INTEREST-RELATIVE DETERMINATION OF REFERENCE FOR THE SO-CALLED NATURAL KIND TERMS

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INTEREST-RELATIVE DETERMINATION OF REFERENCE FOR THE SO-CALLED NATURAL KIND TERMS

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Thesis Abstract

Kerem Geçmen, "Interest-Relative Determination of

Reference for the So-Called Natural Kind Terms"

The aim of the present study is to show the important role human interests/concerns play in the determination of reference for kind terms such as gold, water, tiger etc. which are commonly discussed in the literature as natural kind terms. To this end, I criticize the dominant theory of reference for these terms, namely the causal theory of reference, which holds that such terms are products of an attempt to name *natural kinds*, thus attributing humanity only one and universal concern with respect to the natural materials they see around them. A strong pillar for this idea is the common tendency of linguistic communities to go on using the term exclusively for things having a certain internal structure in both real and counterfactual situations. With a view to argue against this, I give some examples of real and counterfactual situations in which linguistic communities seem to have different tendencies, that is, tendencies to use the terms without taking the revealed underlying structure as the criterion determining what should or should not count as a member of the kind in question. This way, I attempt to take down the pillar supporting the causal theorists' assumption that people named natural kinds when they used terms like gold, water or tiger. This allows me to criticize this theory for ignoring the possibility that intentions different from naming natural kinds can make communities attempt to name ordinary kinds and that we have no justification in believing that terms like gold, water, tiger etc. were coined with the intention of naming *natural kinds*. I try to explain how other intentions can lead to naming other kinds in different contexts by introducing the concept of "interests" and discuss them in order to illuminate the various ways in which they can influence the determination of reference for the so-called natural kind terms.

Tez Özeti

Kerem Geçmen, “Doğal Tür Terimleri Olarak Adlandırılan

Terimlerin Gönderimlerinin İlgi-Bağımlı Belirlenimi”

Bu çalışmada, altın, su, kaplan gibi literatürde yaygın bir biçimde doğal tür terimleri olarak tartışılmakta olan tür terimlerinin gönderimlerinin belirlenmesinde insanların nesnelere dair alâkalarının/kaygılarının oynadığı rolü göstermek amaçlanmaktadır. Bu amaca yönelik olarak, bu terimlere ilişkin hakim teori olan ve bu gibi terimleri *doğal türleri* adlandırmaya yönelik bir girişimin ürünü olarak gören, dolayısıyla da insanlığa çevresinde gördüğü doğal cisimlere ilişkin yalnızca tek ve evrensel bir kaygı/niyet/alâka atfeden nedenselci gönderim kuramı eleştirilmektedir. Eleştirilmekte olan bu fikrin güçlü bir dayanağı, dil topluluklarının bu terimleri yaygın olarak yalnızca belli bir iç yapıya sahip şeylere ithafen kullanma eğilimini hem gerçek hem de farz edilen karşıolgusal durumlarda göstermeleridir. Buna karşı çıkmak amacıyla, dil topluluklarının daha farklı eğilimler gösterdikleri, açıklamak gerekirse, altta yatan yapıyı nelerin söz konusu türe üye olduğunu belirlemede bir kriter olarak almadan kullanma eğilimleri gösterdikleri örnekler verilmektedir. Bu yolla, nedenselci kuramı savunan kuramcılarda görülen bir varsayımı; yani insanların altın, su veya kaplan gibi terimleri kullandıklarında doğal türleri adlandırdıkları varsayımını destekleyen dayanak ortadan kaldırılmaya çalışılmaktadır. Bu yolla söz konusu teori, doğal türleri adlandırma niyeti dışındaki niyetlerin toplumları sıradan türler adlandırmaya teşebbüs ettirmesi ihtimalini ve bu ihtimalin sonucunda altın, su, kaplan gibi terimlerin *doğal türleri* adlandırma niyetiyle dile kazandırıldığına inanmak için bir gerekçe bulunmadığını göz ardı etmesinden dolayı eleştirilmektedir. Bu noktada nesnelere dair “alâkalar”/”kaygılar” kavramlarını önererek, niyetlerin nasıl farklı bağlamlarda farklı türleri adlandırmamıza sebep olabileceği açıklanmaya çalışılmakta ve bu kavramların doğal tür terimleri denen terimlerin gönderimlerinin belirlenmesinde oynayabilecekleri çeşitli roller gösterilmektedir.

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PREFACE

Reference is one of the two central topics in the literature on the philosophy of language aside with meaning. The topic of the present thesis is within the domain of the former topic. Even though the reference of any kind of linguistic entity to the world is the subject of philosophy of language, be it a singular term (terms that refer to one thing), a general term (terms that supposedly refer to groups of things, as vague as this phrase is) or a sentence, the overwhelming majority of discussions is on the reference of singular terms. However, I believe that the reference of general terms are at least as important as the reference of singular terms primarily because they are open ended and cover an incredibly larger domain of beings.

As such, how general terms refer and what they refer to are among the few most important questions discussed in the philosophy of language literature. The fact that languages have general terms is loaded with implications on the nature of human thought and knowledge. And my humble opinion is that what they exactly do, how they exactly refer, what exactly they refer to should be objects of intense curiosity for any philosopher of language.

The causal theory of reference dominates the agenda of discussion concerning the reference of singular terms, and when general terms -especially kind terms- are concerned, the picture is no different. So far, the predominant theory of reference for kind terms has been this or that version or interpretation of the causal theory of reference. The causal theory of reference, especially the orthodox versions strictly denying that descriptions play any role in how general terms of a certain type, namely the so-called natural kind terms, semantically refer are commonly accepted.

Crudely, the proponents of causal theories conventionally suggest that the so-called natural kind terms refer to "natural kinds" (the human-independent divisions inherent to reality), the membership of which is defined in virtue of internal structures. Relating to that picture outlined by causal theories of reference for kind terms, the present paper attempts to reveal what it is that determines whether a kind term semantically refers to a natural kind (be it a real kind or a nominal kind, it does not matter for the linguistic concerns hereby) in the sense that the commonly accepted causal view suggests[1] or to an "ordinary", "social" or "artifact-like" kind whose standards of membership are common functions or stereotypes of its particulars. Moreover, what it is that links a term to this kind rather than that kind will also be under examination. In other words, the present thesis shall inquire into what determines whether a kind term refers to a supposedly natural kind X (defined by a certain "internal" structure), to another supposedly natural kind Y (defined by a different internal structure) or to an ordinary kind A (whose boundaries are drawn by us in whichever way we like). Here, whether natural kinds exist independent of humans or are merely nominal kinds will not be in question. Whether a kind whose membership is defined by having the atomic number 79 is actually nominal or real is not my concern. Instead, my concern is the linguistic (or more specifically,

[1] Here I use the term 'natural kind' to mean classes of natural things with a certain uniformity in terms of underlying structure. Just like Kripke (see Saul A. Kripke, *Naming and Necessity* (Cambridge, Mass.: Harvard University Press, 1980)) and Putnam (see Hilary Putnam, *Mind, Language, and Reality* (New York: Cambridge University Press, 1975) seemed to presuppose. I think we can see this presupposition in that they both argue that terms like tiger refer to natural kinds and at the same time maintain that they apply exclusively to things with a certain underlying structure and to nothing else. Also they seem to presuppose that natural kinds are objectively *there* in the external world and are arranged such that there is a perfect taxonomy of natural kinds. We can see this presupposition in that they think our terms would manage to successfully refer to, say H2O (which they think is a natural kind), as long as we just point to particulars instantiating it and coin a term for its kind, even though we have no idea of whatever microscopic properties it has.

referential) mechanism which influences, if not determines, whether the so-called natural kind terms such as 'water' refer to ordinary kinds or to "natural kinds" (with all the metaphysical expectations, assumptions and presuppositions intact, be it real or nominal) defined by having a certain internal structure that "can" be discovered through scientific inquiry. This is related to the determination of "what type of a kind" is referred to (those with internal structures or those with functions or stereotypical properties). And there is also the issue of which specific kind terms come to refer to (e.g. a term's referring to "substance with atomic number 79" or "substance with the X isotope of the element gold".)

In other words, setting aside (but remaining sensitive to) discussions such as a) what kinds of ontological entities general terms refer to (universals, extensions, sets, collections, abstract entities, kinds etc.), b) whether these entities exist and c) whether kind terms refer or not (at all), the present thesis attempts to inquire into the mechanism that determines the referents of the so-called natural kind terms and that determines the types of membership criteria (internal structure, function, stereotypical features etc.). According to the view to be defended throughout the thesis, a) whether a kind term refers to a kind defined by certain internal structures, by functions useful for us, by stereotypical properties or by what not and b) which particular kind the kind term refers to both depend on the interests of the community, not to a law or mechanism inherent in languages waiting to be discovered by language philosophers. To put it in a more concrete way by way of an example; whether the term 'water' refers to H2O or to an ordinary kind such as materials that quench thirst, or to anything else is dependent on the "interests of the community". The intention/interest-relativity in question cuts across the discussions

of whether the so-called natural kind terms refer through an intervention of descriptive content and whether the referents of kind terms are determined through invariable causal relations. The implication of the view to be defended here is that the so-called natural kind terms refer to purported kinds (which correspond to real kinds or purely nominal kinds, it does not matter) whose criteria of membership can be both in terms of underlying traits or other traits such as stereotypes, functions etc. For example, 'gold' may refer to "the element whose atomic number is X" or to"the yellow, shiny, bright, heavy, conducive etc. material" or to "the isotope X of element Y" etc. depending not on whether the reference of kind terms is causal or descriptive, or on whether the reference fixing baptism is causally linked to this or that particular, but on the interests of the community.

In order to defend these views, I will begin Chapter 2 by briefly describing the dominant theory in the literature, namely the causal theory of reference as it is extended to the so-called natural kind terms to set the background for Chapter 3, in which I will point to the problem that this theory fails to explain certain cases by giving examples of such cases and discussing them. These examples will propose the observation that these cases show that properties other than the uniquely identifying underlying properties to be revealed by science can also be special in some contexts even though they may not be uniquely identifying, and that they at least play a role in the determination of reference for the so-called natural kind terms. In Chapter 3, I will try to explain the reason why and when such properties become special as well as why and when underlying properties operate as uniquely identifying ones. The reason I will argue to be causing these phenomena is the variety of interests/concerns of linguistic communities over the particulars they see

around them. After trying to defend this view, I will go on to conclude my remarks in Chapter 4 by summing up the arguments of the previous chapters, laying bare as clearly as possible the mission of the present thesis and discussing its prospective significance briefly.

CHAPTER 1

INTRODUCTION: CAUSAL THEORY OF REFERENCE FOR NATURAL KIND TERMS

The following background information about Causal Theories of Reference for so-called natural kind terms is by no means a comprehensive and concise summary outlining the important aspects of the theory. The purpose for presenting the information is to remind the reader of *some* aspects of the theory which lead to the problems attempted to be introduced.

Causal theories of reference for so-called natural kind terms suggest that the so-called "natural kind terms", refer to kinds or to their extension non-descriptively except for some special kinds of descriptions.[1] The main rationale behind this claim is that the properties denoted by the descriptions or clusters of descriptions commonly associated with a kind are neither necessary nor sufficient properties for

[1] First of them is the trivial description of "*being of the relevant kind*", which is by no means a legitimate way of saying that the reference of kind terms is descriptional. Even if such a description is inseparable from the reference of natural kind term, this can only suggest that the reference is trivially descriptional. Going into the details of this issue is not intended here. Nathan Salmon deals with this issue extensively in his *Reference and Essence* (Princeton: Princeton University Press, 1980). Secondly, the causal theory might allow for necessary descriptions in the form of certain sortals; in the case of Putnam, those such as *liquid* (see Hilary Putnam, *Mind, Language, and Reality* (New York: Cambridge University Press, 1975) p. 231 and 238) and in the case of Kripke, properties in statements "subsuming one species under another" such as the property of being an animal in the statement "cats are animals" (see Saul A. Kripke, *Naming and Necessity* (Cambridge, Mass.: Harvard University Press, 1980) p. 138). Thirdly, the causal theory can allow for descriptions in the form of reference fixing descriptions that are at work only in the initial baptism stage. Kripke's most famous example for such cases is Neptune. In the case of Neptune, if Leverrier actually baptized the name Neptune as the planet causing the perturbations in the orbits of some planets before he saw it through a telescope, then the reference of Neptune was fixed through a description like 'the planet causing the perturbations in the orbit of Uranus'. (Kripke, 1980, p. 79, fn. 33 and p. 96, fn. 42) Since descriptions other than these types are the subject of the controversy here, I will use the concepts "non-descriptive", to mean "pertaining to no descriptions except for the special kinds of descriptions mentioned in the first footnote in the Preface.

being a member of that kind. Likewise, these descriptions are neither synonymous with the term nor do they determine its extension, because apparently the descriptions associated with the terms denote contingent properties which are not essential for membership to the kind. For instance, a description such as "the yellow, conductive, etc. metal" cannot be said to determine the reference for gold because it may turn out that gold does not have the properties of being yellow, conductive etc. Moreover, things that have all those properties can fail to be gold as in the famous "fool's gold" example. Even though iron pyrite (aka. Fool's gold) resembles gold in terms of the descriptions attached, it *is* not gold. Even if some of the associated descriptions are true of the kind in question and false of all other actual kinds, the properties given by those descriptions are still not the essential properties of that kind. If they were so, then those properties would have to be necessary and sufficient, and it wouldn't have been possible for, say, gold to turn out to fail to conform to them. This is the basic line of thinking behind the causal theorists' rejection of descriptional reference for the so-called natural kind terms. According to causal theorists, the most important problems with descriptional reference are that descriptions are neither necessary nor epistemologically required for successful reference and that the kind term would refer to the "kind" (whatever it may be) even if there were misdescriptions. These problems of descriptivism are discovered by Saul Kripke in his *Naming and Necessity*[2] and explicated in Nathan Salmon's well-established classification of the modal, epistemological and semantic arguments respectively.[3] These two problems of descriptional reference supported and

[2] Kripke, *Naming and Necessity*.

[3] Salmon, *Reference and Essence*, pp. 59-61.

explicated by these three criticisms form the basis of the rejection of descriptional reference and the widespread acknowledgment of the causal theories of reference for, among other referring expressions, so-called natural kind terms. Likewise, one of the central tenets of causal theories of reference is that no description is necessary for the reference of so-called natural kind terms. This is exemplified and made concrete by Kripke's famous examples gold and tiger and Putnam's famous "Twin Earth" thought experiment. According to Kripke, it may turn out that all of the descriptions we originally used to identify these kinds[4] and many others that we discover later[5] may turn out to be false of tigers and gold except their *a posteriori* revealed essences. And according to Putnam, even if all descriptional or intensional content is the same for H2O and XYZ, XYZ is not included in the extension of 'water' in virtue of the fact that the term 'water' was introduced in the presence of H2O and not XYZ[6] This commitment to non-descriptionality is the source of the problem to be introduced below for causal theories and even a causal "picture" modestly offered by Saul Kripke insofar as they rest on the non-descriptionality claim for the reference of kind terms, in other words, insofar as they reject all descriptions pertaining to stereotypical properties as merely parasitic.

[4] Kripke, p. 121.

[5] Ibid., p.124.

[6] Putnam, *Mind, Language, and Reality*, pp. 223-7.

