the *determination* of meaning. Thus, it is possible to endorse this view of the determination of meaning and combine it with a wholly non-descriptional semantics (as Kripke does). On such a view the role of the reference-fixing descriptions is purely meta-semantic.

and only if it has that property?[39] In the case of 'water', again, there is no underlying microstructural property of the required sort and if Needham is right, individuating chemical kinds requires appealing to macrolevel features. Indeed, as noted above, LaPorte himself voices skepticism concerning this type of essentialism and stresses the hidden vagueness or 'open texture' of kind concepts. For instance, he argues, our pre-scientific use of kind terms is not such that it is decided that the term does not apply to various possible twin-substances. Rather, when encountering such substances, a *decision* is called for, a decision that, in effect, leads to a sharpening of the meaning of the term. This, LaPorte suggests, is illustrated by the historical case of 'jade'. In this case speakers did not respond in the way predicted by Putnam since it was decided that both jadeite and nephrite were in the extension of the term. However, he stresses, we might as well have gone the other way; nothing about our earlier use with the term dictated an answer to the question whether jadeite was in the extension of 'jade'. Indeed, in the West early dictionary entries suggest that 'jade' only applies to nephrite, although this recommendation was not in fact followed. This, LaPorte suggests, teaches us something about Twin Earth. If we encounter a liquid that has all the superficial properties of our water, but a different underlying chemical composition, we have a *vague* case: 'We might call XYZ "water", contrary to Putnam. Then again, we might not: We could go either way'.[40]

However, if this is taken seriously, the question is what remains of the externalism that LaPorte appeals to. After all, to claim that we *could* go either way in Twin Earth-scenarios is precisely to deny that the external feature plays a meaning determining role: When the associated descriptions are the same, as in the case of Oscar and Toscar, the

[39] Responding to Putnams account Dupré writes: 'My fundamental objection to the theory as a theory of biological kinds is that no such sameness relations suitable for Putnam's theory can be found in it' (1981: 70).

[40] 2004: 100. This claim, no doubt, is controversial and merits further discussion. However, it is worth noting that proper twin-cases are nomologically impossible. That the meaning of our terms do not dictate what to say in nomologically impossible cases seems both plausible and, arguably, inconsequential – at least as far as communication goes.

external feature will be decisive, or else its role is null. Even if we had gone the other way, externalism would fail to be supported – to support externalism it would have to be held that there was *no room for a decision*, that the underlying (external) essence, were decisive. Skepticism concerning the existence of such underlying essences, therefore, leads to skepticism concerning the original externalist project.

What, then, about the widely shared Twin Earth intuitions? Do they not show that some form of externalism must hold for this class of kind terms? As always when it comes to intuitional evidence we have to be careful. First, there is the empirical question of how widespread these intuitions are (in particular outside the philosophical seminar room). As LaPorte notes, the case of 'jade' is as close as we get to a real-life Twin experiment, and in this case the evidence went the other way, failing to support the externalist conclusions.[41] Second, there is the much more difficult, general question, how we are to judge intuitions elicited by far-flung thought experiments. Twin Earth scenarios, as often noted, are nomologically impossible.[42] This should make us cautious since it means that we are supposed to have intuitions about cases that are far removed from the actual world. For instance, it may well be that our ordinary notion of a natural kind depends on the fact that there are no twin-substances, that observable and unobservable properties are nomologically related. If so, there are reasons to be skeptical of intuitions elicited by scenarios where this fact is assumed not to hold.

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[41] To settle the empirical question, clearly, psychological experiments are required. Some have been undertaken in the case of natural kind terms. Jylkkä, Railo, Haukioja 2009 have conducted experiments in Finland that they suggest provide evidence for externalism. Another experiment has recently been conducted by Machery and Olivola (2009, unpublished data), which collects a large range of data from ordinary speakers in Mongolia, India, France and the USA. They have found a substantial amount of variation but it seems that less scientific cultures are less likely to have the intuition that natural kinds are defined by a set of essential properties.

[42] For a recent discussion of the difficulties involved in evaluating thought experiments see Häggqvist 2009.

5. Conclusion

I have argued that we should question the widely shared assumption that there is a set of terms, 'the natural kind terms', that form a distinct semantic category among the kind terms. What, then, about the intuition that there is something special about terms that track natural, as opposed to nominal, kinds? Should it just be dismissed as mistaken? Well, even if these terms are not special in the sense that they form a special semantic category, they may be special in other senses – most obviously, they are special from the point of view of science. Although there is much disagreement as to how we are to characterize natural kinds, they do emerge as being of interest from an explanatory point of view: natural kinds support inductive generalizations. LaPorte, for instance, suggests that natural kinds are kinds with a certain explanatory value: "A lot is explained by an object's being a polar bear. That it is a polar bear explains why it raises cubs as it does, or why it has extremely dense fur, or why it swims long distances through icy water in search of ice floes" (2004: 19).[43] In this respect, LaPorte suggests, natural kinds are different from highly unnatural kinds, such as the *named-on-a-Tuesday* kind, or kinds like toothpaste and trash.

Similar remarks, arguably, apply to the level of terms: 'Polar bear' and 'water', unlike 'trash' and 'named-on-a-Tuesday', are natural kind terms in the sense that they have a special value from the point of view of prediction and explanation. If I say *Bob is a polar bear* predictions can be made about Bob's behavior and food preferences, whereas if I say *Bob was named on a Tuesday* the predictions that can be deduced are few and trivial. Hence, these terms are of special value from the point of view of science. This also means, plausibly, that they are of special value in ordinary contexts where projectible properties

[43] For related views of natural kinds see Häggqvist 2005 and De Sousa 1984. As De Sousa notes, on this view there will be no sharp boundary between natural kinds and other kinds and this is one reason it fails to underwrite the standard, Kripke-Putnam, conception of natural kinds.

matter. (That Bob is a polar bear is a very good reason to stay away from Bob.) If so, it is fair to say that 'natural kind terms' *do* play a special role, only not a special *semantic* role.

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