CHAPTER 2

REFERENTIALLY CONSTITUTIVE DESCRIPTIONS: A PROBLEM FOR CAUSAL THEORIES OF REFERENCE FOR THE SO-CALLED NATURAL KIND TERMS

The Problem

There are many examples of so-called natural kind terms for whose purported natural kinds there are some (cluster of) property/properties that is/are non-parasitic and inseparable from that kind. For example, redness is indispensible for being ruby. Even if anything else remains constant, a particular is not considered ruby once the color is different (The real-life example to be developed further in the section of examples is sapphire. It shares any other property with ruby except for color.) Such inseparability suggests that such properties have, to some extent, a determinant role in both what the kind term in question refers to and which particulars shall be considered a member of the kind in question. I will call these significant, determining properties (or, if it better suits anyone, *cluster* of properties) *referentially constitutive*, inspired by Achinstein's category of *semantically relevant* properties. According to Achinstein, a property is semantically relevant if the property's presence counts, to at least some extent for something to be of a kind or not.[7] Similarly, in the terminology I hereby suggest, a property is referentially constitutive if the property's presence affects, at least to some extent, what the kind

[7] Peter Achinstein, *Concepts of Science* (Baltimore: Johns Hopkins University Press, 1968).

term in question refers to and which particulars are to be considered the instantiations of a kind.[8] Referential constitutivity seems to be possible for clusters of properties as well. Also, I will distinguish between the functions served by the presence and absence of (clusters of) properties. So, when the absence of a (cluster of) referentially constitutive property counts for not classifying a particular as a certain kind, then the referential constitutivity is a negative one. And when the presence of a (cluster of) referentially constitutive property counts for classifying a particular as a certain kind, then referential constitutivity is a positive one. For the present purposes, I will apply the concept of referential constitutivity to descriptions as well. If some (cluster of) properties are referentially constitutive for some natural kind (as the examples in the next section suggest) the (cluster of) descriptions denoting these properties must be referentially constitutive too. So, if my examples succeed to show cases of so-called natural kind terms for whose purported kind there are (a cluster of) referentially constitutive properties, they will succeed in showing cases of so-called natural kind terms for which there are referentially constitutive *descriptions*.

The idea of *referentially constitutive*, non-parasitic (cluster of) descriptions poses a problem for the non-descriptionality claim of the causal theory. The causal theory acknowledges no referentially constitutive (cluster of) description(s) except for the description denoting the property of having the unraveled or recently discovered underlying structure of respective natural kinds (such as having the

[8] Referentially constitutive properties are *de dicto* necessary properties in the application of a general term to particulars. As long as a referentially constitutive property remains sufficiently significant for the categorization interests/concerns of a community, it operates as a necessary property. Particulars not having it will not be accepted as a member of the kind in question. Referentially constitutive properties are indispensable criteria for membership to a kind.

atomic number 79 or the composition H2O). According to the causal theory, no other description can have a role in determining what the term refers to. Even the reference fixing description instrumentally used in the naming act stops operating as soon as the reference is fixed.[9] What a term refers to is only determined by the part of external reality to which the social phenomenon of naming is causally-historically connected to. Therefore, if there are referentially constitutive (cluster of) descriptions; that is, (cluster of) descriptions which have a role in determining the reference of so-called natural kind terms, then the non-descriptionality claim of the causal theory would be seriously threatened.

Let me settle the issue with the examples first, since it is not self-evident at first sight that the examples pose the aforementioned problem for the Causal Theory. As referential constitutivity comes in two types, namely positive and negative referential constitutivity, I will present two types of examples one of which is about negative referential constitutivity, and the other about positive referential constitutivity.

Examples That Indicate the Problem

Let me start with the first set of examples that rest the case in a clearer way. In these examples, the absence of certain properties results in the rejection of certain substances from being classified as the kind in question. This seems to suggest that these (cluster of) properties and the (cluster of) descriptions denoting them have negative referential constitutivity.

[9] Kripke, p. 80, fn. 34.

Descriptions with Negative Referential Constitutivity

One might consider terms like 'ruby', 'topaz', or 'diamond' natural kind terms just like gold and expect, as the causal theory suggests, that there are no referentially constitutive, non-parasitic, necessary and sufficient properties and descriptions attached to them. Just like we might have -and in fact have- discovered that some gold was not yellow, we could have discovered that some ruby was not red, some topaz was not yellow and some diamond was not shiny and elegant. In other words, just like there could be non-yellow gold, there could have been non-red ruby, non-yellow topaz and non-elegant diamond, had we discovered some material which was *of the same internal structure as* ruby, topaz, diamond etc. despite being of a different colour, shape etc. However, when we in fact *did* discover that some materials are *of the same internal structure as* ruby, topaz and diamond but different in some superficial characteristics, the linguistic community behaved differently. In the cases of ruby and diamond, no revision was carried out while in the case of topaz, the linguistic practice was quite in line with the way expected by the causal theory.[10] This variety in the linguistic practice seems incompatible with the claim that the so-called natural kind terms refer non-descriptively. If, as supposed in the cases of gold, tiger, water, whale etc., internal structures had been actual determiners of reference (the superficial or *stereotypical* properties being parasitic), the terms 'ruby' and 'diamond' would behave just like 'gold' and 'topaz', referring to anything *of the same internal structure as* the paradigmatic instances. So, blue

[10] Joseph La Porte, *Natural Kinds and Conceptual Change* (Cambridge: Cambridge University Press, 2004).

sapphire (which shares the same chemical structure as ruby) would be classified as ruby and charcoal would be classified as diamond.

In order to save the causal theory of reference for so-called natural kind terms, it could be argued that we (a) failed to name a natural kind or (b) had not ever attempted in the first place to name a natural kind.

Option (a), which maintains that we might have failed to name a kind, does not seem strong enough. If we ever attempted to name a natural kind, there is a certain way allowed by the causal theory that we could fail to do so. Only if nature does not cooperate can we fail to name a natural kind. For example, the ostensively baptized samples (paradigmatic instances) or the things denoted (or attempted to be denoted) by the introducers of a term via the reference fixing description may include things with more than one internal structure.[11] Unless nature is not suitable to our attempt in this or another way (the samples in question might even be illusory), it is hard to account for why the referential mechanism proposed by the theory does not yield the expected results as in the gold case. And in the cases of ruby and diamond, nature is considerably suitable to our attempt -the instances of ruby and diamond are of uniform internal structures, just as much as gold, tiger etc. is. So either the reference determination mechanism offered by the causal theory is not sufficient, or it is not the case that we had tried and failed to name a kind. It seems that the maneuver the theory would resort to here is to claim that we hadn't attempted to name a kind, which brings us to option (b)

[11] Kripke gives such an example (1980, p.136). In such a case, if a great majority of those things share an internal structure, the minority would be considered deviant and rejected, so there would be no failure of naming a kind. However, "if the supposition that there is one uniform substance or kind in the initial sample proves more radically in error", that is, if the portion of at least two substances are considerably large in the distribution of the initial sample, failure to name a kind occurs. Putnam makes the same point by giving the example of jade and the counterfactual example of water. See Putnam (1975).

Unlike option (a), there seems to be some merit in option (b) which suggests that we had not ever attempted in the first place to name a natural kind. After all, the relationship of *the same kind as* need not necessarily operate in virtue of natural kind determining uniform internal structures. The community might have as well used the term 'ruby' to denote a non-natural kind, or at least as *not necessarily* a natural kind. They might have just not been interested in whether or not the kind is natural or artificial. The term 'ruby' is still attached to a kind determined by *the same kind relationship* Kripke talks of.[12] However, going this direction would have some significant implications. If we claim that we had not attempted to name a natural kind *just because it turns out that* ruby and diamond did not turn out to be natural kinds in the strict "internal structure" sense despite the fact that they satisfy the condition of having a uniform internal structure, we would be taking the distinction between natural kind terms and other kind terms as a metaphysical, not a linguistic matter. This way of proceeding will be pursued in the next paragraph. However, if we have other reasons legitimizing our claim that we had not attempted to name a natural kind, there may be some fruitful counter argument to my claim that ruby and diamond constitute a problematic case to the causal theory.

As for taking the distinction between natural kind terms and other kind terms as a metaphysical not a linguistic matter, this would lead us to the horns of a dilemma in which we have to maintain either that x) we can infer a metaphysical claim from a theory of reference, an attempt sensibly denounced by Nathan

[12] Kripke, p. 136.

Salmon[13] (since accepting something as a natural kind would require *a priori* knowledge of future empirical discoveries) or that y) we can not (at least initially) know for certain whether any kind term is a natural kind term or not, no matter how commonsensical it is to call it a natural kind term (think of water, gold, tiger, human etc.). The first option is not even worth considering, since a theory of language is by no means a method of knowing whether the internal structure of some items will turn out to be uniform or not. So let us consider in detail the second option y) which suggests that we cannot know the type of a kind term until the discovery enterprise is finalized.

I shall argue that, though relatively reasonable to maintain, this second option trivializes the point of the semantic category of 'natural kind term' and consequently trivializes the point of the project to extend the causal account to at least some category of general terms.

To begin with, what are natural kind terms if not terms such as cat, water, fish, gold, tiger etc.? The view in question cast doubt on their being natural-kind-terms. If the majority of the items named by any one of these terms turn out not to have a uniform internal structure, we have to say, according to the theory, that they *are not*, and *have never been* natural kind terms. It seems to me that once we accept such a picture the causal theory of reference for natural kind terms becomes trivially true. It fails to: pick out a certain group of terms on the linguistic level, put forward a claim concerning how their reference is determined and predict semantic properties (non-descriptional, indexically tied to the samples etc.). What it does instead is to revise the status of general terms depending on future empirical discoveries. The

[13] Nathan Salmon, "How not to Derive Essentialism from the Theory of Reference," *The Journal of Philosophy* 76, No. 12 (Winter, 1979), pp. 703-725.

interesting aspect of the theory is thus sacrificed. In this picture, the causal theory cannot predict the semantic behavior of any kind term. It just postulates a very special category to which no existing kind term can be known to be a member of, and then grant membership to those terms which happen to live up to the postulated definition. To put it in a more concrete way, the causal theory cannot pick up a term such as 'water' (no matter how natural a kind it seems to refer to) and tell us whether its reference is determined the way causal theory suggests (the way proper names are determined). It *might be* (as it *had been* in the cases of ruby and diamond) the case that 'water' turns out to be a non-natural kind term. This is what follows if 'ruby' and 'diamond' but not topaz or gold are rejected as non-natural kind terms based on the a posteriori approach to natural kind terms. So, the claim that natural kind terms refer as per the causal theory seems trivially true. We could as well say that it is *stipulated* to be true, because if the claim is not true of a particular term, it is expelled from the category of natural kind terms. To put it in another way, natural kind terms are defined in such a way that the theory can't fail to give a true account of them. If the account proposed by the theory is false of a term, it is not a natural kind term. It seems that the theory is true by its definition of a "natural kind term".

Moreover, as soon as we place on the shoulders of the world the burden of determining which kind terms are natural kind terms and which kind terms are not, the metaphysical issues of whether there *are* natural kinds and if so what they are would be constitutive of any possible theorizing on the issue. As Åsa Wikforss puts it, "there are several competing theories [on what a natural kind is] (the micro-structural theory, the causal homeostasis account, promiscuous realism, and so on) and, depending on which theory one adopts, one will draw the distinction between

natural kind terms and other kind terms differently."[14] The problems this would imply are exposed in detail in her joint work with Sören Häggqvist[15] and are worth considering.

If it is argued that it is not determinate whether a kind term is a natural kind term or not before detailed scientific investigation, it suggests the odd result that the way the reference of kind terms are determined depends on "states of the world" to be uncovered by science in the future. Häggqvist and Wikforss call this view "a posteriori semantics".[16] They explain the view as one suggesting;

> (...) not only does the meaning of a term t depend on the external environment, in classic Putnam-Burge fashion, but also that the semantics of t depends on the external environment. For instance, it has been argued that whether or not 'water' should be given an externalist semantics or a descriptivist one, depends on facts about the physical environment, such as facts about chemical composition and microstructure.[17]

Some of the drawbacks of a posteriori semantics they explain are as follows. For one, since we are never in a position to determine whether our good old terms are natural kind terms or not, and since the path of empirical discovery is an endless one, it seems to be that we may *never* come to know if a kind term is a natural kind term or not. Even today when we know a lot about internal structures, there is still a lot to be known. It could (as an epistemic possibility) turn out

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[14] Åsa M. Wikforss, "Are Natural Kind Terms Special?" In *The Semantics and Metaphysics of Natural Kinds*, edited by Helen Beebee & Nigel Sabbarton-Leary (New York: Routledge, 2010), p. 68

[15] Soren Häggqvist and Åsa M. Wikforss, "Externalism and a posteriori semantics," *Erkenntnis* 67 (November 2007), pp. 373-86.

[16] Ibid.

[17] Ibid., p. 374.

tomorrow –if it hasn't yet turned out recently–[18] that what we call water all around the world is and has always been a mixture of two substances XY and YZ neither of which constitute a minority, which might have enabled us to reject one of them as deviant. In such a case, "a posteriori semantics" suggests that 'water' would not be a natural kind term. As this example shows, we can never know whether our kind terms are natural kind terms or not. This is quite counterintuitive.[19]

Another drawback presented by Häggqvist and Wikforss to the claim that it is not determinate whether a kind term is a natural kind term or not before detailed scientific investigation is concerned with thought experiments. Causal theorists seem to resort to thought experiments quite frequently. They take a term that they suppose is a natural kind term, and present the results of their thought experiments as corroborations. However, this methodology is not consistent with the claim that it is not determinate whether a kind term is a natural kind term or not before detailed scientific investigation. After all, as put forward by Häggqvist and Wikforss;

> We may have the intuition that 'water' should not be given a descriptivist semantics, but this intuition cannot in itself constitute any evidence when it comes to our semantic theory since what determines the semantics of 'water' is not how we use [or would use] the term, but facts about the chemical composition of the samples of liquid that we call 'water'.[20]

[18] It might be argued that this is already the case. Modern chemistry revealed that the Hydrogen and Oxygen molecules have naturally occurring isotopes. There are three isotopes of Hydrogen: Protium ^{1}H, Deuterium ^{2}H and Tritium ^{3}H. Also, there are 17 isotopes of oxygen, but *fortunately* only 3 of them are stable: ^{16}O, ^{17}O and ^{18}O. All these isotopes are the *underlying structures* of what we call water in nature. See Nigel Leary ("Natural Kinds: (Thick) Essentialism or Promiscuous Realism?" *Philosophical Writings* 34, (Spring 2007), pp. 5-13)

[19] Häggqvist and Wikforss, "Externalism and a posteriori semantics,"

[20] Ibid., p. 383.

Hence, in order to both avoid the aforementioned critical problems and account for why kind terms such as ruby and diamond are not natural kind terms, the theory must suggest an *a priori* distinction (based on linguistic rather than metaphysical grounds) between these terms and terms like gold, water etc. For reasons outlined above, whether a term is a different type of kind term must depend on linguistic or socio-linguistic facts, not unraveled future facts concerning the mysteries of nature. Objection B seems insufficient unless a valid *a priori* distinction which allows gold, tiger etc. as natural kind terms but rejects ruby, diamond etc. is found. This was the point of discussion left open for future reference. As all doors except this one seems to be closed, we are coming back to the issue we left open. If there is an *a priori* method for distinguishing 'ruby' and 'diamond' from 'gold' or 'topaz' as different type of terms; then the causal theory would be able to explain away the cases of 'ruby' and 'diamond'. Here, the buck seems to be passed to the intentions of the term introducers. If their intention was to refer to a natural kind in the strict sense to the extent that they would drop the term if it turned out that there was no common internal structure, then a term is a natural kind term. If they didn't have any such intention, the term is not a natural kind term. This is the *a priori* distinction that seems to be readable into Kripke's notion of supposition ("the supposition that there is one uniform substance or kind in the initial sample".[21] However, it is hard to find what deficiency terms like 'ruby' and 'diamond' have such that they can be excluded from the class of natural kind terms.

[21] Kripke, p. 136.

Here, instead of trying invent ways of excluding terms such as ruby and diamond and attacking them, I will provide additional examples on whose statuses (as natural kind terms) it is more difficult to cast doubt. It would create sufficiently serious problems for the causal theory if the example terms mentioned in the founding texts of the theory behaves the same way as ruby and diamond does.

Let me start with the most widely discussed (natural) kind term 'water'. As it is widely acknowledged, Putnam's famous twin-earth scenario describes a situation in which 'water' seems to refer to the kind having the underlying structure H2O by way of a causal chain going back to the introduction of the term to the language. The twin-earth scenario attempts to show that no matter how similar (or even exactly the same) the superficial properties are, difference in underlying structure makes it the case that 'water' does not refer to XYZ, which considerably conforms to our intuitions.[22] This fits well with the claim that stereotypical properties are not what determine the reference of a natural kind term. However, turning the scenario upside down as David Barnett[23] does seems to yield very different results. Let us imagine the scenario of Barnett in which a space travel to the twin-earth is in question and there is a substance in twin earth which looks just like mushrooms and is extremely toxic to humans, even though it is composed entirely of H2O molecules (For convenience, let us suppose that twin-earthians call this substance 'mushroom'). In such a scenario, would it be the case that our good old term 'water' refer to the twin-earth mushrooms? Could we say "do not eat the water" to space travelers from Earth

[22] Putnam, *Mind, Language, and Reality*.

[23] David Barnett, "Is Water Necessarily Identical to H2O," *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 98, No. 1 (Spring 2000), pp. 37-56.

who would visit Twin-earth? Our intuitions seem to suggest that the toxic twin-earth mushroom is not water even if it is H2O.

This is a scenario very similar to what actually happened with ruby and diamond. Even though the internal structure is the same, the radical stereotypical differences prevent us from classifying the mushroom-like toxic stuff as water. Had the differences been a little less radical, our intuitions could have been ambivalent or could have suggested that the stuff should be classified as water (As in the polywater case mentioned by Kripke.[24] So, it seems that there are some indispensible stereotypical properties attached to our concept of water whose deficiency prevents us from classifying the toxic Twin-earth mushrooms as water. Whatever they are, they are probably of a similar importance of the redness of ruby and elegance, shininess etc. of diamond.

So, what happens with 'ruby' and 'diamond' could have as well happened with 'water' (and not necessarily in a twin-earth, our good old earth *could* contain stuff composed of H2O but having radically different in stereotypical properties), forcing the causal theory to hold onto the aforementioned objections A and B. Nevertheless, the only seemingly plausible alternative for the causal theory, namely that the terms in question are not meant to be natural kind terms would be much more suspicious as water is the paradigm case of the founding texts of causal theory.

Now let us try a similar thought experiment with another commonly recognized "natural kind term", 'tiger'. The same line of thinking would suggest that there has to be certain indispensible properties for being a tiger, apart from the underlying structure allegedly attempted to be named by introducers of the term

[24] Kripke, p. 129.

'tiger' and the causal chain going back to them. Suppose that when Australia was discovered, a weird looking animal living on trees which does not particularly look like any previously known animal was observed. These animals were called 'nuona' by the indigenous population, so we started calling them 'nuona' too. Then, with the advent of science the internal structures of the animals started to be analyzed and it turned out that nuonas share the same internal structure with tigers, differing from them only in superficial properties. In such a case, would we confidently conclude that nuonas are tigers? It seems we wouldn't.

Similar points about the kind term 'tiger' is made by Asa Wikforss[25] and Hanoch Ben-Yami.[26] Commenting on Kripke's claim that we could discover that tigers have none of the properties attached to them,[27] Asa Wikforss makes the following point:

> 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. 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.[28]

As the above lines suggest, Wikforss explicitly maintains that it would be nearly impossible to imagine something lacking all the ordinary properties of tigers but still

[25] Wikforss, "Are Natural Kind Terms Special?"

[26] Hanoch Ben-Yami "The semantics of kind terms", *Philosophical Studies* 102, No. 2 (Winter 2001), pp. 155-84.

[27] Kripke, p. 121.

[28] Wikforss, "Are Natural Kind Terms Special?" pp. 73-4.

being a tiger.[29] Moreover, he adds the point that cases in which prominent stereotypical properties turn out to be disposable do not suffice to establish that all descriptions are parasitic and that they do not play a role in the determination of reference.

Hanoch Ben-Yami argues for the same line of thinking in his article "The Semantics of Kind Terms". Commenting on the famous passage of Kripke where he maintains that we can find out that tigers have none of the properties associated with them,[30] Ben-Yami rejects that idea and makes a compelling comparison in support of his view. Ben-Yami compares the case of 'tiger' to the case of 'mermaid'.[31] As it is widely known, Mermaids are thought to have been mistaken for dugongs by lonely sailors. This story might be true or false, it does not matter. If it is true, according to the causal theory we should have been calling dugongs 'mermaids' just the same way Kripke thinks we would do with 'tiger' had all the properties known of the species tiger turned out to be false. And if it is false, it inspires a thought experiment similar to Kripke's experiment in which 'mermaid' is like 'tiger', and the "post-illusion tiger" (tigers that have none of the stereotypical properties) is like the species dugong.[32] To put it in a clearer way, the causal theory suggests that *if it had turned out* that the creatures thought to be mermaids and named by the sailors as such *had been* dugongs, then we *would have called* the dugongs 'mermaids'.

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[29] Kripke makes a similar point for gold too. He rejects the possibility that we could call a substance without the atomic number 79 gold even if we found some other yellow substance "with all the properties by which we originally identified gold, and many of the additional ones that we have discovered later" (1980, p.124)

[30] Kripke, p. 121.

[31] Ben-Yami, "The Semantics of Kind Terms,"

[32] Ibid., p. 158.

However, this is both counterintuitive and probably incongruous with the facts. The scenario that sailors had named dugongs as 'mermaids' supposing that they had certain characteristics is quite a plausible historical account. And if it *were* true, we *would* obviously, as intuition suggests, not call dugongs 'mermaids'. So, why should an illusion about "tigers" be any different?

The examples mentioned so far has shown us that mere underlying structure sameness (and the causal chain starting with a dubbing which entails the presupposition of such a congruity) do not suffice. In any one of the aforementioned examples, underlying structural uniformity was present, but something about the supposedly parasitic properties was missing and this deficiency *mattered*. It seems that some properties, and their corresponding descriptions one might say, were somehow not parasitic. They seem to have *negative referential constitutivity*, that is, their lack causes some particular to fail to be classified as ruby, diamond, water, tiger etc. So they seem to be, at least jointly, *necessary* for something to be *of that kind*.

Descriptions with Positive Referential Constitutivity

The first set of examples of natural kind terms for which there seems to be positive referentially constitutive properties (and correspondingly, descriptions) are 'jade', 'lily' and 'planet'. I will start with Jade.

According to the story of jade sketched by La Porte in his book;[33] jade was a very precious stone for the Chinese, even more than gold. When they called this

[33] La Porte, *Natural Kinds and Conceptual Change*.

material 'yü', they were dealing with nephrite (CA2(Mg,Fe)5Si8O22(OH)2). So according to the causal theorist's picture, when they introduced the name for jade 'yü', they must have called nephrite as 'yü'. But, the causal picture seems to fail to capture reality here because as La Porte's account shows us, a new substance with a different underlying structure NaA1(SiO3) discovered much later than nephrite was also embraced as jade or 'yü' by the Chinese[34]. Even though it was well-known that the underlying structure was different, the new substance qualified to be 'yü' instead of being rejected as fool's jade[35]. The reason why NaA1(SiO3) is accepted as jade is noteworthy and illuminating. There were so many things common in the two materials such as elegance, toughness, carving technique required etc. and most probably this was the reason why the new material was accepted as jade.[36] This suggests that certain properties were positively referentially constitutive and their presence in the new material enabled the new material to be classified as jade.

In short, it seems that there is a cluster of referentially constitutive properties of the kind attempted to be named by the term 'yü' such that the presence of them counts for classifying some substance as the same kind. And if so, the descriptions denoting these properties must have positive referential constitutivity. This is contradictory to the non-descriptionality claim of the causal theory.

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[34] According to La Porte, Putnam's claim that jade had been applied to two different chemicals for centuries is a false historical claim. (Ibid, p. 94)

[35] So maybe the fact that fool's gold was not considered to be gold even before gold was discovered as an element was because it failed to suffice in similitude to gold, not because it was not the same natural kind. It seems probable that if fool's gold had been a very precious metal and found just as rarely, if it did not glitter but shone just the same way as gold, if it had been soft and easier to work with as gold etc. it might have been embraced as gold instead of being dismissed as fool's gold. However, after the advent of science and the discovery of the microstructure of what is considered genuine gold as a certain element with a certain atomic number etc., this is probably no longer possible.

[36] Ibid., p. 97-9.

The second example is 'lily'. This example was provided by J. Dupré in his both influential and ignored (influential for the critiques and ignored by the proponents of the causal theory) paper "Natural Kinds and Biological Taxa".[37] As a matter of fact, it looks quite like a natural kind term as tiger, or gold. It seems quite legitimate to call 'lily' a natural kind term -unless one is tempted by *a posteriori* semantics, the problems of which are already discussed. However, no common internal structure was found for lily. Certain candidate internal structures exclude some of the lily families. Others include other plants such as tulips and exclude certain lilies. And the only candidate which is general enough to constitute the internal structure of all lilies also constitutes the internal structure of onions and garlic. So, it seems there is no uniform internal structure that we can associate with 'lily'. And so, the supposed assumption that there is an internal structure turned out to be false. We cannot even say that it is a more generic natural kind which includes a number of species because of the reasons mentioned above. Then what are we supposed to think here? If it turned out that there had been a deep, hard-to-find, seemingly irrelevant common internal structure which may be of the slightest importance, then we would say, just to be in line with the causal theory, that this structure was the determiner of what the reference is and has been ever since the term was introduced, but now that such an internal structure hasn't popped up from the deepest details of biological research, we have to demote 'lily' from being a natural kind term. Such effort and versatility to save the theory seems problematic.

A much more plausible approach seems to admit that there are, or there is a cluster of, certain properties referentially constitutive for classifying things as lilies,

[37] John Dupré, "Natural Kinds and Biological Taxa," *Philosophical Review* 90, No. 1 (Winter 1981), pp. 66-90.

and when a significant (a totally interest relative notion, the indeterminacy of which will always be solved by the interests of scientists, probably without them acknowledging this interest-basedness) amount of them are present in something, it can be classified by scientists as lily. It seems that scientists examine the properties of particular plants and conclude that if they have sufficiently many properties referentially constitutive for 'lily', then they *are* lilies, regardless of the facts about an internal structure mentioned above. However, it is also important to note that if such an underlying structure shared by nearly or entirely all the lilies were discovered, that would probably be added as one of the referentially constitutive properties. Moreover, it would probably be the most important and predominant referentially constitutive property as the main *concern* of *scientists* is to delineate natural particulars into kinds that are marked by internal structures. Nevertheless, it does not follow from this that we are obliged to accept a supposed inner-structure demarcating strictly the members of our class from other classes as the sole determiner of reference all through the history of the 'term' since the time it was introduced.

In short, it seems that there are referentially constitutive properties for being a 'lily'. Otherwise, in the presence of a scientifically approved lack of internal structure, how would the term 'lily' refer to lilies? And needless to say; referentially constitutive properties suggest referentially constitutive descriptions, which seems to be at odds with the non-descriptionality claim of the causal theory. Again the only way out for the causal theory seems to be demoting 'lily' from being a natural kind term. And such a move seems either problematic for the reasons outlined above

(basically, it forces us to *a posteriori* semantics) or simply *ad hoc* in that we would never think of demoting the term if it had chanced upon an internal structure.

The last example that I would like to present is the kind term 'planet'. Ever since the supposed origin of the term (the Ancient Greek term '*Planēt*') this term's extension has been determined in virtue of descriptions regarding properties such as size, movement, behavior etc. *Planēt* meant literally "wanderer" in Ancient Greek.[38] The term applied to celestial objects that move,[39] thus applying to the Sun and the Moon too (as they also move). From the Ancient Greece onwards, the term's reference has undergone considerable changes or modifications. Nevertheless; neither in the past nor after the most recent definition was prescribed by the International Astronomical Union (IAU),[40] has any authority or community become interested in the internal constitution of these celestial entities as a determiner of what these entities are or what their essence is. The sole concern has always been the radically macro-structural parameters such as size, movement, orbit etc. Accordingly, properties -and thereby descriptions- concerning these parameters at least influenced (if not determined) the reference of 'planet'. For instance, "having cleared the neighborhood around its orbit" is a positive referentially constitutive description. After all, the presence of a (cluster of) referentially constitutive property

[38] Merriam-Webster Online Dictionary, s.v. "Planet," accessed June 22, 2013, http://www.merriam-webster.com/dictionary/planet.

[39] David H. Kelley, Eugene F. Milone and Anthony F. Aveni, *Exploring Ancient Skies: A Survey of Ancient and Cultural Astronomy* (New York: Springer, 2011) p. 36.

[40] According to IAU's definition, a planet is a celestial body that orbits around the Sun, has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape and has cleared the neighborhood around its orbit. Any object fitting into these properties and none lacking these properties shall be classified as a "planet". See International Astronomical Union. "Pluto and the Developing Landscape of Our Solar System." Available [online]: http://www.iau.org/public/themes/pluto/ [22 June 2013].

seems to count to a considerable extent for classifying a particular as the kind in question. Certain properties have always been positively referentially constitutive with the term and their presence in any new material enabled the new material to be classified as a planet. This is very much at odds with the causal theory of reference unless 'planet' is rejected as a non-natural kind term (which seems to me to be counterintuitive; besides, other issues mentioned in the above sections also suggest implausibility).

The most persistent strategy to save the causal theory is to claim that jade, lily, planet, ruby, tiger, water etc. are not natural kind terms. But it does not seem to be plausible. I think the combination of the discussion on this issue in the previous section and the variety of examples that has been provided (not only gemstones but water, animals, plants, celestial objects etc.) suffices to make the case that there is no plausible *a priori* distinction between natural kind terms and non-natural kind terms that can exclude the terms for which there are referentially constitutive descriptions from the terms whose behavior seemingly supports the non-descriptionality claim of the causal theory.

Probably, the source of the problem is that the causal theory attributes a certain attitude to our linguistic practices when natural kind terms are concerned. According to the theory, in introducing natural kind terms for kinds of stuff, we assume that there is a certain sameness relation (whether we'd know it or not) amongst the particulars we classify under the term. But this assumed sameness relation is not a sameness relation in terms of the initially observable properties through which we normally identify the particulars. According to the theory, the supposed sameness relation is a relation in terms of the underlying, internal properties of particulars. In

short, *we suppose* that all particulars we classify under a natural kind term share an internal structure.[41] The theory allows the supposition to turn out to be false, but be it true or false the attitude ascribed by the theory to our linguistic practices is a scientifically oriented one. Its ascription of scientific attitudes to our ordinary linguistic practices even before the influence of modern science in our lives seems illegitimately bold.

Coming back to the main point; the claim that we have a supposition that there is a uniform substance underlying the particulars we want to assign a general term to, and the claim that natural kind terms' reference is determined based on that assumption, thus getting fixed to "kind of things having the same internal structure" if there turns out to be one is an important claim. It implies that we should be disappointed when this supposition turns out to be false and such a negative discovery should make us realize that we have been referring to nothing. If we are comfortable saying that "stuff having the atomic number 79" is the referent of 'gold' from its introduction into the language onwards, we should admit that 'gold' would have referred to nothing if it had turned out that there had been no common internal structure of the particulars that we had called 'gold'. For example, in the case of lily, we should say that we had failed to refer to a natural kind throughout history. And if it is a natural kind term, we couldn't have referred to whatever things having certain properties since it would be descriptional reference which the theory considers impossible for natural kind terms. Thus, we must conclude for the sake of the theory that terms for which no internally uniform substance turns out to exist are not natural kind terms if we continue using them without any sign of frustration.

[41] Kripke, p. 136.

As discussed in the section outlining possible objections to the cases of ruby and diamond, excluding these terms as non-natural kind terms is only possible when an *a posteriori* distinction is introduced. An *a priori* distinction would put the theory at great risk and would inevitably fail since there can be no means by which one can *a priori* classify terms such as jade, lily, ruby, planet etc. as non-natural kind terms. Only an *a posteriori* distinction can distinguish between "terms for which there turns out to be uniform internal structure" from "terms for which there turns out to be none (and there seems to be no accompanying disappointment)".

In harmony with this line of thinking, in the recent years it has been argued by some proponents of the causal theory that terms like jade *were* introduced as natural kind terms but when it turned out that no such natural kind exists (or in other words, when the supposition that there is a uniform underlying structure turned out to be false), we changed our concepts and started to use the terms as non-natural kind terms.[42]

According to Contessa, when it turns out that there is no corresponding internally uniform substance for a "supposedly natural" kind term, the use of the term changes and the kind term becomes a non-natural kind term.[43] A similar line of thinking is maintained by Alexander Bird, who makes the following point concerning the La Porte's example jade.

> In my view, if the term failed determinately to exclude a substance of very different composition, then that shows it did not name a natural substance (...) Equally, if 'jade' did name a natural substance, then the

[42] See Alexander Bird, ("Discovering The Essences of Natural Kinds", In *The Semantics and Metaphysics of Natural Kinds*, edited by Helen Beebee & Nigel Sabbarton-Leary (New York: Routledge, 2010), pp. 125-36) and Gabriele Contessa ("There Are Kinds and Kinds of Kinds: Ben-Yami on the Semantics of Kind Terms", *Philosophical Studies* 136, No. 2 (Fall 2007), pp. 217-48

[43] Ibid., pp. 236-7.

> decision by Chinese jade workers and connoisseurs to admit jadeite as a kind of jade amounts to a conceptual shift, from a natural kind term that excluded jadeite to a term that is not a natural kind term and which includes jadeite.[44]

Alexander Bird explicitly suggests an *a posteriori* distinction here and allows the possibility that succeeding users of the term shift the referent from a supposed natural kind to a non-natural kind for cases where it seems that a natural kind term turns out to fail to name an internally uniform substance.

Admittedly, such a position is hard to disprove as it is well-furnished against the well-formed objections to the causal theory. However, this position has implausible and counterintuitive implications because of the fact that it offers an a posteriori distinction between natural kind terms and non-natural kind terms. Therefore, it is prone to all the objections mentioned in the above sections against *a posteriori* distinctions (see above the case against "objection y"). Most importantly, such line of thinking takes it for granted both the metaphysically loaded claim that being a "natural kind" is defined by having exactly the same internal structure and the unsupported, non-argued semantic claim that there is a certain set of terms whose reference is dependent on the way our actual world is organized.[45] Apart from these rather technical problems, what is probably the most disappointing consequence of such a theoretical move would be to give up the claim that the referents of terms denoting substances like jade, gold etc. are constant. However, this constancy is what gives causal theorists the comfortable idea that the subject matter of our inquiries into substances remains the same despite radical theoretical

[44] Bird, p. 129.

[45] Kripke, p. 122.

changes or despite the changes in what we know or suppose about them. D. Cumminskey makes the importance of this idea very clear in his article "Reference Failure and Scientific Realism: A Response to the Meta-Induction".

> One of the main motivations behind causal theories of reference is to explain how the terms of science can refer to the same aspects of reality when the theories about those aspects of reality change radically. One of the main objections to description theories of reference is that they have the unwelcome consequence that revolutionary theory change results in a change in the referential properties of theoretical terms. If the reference of a term is determined by a cluster of descriptions associated with the term, and if the cluster of descriptions changes significantly as the result of a scientific revolution, then it seems to follow that the term will refer to something different in the new theory. But, this implies that the two theories are about different subject matters, in which case the two theories do not really conflict at all. It is perhaps Kuhn's most famous claim that revolutionary theory change results in a change of subject matter, and thus the theory that precedes and the theory that succeeds a scientific revolution are incommensurable and rationally incomparable. To avoid this consequence we need a theory of reference that allows a successor theory to be about the same aspect of reality as its predecessor; this in turn requires a theory of reference that allows us to be largely wrong about the entities to which we refer. Defenders of causal theories of reference view this feature of their approach as one of its central virtues.[46]

Hence, moving to the direction the causal theorists such as Contessa or Bird take amounts to giving up "one of the central virtues" of the causal theory.

The Moral of The Examples

The examples introduced throughout this section are meant to establish the claim that there are referentially constitutive descriptions that play a role in the way the referents are determined for natural kind terms. If true, this claim seems to pose

[46] David Cumminskey, "Reference Failure and Scientific Realism: A Response to the Meta-induction," *British Journal for Philosophy of Science* 43, No. 1 (Spring 1992) pp. 21-40.

certain problems for the account of natural kind terms offered by the causal theory of reference to a considerable extent. The following section is an attempt to demonstrate the extent to which the presence of referentially constitutive descriptions for natural kind terms undermines the causal theory of reference for natural kind terms and further to demonstrate the extent to which it can help us give a better account of how the referents of natural kind terms are determined.

Implications of Referentially Constitutive Descriptions for Causal Theories of Reference

In this section, implications of the presence of referentially constitutive descriptions on the causal theory of reference for natural kind terms shall be discussed.

First of all, the presence of referentially constitutive descriptions for natural kind terms suggests that the non-descriptionality claim of the causal theory is false. This is one straightforward impact on the causal theory of reference for natural kind terms. From this, many implications for the causal theory of reference for the so-called natural kind terms seem to follow.

This suggests that the introduction of a natural kind term (through baptism or reference fixing description) and the consequent causal chain linking the introduced word to subsequent uses of the term do not suffice for determining the referent of the term. Therefore, the causal theory of reference is at most an inadequate account for the reference of natural kind terms. It seems to be obliged to include some sort of intensionality contributing to the determination of the referent though perhaps not necessarily in the form of descriptions. For example, the supposed “same kind”

relationship proposed by the causal theorists and responsible for the determination of reference can be enlarged to include not only internally, chemical or physical underlying structure but also other forms of relating particulars to one another such as the stereotypical properties spurned for decades or certain relationships or forms of contact with the particulars.

Furthermore, the intention of naming "natural kinds" (in the scientific sense of the word, defined by chemical composition, atomic structure etc.) assumed by the proponents of the causal theory becomes much more implausible. If there are referentially constitutive descriptions, there are other criteria apart from internal structure that counts for the membership of particulars to a certain kind. And if there are other criteria, how can we take for granted an intention to name a "natural kind" in the strict scientific conception. An intention to name a "natural kind" regardless of stereotypical properties would make it impossible for a natural kind term to have any referentially constitutive property except for the scientifically framed essential property. This is a very important point and it undermines one of the most important tenets of the causal theory of reference for kind terms. If there are referentially constitutive properties other than scientifically framed essential properties such as internal structure or micro-structural composition, we do not necessarily name "natural kinds". Instead, it is possible for us to name any old grouping. If so, what is the justification for assuming that we had not named any old grouping but necessarily a grouping defined by having the same internal structure, atomic number, chemical composition etc. This allows the possibility that 'water' referred to anything having the properties life-replenishing, colorless, odorless, tasteless, thirst-quenching etc. before the age of science (in which age, one can say, uniform

internal composition is the strongest referentially constitutive description determining the referents of natural kind terms). These are destructive implications for the causal theory of reference for natural kind terms.

To conclude, even though the presence of referentially constitutive descriptions do not "refute" the causal theory of reference for natural kind terms, it undermines some of its basic assumptions and some important tenets and shows that the theory is not *sufficient* to explain the referential mechanisms.

CHAPTER 3

INTEREST-RELATIVITY AND SO-CALLED NATURAL KIND TERMS

Purpose of the Chapter

We are quite familiar with the cases of natural kind terms which seem in line with the causal theory of reference for natural kind terms. The accounts provided by Kripke and Putnam regarding terms such as 'water', 'gold', 'tiger' etc. are widely known and acknowledged. However, examples or accounts of terms that seem to conflict with the causal theory are by no means equally common in the literature. The previous chapter presented such examples which seem to be unaccountable for plausibly by the causal theory of reference. Contrary to what causal theorists suggest, the cases presented seem to show examples of referentially constitutive properties.[47] So, there are two sets of cases which I will call epistemic-oriented examples and pragmatic-oriented examples for convenience. The first set consists of examples provided by Kripke, Putnam and other scholars defending causal theories of reference. These are examples of natural kind terms that seem to fit the causal-historical picture because throughout their history, they seem to behave in line with the predictions of the causal theory of reference for natural kind terms. In this set of

[47] i.e., properties whose presence affects, at least to some extent, what the kind term in question refers to and which particulars are to be considered the instantiations of the kind. Referentially constitutive properties are not accidental or "parasitic" to a natural kind but a constitutive part of it, and they have a significant role in the determination of the reference of the corresponding natural kind term.

cases, it looks as though there is only one referentially constitutive property, namely, the property of the unknown underlying essence of a kind (e.g. the not yet discovered atomic number). And it looks like that property is not only referentially constitutive, but also uniquely identifying. Apart from that, no property seems to be referentially constitutive. The second set of cases consists of what I call pragmatic-oriented examples that seem to include referentially constitutive properties that do not allude to the unknown underlying essence. These are cases where some of the properties commonly associated with certain kinds seem to be considered by the community as indispensible properties of the kind and therefore the terms operate in contrast with the predictions of the causal theory of reference. There seems to be referentially constitutive properties, and thus some descriptionality in the reference of such terms. The predictions of the causal theory seem unable to provide a plausible explanation for the story of these terms, because according to it, only underlying essence can determine reference, all other properties are parasitic. Following the doubt cast by the previous chapter on some of the claims of the widely accepted causal theory, and assuming that there are infinitely many examples which seem to fit the picture offered by the causal (historical) theory almost perfectly; (after all, this popular theory has not become dominant for no reason) the main purpose of the present chapter is to offer a plausible and uniform theoretical explanation to the difference between the sets of cases some of which seem problematic for and some of which seem congruent with the causal (historical) theory of reference (namely, the epistemic-oriented and pragmatic-oriented cases respectively). This uniform explanation is that referentially constitutive properties determined by human interests/concerns influence the determination of reference.

As human interests/concerns vary, different properties become referentially constitutive; and different referentially constitutive properties influence reference differently. This is the reason why two sets of cases differ in their referential mechanisms as seen in the second chapter.

Disclaimer

Needless to say, it must be noted that I will by no means attempt to provide a full-fledged theory of reference for natural kind terms alternative to or in favor of one of the two most dominant theories of reference, namely the descriptivist or causal (historical) theories. These are theories that introduce a "means" by which the extensions of general terms are determined. Instead, what I attempt to do is try to point to an important common mechanism that is at work in the determination of reference for all natural kind terms, which I hope will help grasp in a better way some of the crucial issues on the subject, namely, the issues of why the implications of the causal theory of reference for natural kind terms hold for many cases while failing in others and why some properties (and thus, the corresponding descriptions) are referentially constitutive while others remain parasitic.

Interests, Referentially Constitutive Properties and Reference

This section is an attempt to defend the claim that interests of linguistic communities over kinds determine which properties are referentially constitutive to a kind, and that referentially constitutive properties in turn influence reference.

A Scenario and A Real Life Case: Thrakk and Jade

In this section, I will try to draw a picture in order to make concrete as well as support the aforementioned claim concerning the referential mechanism of natural kind terms.

Let us imagine the following scenario. When a primitive tribe is under attack by wild animals coming from the forest, they may introduce a kind term denoting these creatures in order to communicate the danger more easily to their tribesmen. Whenever a large, aggressive animal with sharp teeth appears, they may cry 'thrakk' and report to others that a thrakk is coming. In such a case, the source of the motivation for naming would obviously be the danger caused by these animals and the community would probably be interested primarily in the danger, and maybe size of the body or sharpness of teeth in addition to that, while other properties would probably have less significance. The animals in question may be very different from each other in many respects. To put it in a slightly different -but supposedly an equivalent- way, they might be of several different types in terms of other respects (appearance, form of reproduction, form of feeding infants etc.). However, these might be of no concern for the tribesmen. Their point of interest may lie purely with the animals' causing a certain kind of danger to the tribe. In such a scenario, this interest/concern of the community regarding the particulars in question would greatly influence the reference of the term 'thrakk'. Particulars that are of the same or sufficiently similar concern to the tribe would be extremely highly likely to be called thrakks. Unlike us today, and like many civilizations at various points of time, these people would probably not be interested in other details such as the animals'

genetic structure, phylogenetic development, forms of reproduction etc. -details that we care so much because of concerns such as classifying the animals or distinguishing between types of animals for the sake of knowing things about the world, being able to use the inductive method etc.. So, in a sense, a kind term refers to what the community wants it to refer to, or more precisely, the interests/concerns of the community over the particulars greatly influences -if not completely determines- which particulars the kind term extends to. And this fact makes it possible for members of different scientific kinds, or animals with different genetic make-up or phylogenetic development, to be called thrakks. Such a scenario is not only entirely possible but also quite plausible, as there are numerous documented examples like this in folk biology. One striking example is the Tsistsistas (Cheyenne) term '*vovetas*'. Van Brakel remarks;

> (...) vovetas is a Tsistsistas (Cheyenne) word (Van Brakel [1991]), the reference of which includes most vultures (Cathartidae), the common nighthawk (Chordeiles minor), swarms of green darners (Anax junius, a dragonfly), swarms of red skimmers (Libellula saturata), and tornado's (meteorological events). Clearly, *vovetas* doesn't meet the natural-kind-criterion of 'genetic similarity'; but why would the 'natural' interest be genetic similarity, and not 'whirling movements' or whatever motivates speakers of Tsistsistas to speak about *vovetas*?[48]

With such an important possibility at hand, we cannot ignore it and declare confidently that the cases of tiger, fish, whale, dolphin etc. are not, -and have never been- any different as the causal/historical theory of reference for natural kind terms suggests. The causal/historical theory is at fault at this point. It might not always be the case that an initial naming act presupposes that essential underlying properties of

[48] Jaap V. Brakel, "Peirce's Natural Kinds," In Peirce. C.S. Peirce: Categories to Constantinople: Proceedings of the International Symposium on Peirce. Edited by Brakel, Jaap. and Van Heerden, Michael. (Leuven, University of Leuven Press, 1998), p. 37.

the particulars are the criteria determining which particulars the term extends to.[49] Another way to put this is that linguistic communities can refer to whatever kind they are interested in referring to, they are not bound by "our" semantic intuitions to refer to whatever supposed joint of nature their terms supposedly get anchored to. Terms like *thrakk*, *vovetas* etc. do not always need to get automatically anchored to the underlying properties (such as the chemical structure, genetic make-up etc.) of the particulars in question as many causal theorists claim they do. There is another option, especially if the interests of the society over the particulars of that kind are more pragmatic.

Here, many causal theorists would say that "natural kind terms" are different from terms like '*thrakk*' or '*vovetas'*. After all, natural kind terms are based on the assumption or "supposition" (as Kripke calls it) that there are kinds of particulars distinguishable from anything else by their unique properties which are uniform in every member of the kind. Kripke calls this supposition "the supposition that there is one uniform substance or kind in the initial sample".[50] Though one may not and most of the time does not know what the properties unique to the kind are, the supposition that there is a decisive uniformity among the members guarantee the term as an attempted natural kind term and the term's referent as a supposed "natural kind".[51] Regarding the '*thrakk'* example, a causal theorist could argue that the community cannot have attempted to coin a natural kind term. They must have

[49] See Kripke (1980, p. 121; 136) who seems to think it generally does.

[50] Kripke, p. 136.

[51] In case no such uniformity or uniqueness turns out to exist, the supposition in question is deemed as false, and the natural kind term turns out to fail to refer or become a higher order ordinary kind term. See Kripke (1980); Putnam (1975); and Soames (*Beyond Rigidity: The Unfinished Semantic Agenda of Naming and Necessity* (Oxford: Oxford University Press, 2002))

simply created an ordinary kind term. Acting under the assumption that there is a unique uniform essential (and probably underlying) property distinguishing thrakks from non-thrakks and then coining a term for "that kind of animal, whatever its essential properties may be" cannot be what they were doing. According to causal theorists, they would be attempting to coin a natural kind term only if they wanted to name "that kind of animal" according to the conception of the concept "kind" as we have today (defined by distinguishing criteria such as internal structure revealed by science), that is, only if they wanted to distinguish types of animals and tried to pick out this type of animal as one of the many kinds of animals in whatever animal kingdom taxonomy they had. Only then could we expect a term like thrakk to operate as the causal theory of reference for natural kind terms suggests. In the first scenario, no matter what future scientific discovery were made, the community would not consider some animals previously called as thrakks not to be so. However, in the second scenario, scientific discoveries concerning the genetic structure or phylogeny or reproduction system etc. of animals named as thrakks would change the way they label animals as thrakks. They will consider some previous usages to be wrong based on new discoveries (just like many people now say that we were wrong in calling dolphins as 'fish'). In the first scenario, the tribesmen would not be open to new possibilities such as non-dangerous thrakks while in the second scenario they would be open to such possibilities. In the second scenario, the term would be a natural kind term and would act as a natural kind term, all descriptions apart from the description denoting the later-discovered but once-unknown underlying structure would be denoting accidental properties which would be utterly revisable in the presence of further discovery. In short, the term would

show all the characteristics attributed to natural kind term by causal theorists in the second scenario.

This line of thinking is not something I will argue against. I would totally endorse and acknowledge scenarios like the aforementioned second scenario. A community might have been interested in naming a kind of animal for the sake of knowing kinds of stuff in the nature, holding the Kripkean supposition that there is a unique substance instantiated by the observed specimens, defined by unique essential properties. They would not have been interested in this or that property of the particulars they wanted to give a general name to, but they would have been interested in, or concerned with, any similarity the particulars in question might have among themselves and/or any difference from the various kinds of other observed animals. So, with this type of concern, the community would be able to revise every single thing they would have been supposing about the animal in case of further discovery. As a result, the term in question would be a "natural kind term" in the causal theorist's sense. The only thing I would disagree is unjustifiably presuming that terms like water, tiger, gold etc. have always been such natural kind terms, having been coined with what I call epistemic interests, dismissing the possibility that at least some of the terms that have been discussed in the literature as paradigmatic examples of natural kind terms (such as water, tiger, fish etc.) could have as well been like 'thrakk' in the first scenario at a certain point in time in their history. The possibility of the scenarios of the second type is not at all a problem for my project. I will grant the causal theorists the possibility of the second type examples and I will attempt to explain both the presence of and the difference between these two kinds of scenarios with the presence of and difference between

varying interests of communities in the natural stuff/beings around them. The difference between the two types of scenarios (naming 'thrakk as a creature threatening the tribe vs. naming 'thrakk' as a "kind" of animal in the animal kingdom) is obvious, and as the examples in folk-biological studies prove, scenarios of the first type are entirely possible and has occurrence[52] in real life.[53] In the first case, there would be ordinary commonly associated properties that are referentially constitutive while in the second case the only referentially constitutive properties would be the then-unknown underlying properties which were supposed to be uniformly present in all particulars correctly called as 'thrakk'. The same term can extend to different particulars depending on what the community is concerned with about the particulars in question. If a community were to be "primarily" interested in the common underlying structure of certain particulars around them, the term they coin would act as per the predictions of the causal theory of reference. However, if they were to be "primarily" interested in certain observable properties of the particulars in question, the term they coin would act just like the way 'thrakk' does in the first scenario.

The lesson I draw from these observations is that there are two different types of intentions or concerns, and this make the terms differ with respect to their referents. What makes the two terms differ is not a linguistic fact that they are different kinds of terms with respect to some linguistic aspect. Nor is it the alleged "fact" that when communities coin a term for groups of similar particulars found in

[52] By occurrence in real life, I mean having a historical incidence, having already happened at least once in history.

[53] It is the scenarios of the second type, which causal theorists entirely rely and depend on, that needs further argument to be acknowledged as possible and as having occurrence. However, I don't need to question their possibility or occurrence to make my point. Neither the possibility nor the occurrence of such scenarios undermines my point.

nature they must have a supposition that they have a common underlying property that cannot be observed at the time; and therefore the term gets automatically anchored to whatever unique properties the particulars in question happen to have. These are not why these terms differ with respect to the determination of their referents. Instead, the source of the variation between the possible referents of 'thrakk' in two scenarios is that the interests/concerns of the community over the particulars they are acquainted with are quite different in each scenario. Interests/concerns of the community significantly influence the determination reference, so varying interests/concerns naturally result in different conceptions of the world, thus resulting in different referents for the term. If the intention of the community is to name a group of animals that cause a certain kind of danger to the community, the extension set would probably contain particulars of many different species (our species, according to current scientific taxonomy). However, if their intentions are whatever intentions usually epitomized by the metaphor of "carving nature at its joints" (just like in an attempt to have and to be able to communicate knowledge of the world), a group of animals which share, according to their supposition, certain underlying properties and which also *happen to* cause a certain kind of danger as a matter of fact, then the extension set would necessarily contain only one species in the absence of a uniform underlying structure, or else the term would either fail to refer just like the term 'phlogiston', or it would undergo conceptual change (as our expectations of it turned out to be false) and refer to a higher order.[54]

[54] See Kripke (1980) and Putnam (1975)

Likewise, when we look closely at the examples provided in the second chapter, the first thing a keen eye would notice is that there are conflicting interests/concerns between different conceptions of kinds in both the real-life settings and in the imagined scenarios. In the case of jade, for example, a scientific concern over the taxonomy of substances would advise that we reject the new material NaA1(SiO3) as fool's jade just like we rejected iron pyrite as fool's gold. This is also what the causal theory of reference would be committed to say.[55] However, it seems that the Chinese community was interested in whether the appearance, elegance, toughness, carving technique required or maybe certain other features related to jewelry were similar enough or not, rather than their physical or chemical composition. After all, jade has always had great significance for the Chinese community, and the role of this substance in Chinese culture was far from being just any old natural substance. As La Porte puts it:

> The Chinese relationship to jade, or "yü", as they call it, is more interesting than Westerners' relationship to the material (...) For the Chinese, jade has enjoyed something like the status gold has enjoyed in the West. The Chinese consider jade to be the most precious of material substances, more precious than gold, as a Chinese saying indicates: "One can put a price on gold, but jade is priceless" (Ward and Ward 1996, pp. 9-10). In contests of skill in ancient China, the victor received a scepter of jade, not gold; the second-place competitor received a scepter of gold (Gump 1962, p.15) The Chinese once used jade as a coin (Sakikawa 1968, p. 34). Its value in jewelry is comparable to that of gold and diamonds in the West. Most salient of all is jade's value in masterful carvings. Westerners express excellence by comparing a person, character, performance, or other item with gold or silver, as in "heart of gold," or "silver-tongued" The Chinese express excellence by comparing a worthy item to fine jade.[56]

[55] La Porte, *Natural Kinds and Conceptual Change*, p. 95.

[56] Ibid.

I believe this history and significance of jade in China is the key to explaining the surprising acceptance of a pragmatically similar but micro-structurally different substance as jade instead of rejecting it as fool's jade. Alexander Bird makes a similar conclusion. According to him, even though classifying objects by their underlying structure is a very "compelling" disposition, sometimes practical interests/concerns can lead to more "useful" criteria for classification.".[57] Here it seems quite plausible to argue that instead of what Bird calls "the desire to classify things by their natural kinds"[58] and what I call epistemic interests, which favor a scientific demarcation of substances with different chemical formulas, other interests, namely "pragmatic" interests or in Bird's terms "practical interests/concerns" were dominant in the Chinese society. In his book *Jade*, Sakikawa maintains that:

> the resemblances between the two [nephrite and jadeite, the two micro-structurally different substances that are both considered jade] are many and the distinctions limited to matters of hardness, specific gravity and x-ray analysis – not commonly considered in setting prices of jewels for commercial consumption.[59]

Another author suggests that the differences between these two substances are differences in properties that are important not for dealers or collectors but rather for scientists, while these substances are similar in terms of commercially important

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[57] See Bird (2010). However, he argues that this is not a common occurrence because "Often, practical interests and the desire to classify things by their natural kinds will coincide." (p.129). He also maintains that in such rare cases where these interests conflict, the term cannot be a natural kind term. It either had never been, or it was in the past but with the acceptance of the micro-structurally different substance there must have been a conceptual change and the term must have been demoted from the status of natural kind term. I find this latter point (that such terms cannot be natural kind terms) problematic for reasons primarily expressed in the objections to option y (See Chapter 1).

[58] Ibid., p. 129

[59] Sakikawa Noriyuki, *Jade* (Tokyo: Japan Publications, 1968), p. 35, quoted in La Porte, *Natural Kinds and Conceptual Change*, p. 99.

properties such as coloration range and working technique, which means a lot to collectors and large portions of the society.[60] Taking into consideration the fact that there are a set of differences on the one hand and a set of similarities in the other, and adding to it the knowledge that the prevailing classification accepted both substances as jade suggest that pragmatic interests with respect to jade have trumped epistemic interests in the Chinese society.[61] The moral we should draw from the hypothetical case of 'thrakk' and the historical case of jade is that the domination of pragmatic interests leads to criteria other than scientifically important ones such as chemical composition or genetic make-up. On the other hand, parallel to this, when epistemic interests/concerns trump pragmatic interests, which is almost always the case in today's scientifically dominated societies, the criteria for classification are scientifically important ones, which might as well be called the "underlying structure" or sometimes other scientifically important properties like phylogeny, interbreeding properties, behavior in chemical reactions etc. This is the reason why I argue that interests/concerns greatly influence, if not determine, reference. Similarly, it is not difficult to imagine that if epistemic interests were more dominant than pragmatic interests, for example, if a scientific-oriented community[62] had

[60] Geoffrey Wills, *Jade* (London: Arco Publications, 1964), p. 14, quoted in La Porte 2004, p. 99.

[61] There is also some historical evidence for the presence of strong pragmatic interests. Some examples are that the two substances were quite thoroughly similar and for practical purposes there was no difference between them (La Porte 2004, p. 98; Wills 1964, p.14, quoted in La Porte 2004, p.99). The working technique for both substances was the same. See Ian Hacking ("Natural Kinds, Hidden Structure and Pragmatic Instincts" In *The Philosophy of Hilary Putnam*, Library of Living Philosophers 34 (La Salle: Open Court, 2009, forthcoming), p.14.) and Howard S. Hansford ("Jade and the Kingfisher", *Oriental Art* 1, p. 15, quoted in La Porte, *Natural Kinds and Conceptual Change*, p. 98.), and the emperor who ruled at the time of the introduction of jadeite favored the stuff very much, and unhesitantly granted it the venerable status of being "yu". See Ian Hacking ("The Contingencies of Ambiguity", *Analysis* 67, No. 4 (Fall, 2007), pp. 269–77)

[62] By a scientifically-oriented community, I mean a community just like most modern communities today where science is considered the ultimate decision maker which provides us the most accurate

known a precious stone for thousands of years and then encountered a micro-structurally different but otherwise very similar material like the jadeite, when they had been in a position to name it, they would have probably been more tempted to give it a different name due the stronger influence of epistemic interests, namely, tacit or explicit desires to "carve nature at its joints". Actually, we do not even have to imagine such a possibility because the history of the conception of this material among the scientists' and intellectuals provide a factual example. When Western scientific community discovered that jadeite NaA1(SiO3) was micro-structurally different from the good old nephrite, epistemic interests proved dominant among mineralogists, who tried to restrict the use of the term 'jade' to nephrite.[63] However, the dispositions of the scientific circle did not dominate the larger masses of the English-speaking community and after a period of confusion or vagueness, the term 'jade' came to designate both nephrite and jadeite. La Porte elegantly explains this as follows:

> The inclination to restrict 'jade' to nephrite yielded to the inclination to use it also for jadeite. (...) After some lack of clarity about the proper general use of this term, the inclination to count jadeite "true jade" came to dominate throughout the language. (...) The benefits for communication provided motivation for self-conscious speakers to keep to the newly refined, general use [the one encompassing both substances].

I think it would be fair to interpret the confusion between the two uses of the term as a manifestation of a battle between pragmatic concerns and epistemic concerns; and

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knowledge with respect to the happenings and things around us. In such communities, science is the "authority", i.e., it is the source of unquestioned facts in arguments that do not extremely deviate from common sense. It is the buck stopper when there is conflict. It is the ultimate authority people refer to.

[63] Frederick W. Rudler, "Jade," In *Encyclopedia Britannica* XV, (Edinburgh: Cambridge University Press, 1911); pp. 122-124., quoted in La Porte 2004, p. 99.

the prevalence of the comprehensive use as a manifestation of the prevalence of pragmatic concerns. Ian Hacking's explanation of why the inclination to restrict the use of jade to nephrite failed in the English-speaking community seems to support my view. According to Hacking, this turn of events is by no means a surprise because the principal customers of the jade market controlled by the British were rich Chinese merchants, and this forced the English to adapt to the Chinese interests.[64] According to the needs of the Chinese traders, there was no distinction between nephrite and jadeite, and their term 'yu' (jade) encompassed both substances.[65] Hacking goes on to say "Commerce dictates that the English will resolve their semantic scruples and use 'jade' to mean *yu*, and especially jadeite." Finally, he clearly summarizes his point by saying "*The present meaning of 'jade' in English was determined by business interests, not artistic or mineralogical ones.*[66]

If the reverse had happened and the discourse of mineralogists had influenced the larger population successfully, this turn of events would be taken by causal theorists to confirm the causal theory of reference but the actual reason of such a turn of events would be a prevalence of scientific interests over the interests of craftsmen, merchants etc. Thus, it does not seem *too* bold to say that the present dominance of a certain type of scientific interests in modern academic circles and the authority of scientists and the scientific literature and discourse is the key factor behind the seeming success of the causal theory of reference in explaining cases like water, fish etc.

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[64] Hacking, "Natural Kinds, Hidden Structure and Pragmatic Instincts," p. 15.

[65] Hacking, "The Contingencies of Ambiguity," p.273.

[66] Ibid.,

This line of thinking would contradict with the implications of the causal theory of reference for the so-called natural kind terms in that this theory does not allow natural kind terms to behave as they do in the jade case or in the first scenario of the thrakk case. The causal theory of reference only allows for terms like these if one concedes that they are non-natural kind terms. Even though I think that such a concession would not undermine the importance of introducing interests/concerns as a significant factor influencing reference for certain kind terms even if they are not natural kind terms, I would still like to say that demoting terms from the status of natural kind terms is an *ad hoc* move that causes important problems mentioned in the section on "option y" (see Chapter 2)

Having provided a concrete picture with a view to enable a clear and concrete picture, the present thesis will proceed with the details of the defense of its main claim.

The Defense: Two Types of Interests, a Variety of Referentially Constitutive Properties, a Variety of Influence over Reference

This section includes the defense of the main claim of this thesis, namely that there are two types of interests and these determine referentially constitutive properties in different ways, which in turn influence reference in different ways.
Undoubtedly, communities can have an infinite variety of interests / intentions / concerns with respect to things they find in nature. However, these interests can be grouped into two types, "epistemic interests" and "pragmatic interests" for the purpose of clarity, as the distinction between the two different types of interests

correspond to the difference between epistemic-oriented and pragmatic-oriented sets of cases.

Epistemic Interests

Epistemic interests are, basically, the knowledge oriented interests of the community over the grouping of particulars they find around them. When a community seeks a certain form of knowledge concerning a multitude of particulars, their interests can be relatively similar to those of natural scientists. They may try to reveal unknown properties of the multitudes in question by examining particulars (especially the prototypical particulars, i.e. particulars that are almost indubitably acknowledged as members of the multitude). When people are in this kind of an attitude towards a group of things they find in nature, they would be inclined towards searching for unknown common features among particulars, probably with a view to learn "what they are" more deeply. As the search progresses; the differences between members (esp. paradigmatic members) are disregarded, and more and more specific common features that were once unknown are sought. As it is well known, people organize phenomena under categories according to their common properties and these common properties are the many candidates for uniquely identifying properties of the kind in question. Whichever one of the properties demarcates the particulars (especially the paradigmatic ones, as their membership is not considered dubitable) from other stuff more successfully than other features is a better candidate and is highly likely to be used by the community as a distinguishing property. Even though the distinguishing properties thus arrived at most often change throughout the search

period, we don't give up this method of progressively moving towards more and more specific, sophisticated and "successful" criteria that will hopefully identify uniquely a group of particulars in the best possible way. For example, we move from identifying, say, gold with its more easily observable properties or behavior in chemical reactions to identifying it with its atomic number. This way we attempt to achieve more precise criteria for demarcation. Kripke talks about this process in his discussion of gold by saying that "(...) scientific investigation generally discovers characteristics of gold which are far better than the original set [the set of more superficial properties such as being yellow, conductive etc. that had been used to identify gold before the discovery of the element's atomic structure]".[67]

Also, during such search efforts (that go on for a very long period of time, if not forever), in addition to the possibility of learning about new and more sophisticated, specific properties, there is also the possibility of finding out that some of the features previously associated with a kind are no longer valid for generalization because some particulars that show important resemblances to the prototypical members in other important aspects lack those features. This naturally happens as we move closer to more sophisticated, more precise demarcating properties. The features to be left out, or to be disassociated from the group can be those previously arrived at in an earlier period of the search efforts (e.g. boiling temperature), or they can be superficial, stereotypical properties that have always been obvious to almost everyone (colorless, odorless etc.).

[67] Kripke, p. 138.

Wherever the search takes people (or to be more specific, experts or scientists), the effort here can be singled out as an epistemic effort oriented towards finding out things about the world around us, finding out the shared underlying structure of different groupings of particulars, namely, the supposed "joints of nature" (if and when such a supposition exists). Studies on the classification mechanisms of natural substances of societies in folk biology point to a cross-cultural presence of a presumption that beneath the varieties of particulars, there are underlying structures causing apparent superficial properties.[68] The interests primarily directed to finding out these presumed (though usually unknown and possibly non-existent)[69] underlying essences can be conceptualized as "epistemic interests". When epistemic interests towards some multitude of particulars are dominant (I say dominant because it is not an "all or nothing" issue. Infinitely many interests, both epistemic and pragmatic, are intertwined in as much as the society interacts with a kind), the superficial characteristics of the particulars, and even all the candidate demarcating properties, are not of central importance and are utterly subject to a dismissal from being associated with the kind in the presence of further discoveries. The properties that were once closely associated with membership to the group can become less useful for demarcating the kind in question from other kinds, and therefore experts may decide at any point in time that a property is no longer a uniquely identifying

[68] Susan A. Gelman & Lawrence A. Hirschfeld, "How biological is essentialism?", in Folkbiology, edited by D.L. Medin & S. Atran (Cambridge, MA: MIT Press, 1999), pp. 403-46.; Scott Atran, *Cognitive Foundations of Natural History* (Cambridge: Cambridge University Press, 1990).; Scott Atran, "Classifying nature across cultures." In *Invitation to Cognitive Science: Thinking* 3, 2nd ed. Edited by D. Osherson and E. Smith (Cambridge: MIT Press, 1995), pp. 131-74.

[69] Especially when we think about the communities at the time of the introduction of many terms for natural substances like tiger, water, gold etc., we can say that they did not have such knowledge back then. Also, Even paradigmatic members of a supposed kind may always turn out not to have a common uniform underlying structure, however we want them to do, as both Kripke, Putnam and Soames concede (1980; 1975; 2002).

property of a kind. (just like they decided that living in the sea and having morphological similarities to other fish do not constitute uniquely identifying properties for the kind fish, thus excluding whales and dolphins from the class fish) The latest-discovered, most precise, most sophisticated properties at hand, revealed by the search into the so-called essence of the kind are the only thing that matters when epistemic concerns are dominant. As experts carrying out research gain access to new information concerning the particulars that are thought to be members of a group (esp. the prototypical ones, because their membership to the kind is far less dubitable), they may come across findings that are contradictory to the long held beliefs concerning the particulars (such as dinosaurs turning out to be birds, or such as Pluto turning out to be non-planet). As Kripke's famous example suggest, they might find out facts as radical as tigers may not have "any" of the properties commonly associated with them.[70] As inquiry proceeds, almost all the properties that were once "thought to be known" of the group of particulars in question such as the look, smell etc. of the particulars may turn out to be accidental, or in Kripke's terms "parasitic", that is, completely trivial when demarcation of the group is concerned. A dark colored liquid may be identified as water, a black metal may be identified as gold (actually, gold may come in different colors due to impurities, but this might or

[70] See Kripke (1980, p. 121). Saul Kripke suggests, and most causal theorists confirm that they might even find out that *all* of the properties commonly associated with a group are wrong. Though such a situation probably has never actually been the case, and even though it is very hard to imagine as Wikfross suggests (see chapter 2), it may be possible provided that there are some particulars that are known to be the spatio-temporal continuation of the particulars once identified through the good old common properties. For example, normally, if there is an illusion making us perceive tigers as large, cat-like, black striped etc. animals and if our entire knowledge and experience concerning things we call 'tigers' consist of these mistaken suppositions, we will perceive the animal entirely different when the illusion is later terminated, and we will not consider it "tiger". However, provided that we somehow knew that the entirely different looking animals were the spatio-temporal continuation of the things we had once called 'tigers' (we may have locked them up in an area for the experiment that dispelled the illusion and we may be substantially justified in believing that nothing has got in or out), we would most probably concede that they are still tigers and that our good old beliefs were entirely wrong.

might not be seen as proof of the possibility of the identification of some gold with an impurity-induced coloration as gold, depending on your standpoint with respect to the impurity issue),[71] a fish-like being in the sea can be identified as non-fish (as in whales, dolphins etc.)[72]

In my opinion, all of these can happen not because of the reasons proposed by the causal theory (esp. the term gets anchored to the essence of the particulars in the dubbing ceremony) and that the theory is true, but because of the fact that communities have interests/concerns of a special kind, namely, epistemic interests and these interests influence the determination of reference of terms such that the terms refer to an unknown but supposed-to-exist kind, namely, whatever the kind (defined by a yet unknown hidden essence) certain particulars instantiate. The interest leading to such a referential mechanism is quite similar to what Kripke calls "the supposition that there is one uniform substance or kind in the initial sample".[73] Bird calls such an interest "the desire to classify things by their natural kinds".[74] Such interests make communities attach more importance to properties which are good candidates for an underlying structure (precise specific sophisticated properties such as chemical formula, phylogenetic properties for species etc.). However, I will reserve the details of this competition for the explanation of the search process for underlying essences for another day and concede to the causal theorist the fact that

[71] There is an ongoing discussion in the subject of natural kinds and natural kind terms on how to deal with impurities, i.e. whether to accept impure bulks as the natural kind in question (e.g. whether to accept river as the natural kind water even though it contains more impurities in H2O than a newborn baby does (See Joseph La Porte ("Living Water," *Mind* 107, No. 426 (Spring 1998), pp. 451-55), or whether to accept only completely pure aggregates as a natural kind)

[72] Kripke, p. 138.

[73] Kripke, p. 136.

[74] Bird, p. 129.

the causal theory of reference for natural kind terms can be true for a segment of natural language, namely, in contexts where a community' epistemic interests are dominant. This is almost always the case in the scientific context[75] and at least sometimes the case in other contexts, sometimes even in communities where science is by no means advanced or dominant in the culture.[76]

However, it is important to make one point clear. Even though interests of epistemic sort have overwhelmingly been oriented towards the search of a supposed hidden essence, this is not necessarily so. Especially after the advancements in science within the last few centuries, it is now conceivable that scientists may sometimes fall into situations in which there may be two properties equally legitimate for being candidates for unique identification. Putnam talks of such a case. He informs the reader that all naturally occurring iron on Earth comes with a certain pattern of mixture of different isotopes. Yet he adds that it is possible with advanced technology today that we can manipulate some iron into having a mono-isotopic structure instead of that natural pattern of mixture. In such a case, Putnam argues that these two materials (iron with the natural poly-isotopic pattern and iron with the mono-isotopic structure) can be said to be of the same kind (metal with the atomic number 26, no matter what the isotopic structure is) or of different kinds (the poly-isotopic metal with atomic number 26 and mono-isotopic metal with atomic number 26) depending on our interests.[77] So, it seems we can define iron in two

[75] As the renowned philosopher of science John Dupre maintains: "Scientific classifications, I argue, are driven by specific, if often purely epistemic, purposes (...)". See John Dupre (*Humans and Other Animals* (Oxford: Clarendon, 2002), p. 43.

[76] Gelman & Hirschfeld, "How Biological Is Essentialism?"

[77] Hilary Putnam, "Is Water Necessarily H2O," In *Realism with a Human Face*, edited by James Conant. (Cambridge, MA: Harvard University Press, 1990), p. 68.

ways: a) 26 atomic numbered metal or b) 26 atomic numbered metal with the natural poly-isotopic pattern. These two candidate uniquely identifying properties seem to be equally legitimate. Also, in biology, such cases are abundant since different methods of classification are present (even though the phylogenetic taxonomy currently seems the most dominant one) Also, La Porte talks of such a case. In the case of the kind "bear", the concept can be defined in two different ways, which would change the status of panda, making it a bear or non-bear depending on whether you take evolutionary history or morphological and functional similarities/differences as the criterion.[78] One way is suitable for cladistic classification (classification based on evolutionary history), and the other is suitable for taxonomic classification (classification based on similarities and differences).[79] Another author mentioning such a case is Friedrich Waismann. In his insightful book *How I See Philosophy*, he talks about a counterfactual case where a substance which has all the properties of gold except for emitting a different sort of radiation.[80] In such a case, would not it be equally legitimate to define gold as the element with the atomic number 79 (thus including the new substance in its extension) or define it as the 79 atomic numbered element which emits a certain kind of radiation (thus excluding the new substance in its extension since the new substance emits a different kind of radiation).

In such cases where it is not clear and straightforward as cases like gold which property or properties to take as uniquely identifying properties, specific epistemic

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[78] La Porte, *Natural Kinds and Conceptual Change*, pp. 83-4.

[79] Verne Grant, "Incongruence between cladistic and taxonomic systems," *American Journal of Botany* 90, No. 9 1263-1270.

[80] Frederick Waismann, *How I See Philosophy* (London: Macmillan, 1968), p. 96.

concerns directed towards the more general and somehow vague[81] epistemic concern of "revealing the underlying essence" becomes more and more visible. These epistemic interests include concerns such as simplification,[82] finding as precise criteria as possible, the principles of no-overlap, exhaustion/tidiness and inclusion,[83] not deviating too much from ordinary concepts (as clearly exemplified in the Pluto case[84] and the lizard case),[85] neatness etc. Faced with a need to choose between more

[81] to the extent that the notion of underlying essence is vague, as shown by the previous examples of iron and bear.

[82] La Porte, p.74.

[83] The overlapping principle reflects the concern that no two hierarchically equal class should have a common member. For example, a species can't belong to two genera, a celestial body cannot be both a star and a planet, an atom cannot be an instantiation of two elements. The exhaustion principle reflects the concern that a hierarchically superior kind should leave any residue and exhaust the totality of particulars belonging to any one of its subordinate kinds. For example, astronomers in the 16th century were concerned about classifying any celestial body under one of the two recognized superordinate kinds: stars or planets. The importance of the concerns related to exhaustion is also underlined by La Porte. Under the name "tidiness", he talks about a concern of scientists in classification which is the same as the concern for the exhaustion principle. He explains the concern as an insistence that every organism must belong to some species or other (La Porte, 2004, p. 74). He gives the example of the substantial criticism towards classifications based on reproductive units. These criticisms were made because reproduction based classification leaves asexual species in the open. Finally, the inclusion principle reflects the concern that the identifying properties of a hierarchically superior kind should be present in all the particulars that are members of a subordinate kind. For example no star could be classified as non-celestial object since star was a sub-category of celestial objects. These principles are considered crucial. See Hanne Andersen, Peter Barker And Xiang Chen (*The Cognitive Structure of Scientific Revolutions* (Cambridge: Cambridge University Press, 2006), pp. 67-68.)

[84] The most interesting one of the cases where such specific epistemic concerns become quite visible was probably the case of the kind "planet". As it is widely known now, there turned out to be a discussion over the two equally legitimate ways of defining "planet" due to the knowledge gained through the research on the now famous underdog Pluto. As our knowledge about Pluto and other celestial bodies increased, we learned that the long held definition of planet led to the irritating conclusion that there are too many planets. My opinion is that scientists did not want to diverge from the ordinary conception of planet too much by acknowledging so many planets. They may also have wanted to avoid a great complexity when hordes of celestial objects would enter the category of planet (simplicity concern). In the IAU press release (see International Astronomical Union. 16 August 2006 "The IAU Draft Definition of 'Planet' and 'Plutons'." Available [online]: http://www.iau.org/public_press/news/detail/iau0601/ [22 June 2013], president Ron Ekers explained the rationale behind the decision as refining the concept of planet such that it conveys more This seems like just another concern of the epistemic type.

[85] The lizard case is very similar to the Pluto case. If the closest monophyletic group was set as the definition of the category of lizard, then snakes would have to be counted among lizards, since the monophyletic group includes snakes as well. When confronted with such a situation, scientists

than one equally legitimate alternative, the scientific community would go on to use the term in such a way that it would reveal which specific epistemic concerns were dominant among the experts who were to make the decision. For example, if the inclusion concern were dominant, the new metal substance would be classified under the category of elements since metal is a subordinate category to element. Having been classified under the category of elements, what "mattered" would be its atomic number. Hence there is the absorption of the new substance into the kind gold. Also, a concern for the exhaustion principle would also tempt us to include the new substance in the kind gold because otherwise the category of elements would leave the new substance as residue. All these examples were an attempt to show that interests of the epistemic type are not limited to the general concern of trying to reveal the unknown internal structure of natural substances.

These cases show us that even within the context of epistemic concerns; different concerns can lead to different conceptions about a kind term, which determine the reference of the term in a different way (thus assigning different extensions to the same term). The criterion for identification can be taken to be different kinds of properties. This is an important point to prevent the objection that extra-scientific concerns such as the jeweler's concerns in the jade case make a kind term a non-natural kind term. Taking something other than underlying structure as a criterion for demarcating "natural" kinds is possible even within the natural science community.[86] Also, there might be more than one relevant underlying structure

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decided not to deviate so radically from ordinary language and left the category of lizard to ordinary language (La Porte, 2004, p. 69)

[86] Two important examples are acid and *aqua regis*. For acid, there had been a centuries long controversy among scientists on whether to use one definition or another. Some proposed definitions

(atomic number vs. atomic number with a certain isotope pattern, as seen in the aforementioned gold and iron cases. This shows that different demarcation criteria do not prove kinds to be "non-natural", if one is not tempted to go far enough to argue that scientists are dealing with artificial kinds. Moreover, even when we agree that underlying structure should be the criterion, which underlying criterion is to be used for unique identification remains to be an open question to be solved by the interests of scientists (Just like in Putnam's iron case,[87] La Porte's bear case and Waisman's gold case), a question to be wholly or partially resolved through specification based on certain interests.

So much for epistemic interests now. On the other hand, what about the domain that remains outside this segment? What about the contexts in which epistemic interests are not dominant? For example, what about our societies before the advent of science and establishment of its authority, or what about terms introduced without epistemic concerns. I will classify such contexts as contexts in which pragmatic interests are dominant. The following section will explicate what I mean by pragmatic interests. This is especially important in that it shows how significantly specific interests influence reference.

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appealed to molecular structure while others appealed to sets of phenomenological properties like taste, corrosiveness etc. The debate seems to be resolved but in a disappointing manner. Definitions appealing to molecular structure won, however, now there are three distinct molecular structures, thus three distinct types of acids. See P. Kyle Stanford & Philip Kitcher ("Refining the Causal Theory of Reference for Natural Kind Terms" *Philosophical Studies* 97, No. 1 (Winter 2000), pp. 99-129) Maybe this is too much of a deviation from the original concept of acid.

[87] In Fact, Putnam explicitly states that in the iron case which direction to be taken is totally dependent on our interests (Putnam 1990, 68).

Pragmatic Interests

Unlike the aforementioned "scientific" or "proto-scientific" attitude towards things we find around us, our attitude towards the external world is often use-oriented. We tend to classify things based on aspects in which they are of use for us. The relationship between us and the basic materials around us such as the plants and animals we depend on is a dominantly pragmatic one. These materials are most of the time our tools rather than study objects into which we persistently inquire. Their internal structures, chemical compositions, evolutionary origins etc. are of secondary importance, if they are of any importance at all. Especially when the early history of languages is concerned, or even when the languages of contemporary tribal communities are concerned, we can hardly ever -if at all- mention epistemic interests being dominant, or maybe even present. For our ancestors probably up to the antiquity or so on, it is highly unlikely that "the supposition that there is one uniform substance",[88] a desire to reveal the joints of nature, or "a desire to classify things by their natural kinds"[89] were present quite often. Anthropological studies in folk classification of natural stuff and beings support this claim and suggest that there is an important pragmatic aspect to folk classification. A survey of ethno-biological literature on the issue suggests that two of the most common and dominant parameters in folk-biological classification are a) distinguishing classes based on morphological-perceptual differences and b) distinguishing classes based on utilitarian considerations. Many ethno-biologists favor one parameter over the other,

[88] Kripke, p. 136.

[89] Bird, p. 129.

both sides provide comprehensive data in favor of one. As one author perfectly summarizes:

> Ethnobiology is the study of how humans understand and make use of their natural environment and its resources. A central question is whether the folk understanding of nature is driven by intellectual curiosity or by practical need. On one side, authors such as Levi-Strauss and Berlin see folk classifiers as innate natural historians who seek to understand nature for its own sake, discriminating classes of organisms based on readily observable morphological features (Levi- Strauss 1966; Berlin 1973; 1992; cf. Boster and Johnson 1989). In contrast, authors such as Hunn (1982) argue that the folk impulse to classify biological kinds is driven by practical rather than intellectual considerations, and that the utilitarian features of organisms (those most directly affecting the use of the plant or animal) are of primary interest to folk classifiers.[90]

Undoubtedly, in discussions on the philosophy of language, we are in no position to settle this debate. Both sides seem to be successful in explaining their own choice of cases. The lesson I draw from this debate in ethno-biological research and from the evidence provided in favor of both parameters is rather that it is a historical fact that human societies base their classification of things they find in nature primarily on morphological differences and utilitarian significances – which classification method is more dominant is not my concern, the possibility of them is the important thing for settling a possible controversy on the existence of pragmatic concerns'[91] influence on the reference of kind terms. Now we can safely say that scientific

[90] Asha C. Srinivasan Shipman & James Shilts Boster, "Recall, Similarity Judgment, and Identification of Trees: A Comparison of Experts and Novices," *Ethos* 36, No. 2 (Summer, 2008), p. 171.

[91] A clarification is necessary here. I consider the aforementioned morphological parameter for folk classification (that is, the disposition to classify natural substances based on their macro-structural-perceptual properties) as indicative of pragmatic interests. In other words, the concerns for classifying natural substances based on these two parameters are equally pragmatic concerns. One can also plausibly argue that the concerns that motivate a morphological classification should be considered as epistemic concerns. I would concede that this *can* be the case. However, not every morphological classification is indicative of a desire to carve nature at its joints as Henry Bates' case clearly shows. Thus, morphological classification should also be regarded as driven by pragmatic concerns as long as the society does not show a disposition to gradually specify and narrow down the identifying properties.

research suggests that it is possible for practical concerns to influence the classification of natural substances.

When pragmatic interests are dominant, some of the properties commonly associated with the kind are considered important for the community for such a classification. They are an important source of the motivation behind the creation of such a class. In contexts where pragmatic concerns are dominant, the properties that cause the motivation for the community to name the kind are necessarily within the realm of the community's knowledge. Certain properties that can be observed at a certain point of time delineate the boundaries of the characteristics that are considered crucial for the membership of a kind. These properties are usually the common properties associated with membership to the group. (Like the redness of ruby, being half human women in mermaids etc. See Chapter 2) The more precise, more sophisticated properties that may be result of any close examination of the members of the multitude are partly or completely irrelevant. They are merely additional information about the group. And more importantly, these sophisticated properties cannot rise into the status of the referentially constitutive properties unless the epistemic interests start to dominate and move pragmatic interests towards the periphery. To put it in a more concrete way; under the dominance of pragmatic interests, a micro-structural property cannot become the defining property of a kind that is significant for the community predominantly for its use. This is what happened in the case of jade, and also what the naturalist Henry Bates went through when he tried to convince local people about the distinctness of hummingbird hawk moths and hummingbirds which looked quite similar. Even though Bates told the

locals that the two birds come from a different lineage, they were not at all interested.[92]

Chapter Conclusion

There is a need for a uniform explanation of the discrepancy between two kinds of cases. Many causal theorists try to close this gap by presenting the category "natural kind terms" as a quite narrow category that excludes terms such as jade (terms that are coined and used in predominantly pragmatic contexts) from natural kind terms. If the terms in the set of cases that cause problems for the causal theory are denied to be natural kind terms, then the causal theory can be considered as adequately explaining "all" cases of natural kind terms. However, such a move entails many problems. These problems are sketched out in the previous chapter, on the section concerning what I called objection y (See Chapter 2).

The difference between the two set of cases here results from the difference between conceptions of "being the same kind as something else". Conceptions of being the same kind depend on the community's interests over the particulars in question. With what one may call "epistemic interests", being a member of the same kind most of the time means having exactly the same relevant underlying properties, and in some cases having exactly the same relevant functions, effects on other substances etc. (such as acid). If our concern/interest in demarcating phenomena is a natural science oriented one, we tend to distinguish between kinds in terms of their underlying traits or certain functions, reactions etc. because such categorizations

[92] Henry W. Bates, *The Naturalist on the River Amazons* (New York: E.P. Dutton & Co, 1910), p. 102, quoted in La Porte (2004, p. 44).

help us understand how the external world works, in a better way than the categorization of a jeweler. Stuff sharing the same underlying structure almost always behave the same, freeze and melt at similar temperatures under similar conditions, chemically react similarly, transmit heat, electricity etc. in a similar fashion and so on and so forth. However, absent such scientific concerns like understanding the internal composition and thus causal powers of a substance there is no need for a shared underlying structure or another micro-structural criterion for two materials to be of the same kind. Provided that a number of particulars share a certain significance, they might be easily grouped together and named by communities and the kind thus established (or its instances or the set of its instances depending on one's position with regard to the reference of general terms) is the legitimate referent of the kind term. Moreover, even within scientific concerns there is a variety. Even when we have epistemic interests, it is open to question which scientific concerns will be dominant. Criteria other than microstructure are possible. Two most dominant conceptions of species, i.e. classifying species based on interbreeding units and based on phylogeny both suggest that criteria for belonging to a species are by no means micro-structural.[93]

In short, no matter what kind of an animal it is that a "natural kind term" refers to (an extension set, an abstract object called "kind X", a concept etc.) or however they refer to their referents (descriptionally, directly, causal-historically etc.) interests/concerns of the community partly determines what properties are valid for demarcation of the kind in question, or in other words, what the criteria for being

[93] La Porte, p. 72.

counted as a member of a kind are, and therefore, what the referential/extensional range of the kind term is.[94]

Basically, the way they do so is through referentially constitutive properties/descriptions (see Chapter 2). As a result of certain human interests/concerns over a multitude of particulars, certain properties are prioritized in the categorization effort, they become what I call referentially constitutive properties, because their presence affects, at least to some extent, what the kind term in question refers to and which particulars are to be considered the instantiations of a kind.

The second chapter includes quite a few examples of referentially constitutive properties/descriptions. (Red for ruby, shining in a certain way or being extracted naturally[95] etc. for diamond.) Also Ian Hacking talks about certain special properties, which I think can be interpreted as referentially constitutive. He talks about jade's property that "it can be worked by abrasion (not by carving) into exquisite shapes". He claims this property to be "the *property of interest* that leads to *yu* [jade] being used as the name of both minerals [in China]"[96] (my emphasis). Another author talks about "commercially important properties" such as color range and suitable working techniques that mean a lot to collectors and large portions of

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[95] Leslie talks about an important distinction made by the society between natural and synthetic diamonds. Synthetic diamonds show none of the usual flaws in diamond, and therefore have different manifest properties from natural diamond. Even though they share the same microstructure, people distinguish between them and call artificial diamond fake, imitation etc. See Sarah-Jane Leslie ("Essence and Natural Kinds: When Science Meets Preschooler Intuition," In *Oxford Studies in Epistemology* 4, edited by Tamar S. Gendler and John Lawthorne (Oxford: Oxford University Press, 2007), pp. 164-5) Most probably, this would be the case if we synthetically produced gold. As gold is one of the paradigm cases of discussion concerning natural kind terms, there should be less doubt that 'jade' or 'diamond' are not worthy of being natural kind terms.

[96] Hacking, "Natural Kinds, Hidden Structure and Pragmatic Instincts", p. 14.

the society.[97] Alexander Bird mentions properties that make a substance useful for a distinct purpose.[98] Such special properties, (such as having the color range X, being suitable for being worked by technique Y for the kind jade), or at least some of them, must be referentially constitutive for the kind *yu* in the Chinese community because their presence clearly affects, at least to some extent, which particulars are to be considered jade.

There are infinitely many examples which show that different interests can lead to different special properties (which I would call referentially constitutive, but those who are not comfortable with this conceptualization can stick to Hacking's concept of "property of interest" or simply "important property")[99]. Jade was the first and probably the most flamboyant one. On the on hand, aesthetic, technical etc. interests of the Chinese on this substance were focused on properties like color range, working technique etc., thus making these properties referentially constitutive and in turn influencing the determination of the reference of '*yu*' by enabling jadeite to be counted as *yu*. On the other hand, the scientific, taxonomic, micro-structural etc. interests of Western mineralogists were focused on chemical composition, thus making this property referentially constitutive (not also that but also the uniquely identifying property of jade) and in turn influencing the determination of the reference of 'jade' by denying jadeite to be counted as jade. As we can see here, the

[97] La Porte, p. 99.

[98] Bird, p. 129.

[99] Of course, "important property" is a quite vague notion. It can be used to mean many things including but not limited to a) properties commonly associated with a kind (like Putnam's stereotypes), b) identifying properties, or more strictly c) uniquely identifying properties etc. Putnam uses the phrase "important properties" in a very remarkable and radical way. According to him, important properties are the structurally important properties that specify the composition of the substances in question. (Putnam 1975, p. 239)

interests of linguistic communities play a very important role in specifying reference, i.e. what type of a kind these kind terms shall refer to, what the criterion for membership shall be, and accordingly, what type of particulars shall be counted as members.

For example, a primitive society, which has no concern whatsoever over the tiny, unseen particles that make up stuff, names the thirst quenching, life replenishing, cleansing, colorless etc. liquid they see around them 'water', what the term would refer to would not be H2O or whatever kind of chemical composition it is that exists during the naming act. Instead they would be simply calling the liquid which has certain functions and which happens to be at certain locations 'water', and there is no plausible universe in which one can persuade such people that some of what they call 'water' may not be water because of having a different chemical composition (imagine a scenario in which some Putnamian XYZ is placed on earth and happily consumed by these people without any different effects on life). Our community's scientific concerns today are by no means universal. Neither the Kripkean "supposition that there is one uniform substance or kind",[100] nor any kind of presumed disposition to revise the demarcating criteria for a kind as per scientific classification, nor any expected disappointment when two or more types of substance turns out to be named by the supposedly natural term is a cross-cultural fact. (Henry Bates' case is a concrete example to that). Today, we defer to natural science experts on the issue of which substance is which, and how their nature is to be conceived and conceptualized even though their concerns are most of the time different from ours. This is because science has a certain authority in contemporary

[100] Kripke, p. 136.

Western culture. However not every society today and obviously not every society before the rule of science in social life could have been like this. And most probably, in the past, we were just like the locals Henry Bates could not convince. Or at least, we could have been like them in the past, or even now, had social contingencies of history been different. And the crucial point here is that the possibility of having been like them seems to refute the idea that we were wrong when we did things like calling dolphins or whales fish. This is because we have no evidence that these terms were introduced with dominantly epistemic interests as opposed to pragmatic interests. However, now that epistemic interests dominate our culture, such terms can be said to have undergone a conceptual change even if they had not been introduced to the language with dominantly scientific concerns. Our interests always continue to determine referentially constitutive properties, thus affecting reference (as the interplay between the Chinese and Western mineralogists show).

CHAPTER 4

CONCLUSION

There are various types of general terms in language, and the so-called “natural kind terms” are by far the most popular one. This is not surprising. We value so highly the concept of a “natural kind”, and this is quite *natural* in a world fascinated by scientific achievements and the knowledge it provides on the external world surrounding us, constituting the very setting in which we live by. Driven by the motivation to read and understand “the book of nature” (sometimes with a view to control and utilize it, sometimes because of the curiosity or even the awe in which we often are, in the face of the vastness and richness of external stimulation), and motivated by an interest in the underlying reality beneath appearances, we seem to have quite a load of metaphysical expectations from natural kinds - which quite often seem to be met.

In the heat of such enthusiasm, two of the most prominent figures in the philosophy of language, Kripke and Putnam have attributed such a concern for underlying structures of nature to all cultures. Their causal-historical theory -or “picture” as Kripke calls it- of reference for the so-called natural kind terms such as water, tiger, gold etc. seems to be predicated on the assumption that these terms are introduced in the language with the intention to refer to, or at least with the supposition that one refers to, whatever natural kind that is defined by the hidden

structure beneath the observed samples of stuff in nature.[102] This attribution also seems to be indirectly supported by science. Studies in various fields ranging from cognitive psychology to anthropology suggest that people from various cultures as well as various age groups including young children have a disposition to have significant awareness with respect to underlying structures responsible for apparent properties, and that they give priority to underlying structures.[103] So, assuming that our naming practices with respect to natural stuff are dominated by such strong dispositions that seem universal for humans seems more plausible in the light of such scientific evidence. After all, if humans have such a drive towards underlying structures, it would be much less visionary to argue that they give these names to *natural kinds*[104], without the need to know these so-called essences.

However, the boundless variation of folk taxonomy across different cultures and the role of the tendency to make utilitarian classifications of nature in many -if not all- societies (for only a few among many examples of such cultures and the variety of classification across cultures)[105] suggest that the aforementioned disposition towards underlying kinds of stuff is not the complete picture. Much as the prospect of an underlying reality causing more apparent phenomena seems to

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[102] Kripke, p. 121 and 136; Putnam, *Mind, Language and Reality*.

[103] See Gelman & Hirschfeld (1999), Atran (1990; 1995) and Leslie (2007) for a perfectly clear and comprehensive sketch

[104] Here it may be crucial to remember that I use the term *natural kind* in the sense that I've described in the first footnote of the preface.

[105] See Eugene Hunn (*Tzeltal Folk* Zoology: *The Classification of Discontinuities in Nature* (New York: Academic Press, 1977); "Sahaptin Fish Classification" *Northwest Anthropological Research Notes* 14, No. 1 (Spring 1980), pp. 1-19; "The Utilitarian Factor in Folk Biological Classification" *American Anthropologist* 84, No. 4 (Winter 1982), pp. 830-47); Terence Hays ("Mauna: Explorations in Ndumba Ethnobotany (PhD diss., University of Washington, 1974) ; "Utilitarian/Adaptationist Explanations of Folk Biological Classification: Some Cautionary Notes," *Journal of Ethnobiology* 2, (Winter 1982), pp.89-94) and Walter Hough ("The Hopi In Relation To Their Plant Environment," *American Anthropologist* A10, No. 2 (Winter 1897), pp. 33-47.)

draw the attention of humans universally, there are also other things that we attach importance to in our relationships with the stuff around us. These do not necessarily have to be hidden. Quite often and quite naturally, needless to say, we attach much importance to apparent features of our environment. Most of the time, things around us are important for us due to a certain use, they have a certain "significance". In some of such cases, we might as well have named *ordinary-kinds-grouping-the-natural-stuff-around-us*[106] rather than *natural kinds*. Much as we could desire to refer to a group of particulars that we believe to share a uniform underlying structure, we could also desire to refer to a group of particulars that share a common significance for us, and it is not easy to find out which type of kind we named all those years ago when these terms were introduced in the language. (The case of lizard (See p. 56 fn. 85 in this thesis) is very illuminating in this respect.) This seems to make it groundless to assume that terms like water, tiger, gold etc. were given as names to *natural kinds* from the very onset.

Thought experiments in which we (a linguistic community) *would* prefer to "correct" ourselves according to discoveries of underlying structures by giving up applying these terms to nearly-same things (like xyz) which lack only the relevant underlying structure (just like in the famous twin-earth thought experiment) and real cases like poly-water[107] in which we allegedly *did* prefer to call a quite differently characterized substance 'water' seem to support the idea that we had named *natural kinds*. After all, if we are ready to give up all the properties apart from the

[106] just like vovetas. See page 36 in this thesis.

[107] Polywater is a substance that is said to be very different from the water around us in many respects. But it is said to be water anyway, probably because it is H2O. Kripke very briefly mentions this in support of his views. (1980, p.129)

underlying structure as the decision-maker of which particulars we could accept to label under the kind term in question, then the supposition that these terms name *natural kinds* defined by underlying structure is quite plausible.

Nevertheless, to the extent that the causal theorists' claims extend to the distant past or to other cultures, they become problematic. What *we would say* or *do say* in this day and age may be different from what *others would have said* or *did say* in the past. Underlying structures can be very important *for us today*, but they may not be so for other cultures and they may not have been so to *other communities in the past*. It is perfectly possible that, say, a Central Asian nomadic community in the ancient times would not care about the microstructure of what they call water, and therefore they would not revise their taxonomy. They are entitled to stick to their original classification in the presence of micro-structural discoveries (just like the Chinese did with jade) which could suggest that they have not named a *natural kind* but an ordinary kind for natural stuff around them. And this is not a possibility only for different cultures. Our own linguistic communities might have used language in the same way in their relationship with at least some of the stuff they saw around them. So, saying that terms like 'water', 'tiger', 'gold' etc. referred to *natural kinds* all through their history seems groundless. It is quite possible that as our interests change and epistemic interests dominate with the power of science and scientific culture, the semantic reference of our terms are modified as per these new interests to the extent that scientists dominate the discourse on these terms. I believe that interests in different kinds of properties (underlying structure, reproduction method, interbreeding capability, tail shape, level of aggressiveness, patterns of motion, color, mass number, evolutionary history, chemical reactions etc.) can make an

important difference that leads to the discrepancy concerning the use of the very terms between our community today and our ancestors' community in the past.

So, against causal theorists' unconditional attribution of a supposition that natural stuff come in secret joints to be carved and revealed to "any" naming practice concerning the so-called natural kind terms like 'water', 'tiger', 'gold' etc., I advice caution and context sensitivity. To be more specific, it seems quite plausible to argue that within a certain cultural context, the interest of the linguistic community in some property of a group of particulars *can* make people use a term *exclusively* for things having that property, in spite of any new information concerning the underlying structure of that and similar substances. For example, the interest in the redness of corundum stones can be –and I think is– the reason why people use the term ruby *only* for red versions of corundum stones, leaving other colored versions of corundum outside the extensional range of the term despite the fact that they are the same in terms of chemical composition.

Therefore, I find it important for a theory of naming to allow the possibility that in certain contexts linguistic communities might be preoccupied more with the manifest properties of stuff like gold, ruby, water etc. when compared to properties like chemical or genetic structure. I think it is quite possible and even plausible that our ancestors were preoccupied more with manifest properties of certain substances in nature and would not have cared so much about differences of microstructure *for itself* (as long as it does not affect manifest properties). Communities group their environment and give names to these groups based primarily on various sorts of interests in the cultural background. Depending on the characteristics of these interests, they can presuppose the existence of certain joints of nature and attempt to

name *natural kinds*, or they can just make an ordinary grouping of certain stones, liquids, metals etc.

With all these concerns, the main task of the present thesis has been to indicate a problem of the most dominant theory in the literature, namely the causal theory of reference, in recognizing the possibility that properties other than underlying essences can play a role in the determination of reference for the so-called natural kind terms. These other properties can be other scientifically important properties such as conductivity, boiling points, behavior in chemical reactions etc. (as in the cases of acid or *aqua regis* see p. 57, fn. 86 in this thesis) or they can be the manifest, commonly associated properties such as color, malleability, patterns of shapes or behavior, working technique required, etc. (as in the cases of jade, ruby, lily, diamond, planet etc.). The second chapter conceptualizes such properties as referentially constitutive in that they play a role in the way the referents are determined for the so-called natural kind terms. After the attempt to establish the possibility of such properties playing a role in the determination of reference for terms like jade, lily, diamond etc. in the second chapter, the third chapter tries to transfer this *possibility* to all so-called natural kind terms including water, tiger, gold etc. in at least some period in history. Also, it tries to explain why properties other than the supposed underlying structure manage to be referentially constitutive in some cases (jade, ruby, lily etc.) while in some cases (gold, water etc.) the underlying essence is the one and only referentially constitutive property,[108] which

[108] Of course, in such cases the underlying structure is not only referentially constitutive but also uniquely identifying. While a referentially constitutive property is one whose presence or absence merely plays a role in the determination of whether something is a member of a kind, a uniquely identifying property is one whose presence is sufficient for something to be a member of a kind and whose absence is sufficient for something to fail to be a member of that kind.

cases seem to support the causal theory of reference. The attempted explanation for this is the difference in the interests/concerns of a linguistic community over the particulars it attempts to group.[109]

Pointing out to special properties playing an important role in the determination of reference for the so-called natural kind terms and scrutinizing how interests/concerns in a culture are determinants of such properties can be very important in understanding how so-called natural kind terms refer. Also, the insights gained from such an investigation and from recognizing the role of human interests/concerns can be very helpful or even illuminating in future studies concerning the referential mechanisms of other kind terms, because the implications of the study on terms coined with interests other than a special one of epistemic interests directly extends to other kind terms, such as artifact terms (chair, table etc.) and social kind terms (marriage, state etc.).

[109] If the community intends to group the particulars with a tacit or explicit interest in carving nature at its joints, then the only referentially constitutive property is having a certain underlying structure. And if the community intends to group the particulars with a tacit or explicit interest in naming a group of things that have a certain practical significance for them, then it is possible for any property, no matter how manifest or sophisticated it is (from colour to behavior in chemical reactions), to be a referentially constitutive property.

BIBLIOGRAPHY

Achinstein, Peter. *Concepts of Science.* Baltimore: Johns Hopkins University Press, 1968.

Andersen, Hanne, Barker Peter, and Chen Xiang. *The Cognitive Structure of Scientific Revolutions.* Cambridge: Cambridge University Press, 2006.

Atran Scott. *Cognitive Foundations of Natural History.* Cambridge: Cambridge University Press, 1990.

Atran, Scott. "Classifying nature across cultures." In *Invitation to Cognitive Science: Thinking* 3, 2nd ed., edited by D. Osherson & E. Smith, 131-174. Cambridge: MIT Press, 1995.

Barnett, David. "Is Water Necessarily Identical to H2O." *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 98, No.1 (2000): pp. 37-56.

Bates, Henry W. *The Naturalist on the River Amazons* New York: E.P. Dutton & Co, 1910.

Ben-Yami, Hanoch. "The semantics of kind terms." *Philosophical Studies* 102, No. 2 (2001): 155-184.

Berlin, Brent. "Folk Systematics in Relation to Biological Classifications and Nomenclature."*Annual Review of Ecology and Systematics* 4, (1973): 259-271.

Bird, Alexander "Discovering the Essences of Natural Kinds." In *The Semantics and Metaphysics of Natural Kinds*, edited by Helen Beebee & Nigel Sabbarton-Leary, 125-136. New York: Routledge, 2010.

Brakel, Jaap V. "Meaning, Prototypes and the Future of Congnitive Science." *Minds and Machines* 1 (1991): 233-257.

Brakel, Jaap V. "Peirce's Natural Kinds." In *Peirce. C.S. Peirce: Categories to Constantinople: Proceedings of the International Symposium on Peirce,* edited by Jaap V. Brakel and Michael Van Heerden, 31-46. Leuven: University of Leuven Press, 1998.

Boster, James S. and Johnson, Jeffrey C. “Form or Function: A Comparison of Expert and Novice Judgments of Similarity Among Fish.” *American Anthropologist* 91, No. 4, (1989): 866-889.

Contessa, Gabriele. “There Are Kinds and Kinds of Kinds: Ben-Yami on the Semantics of Kind Terms.” *Philosophical Studies* 136, No. 2 (2007): pp. 217-248.

Cumminskey, David. “Reference Failure and Scientific Realism: A Response to the Meta-induction.” *British Journal for Philosophy of Science* 43, No.1 (1992): pp. 21-40.

Dupré, John. *Humans and Other Animals.* Oxford: Clarendon, 2002.

Dupré, John “Natural Kinds and Biological Taxa.” *Philosophical Review* 90, No.1 (1981): pp. 66-90.

Gelman, Susan A. and Hirschfeld, Lawrence A. “How biological is essentialism?” In *Folkbiology*, edited by D.L. Medin & S. Atran, 403-446. Cambridge, MA: MIT Press, 1999.

Grant, Verne. “Incongruence between cladistic and taxonomic systems.” *American Journal of Botany* 90, No.9 (2003): 1263-1270.

Gump, Richard. *Jade: Stone of Heaven*. Garden City, N.Y: Doubleday, 1962.

Hacking, Ian. “Natural Kinds, Hidden Structure and Pragmatic Instincts” In *The Philosophy of Hilary Putnam*, Library of Living Philosophers 34 LaSalle: Open Court, forthcoming.

Hacking, Ian. “The Contingencies of Ambiguity.” *Analysis* 67, No. 4 (2007): 269–277.

Hansford, Howard S. “Jade and the Kingfisher.” *Oriental Art* 1, 1948: 12-17

Häggqvist, Soren and Wikforss, Åsa M. "Externalism and a posteriori semantics." *Erkenntnis* 67 (2007): 373-386.

Hays, Terence. “Mauna: Explorations in Ndumba Ethnobotany.” PhD diss., University of Washington, 1974.

Hays, Terence. “Utilitarian/Adaptationist Explanations of Folk Biological Classification: Some Cautionary Notes.” *Journal of Ethnobiology* 2 (1982): 89-94

Hough, Walter. “The Hopi In Relation To Their Plant Environment.” *American Anthropologist* A10, No.2 (1897): 33-47.

Hunn, Eugene. “The Utilitarian Factor in Folk Biological Classification.” *American Anthropologist* 84, No. 4 (1982): 830-847.

Hunn, Eugene. *Tzeltal Folk* Zoology: *The Classification of Discontinuities in Nature.* New York: Academic Press, 1977.

Hunn, Eugene. “Sahaptin Fish Classification.” *Northwest Anthropological Research Notes* 14, No. 1 (1980): 1-19.

Kelley, David H., Milone, Eugene F. and Aveni, Anthony F. *Exploring Ancient Skies: A Survey of Ancient and Cultural Astronomy.* New York: Springer, 2011.

Kripke, Saul A. *Naming and Necessity.* Cambridge, Mass.: Harvard University Press, 1980.

International Astronomical Union. 16 August 2006 “The IAU Draft Definition of ‘Planet’ and ‘Plutons’.” Available [online]: http://www.iau.org/public_press/news/detail/iau0601/ [22 June 2013].

International Astronomical Union. “Pluto and the Developing Landscape of Our Solar System.” Available [online]: http://www.iau.org/public/themes/pluto/ [22 June 2013]

La Porte, Joseph. “Living Water.” *Mind* 107 No. 426, (1998), 451-455.

La Porte, Joseph. *Natural Kinds and Conceptual Change.* Cambridge: Cambridge University Press, 2004.

Leary, Nigel. “Natural Kinds: (Thick) Essentialism or Promiscuous Realism?” *Philosophical Writings* 34 (Spring 2007): 5-13.

Leslie, Sarah-Jane. “Essence and Natural Kinds: When Science Meets Preschooler Intuition.” In *Oxford Studies in Epistemology* 4, edited by Tamar S. Gendler and John Lawthorne, 108-165. Oxford: OUP, 2007.

Merriam-Webster Online Dictionary, s.v. “Planet,” accessed June 22, 2013, http://www.merriam-webster.com/dictionary/planet.

Noriyuki Sakikawa. *Jade.* Tokyo: Japan Publications, 1968.

Putnam, Hilary. *Mind, Language, and Reality.* New York: Cambridge University Press, 1975.

Rudler, Frederick W. "Jade." In *Encyclopaedia Britannica* XV, 122-124. Edinburgh: Cambridge University Press, 1911.

Nathan Salmon, "How not to Derive Essentialism from the Theory of Reference," The Journal of Philosophy 76, No. 12 (Winter, 1979), pp. 703-725.

Salmon, Nathan. *Reference and Essence.* Princeton: Princeton University Press, 1980.

Shipman, Asha C. Srinivasan and Boster, James Shilts. "Recall, Similarity Judgment, and Identification of Trees: A Comparison of Experts and Novices." *Ethos* 36, No.2 (2008): 171-193.

Soames, Scott. *Beyond Rigidity: The Unfinished Semantic Agenda of Naming and Necessity.* Oxford: Oxford University Press, 2002.

Stanford, P. Kyle and Kitcher, P. "Refining the Causal Theory of Reference for Natural Kind Terms" *Philosophical Studies* 97, No.1 (2000): 99-129.

Strauss, Claude. *The savage mind*. Chicago: University of Chicago Press, 1966.

Waismann, Frederick. *How I See Philosophy.* London: Macmillan, 1968.

Ward, Fred and Ward, Charlotte. *Jade*. Bethesda, Md.: Gem Book Publishers, 1996.

Wikforss, Asa, M. "Are Natural Kind Terms Special?", In *The Semantics and Metaphysics of Natural Kinds*, edited by Helen Beebee & Nigel Sabbarton-Leary, 64-83. New York: Routledge, 2010.

Wills, Geoffrey. *Jade.* London: Arco Publications, 1964.