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The metaphysics of individuation

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Shoemaker thinks that intuitions as to which properties are genuine (which predicates pick out real properties) are tied up with intuitions about which changes are genuine. Geach has formulated a criterion for a thing's having changed as follows: "The thing called 'x' has changed if we have 'F(x) at time t' true and 'Fx at time t1' false, for some interpretations of 'F', 't', and 't1'."[21] This is the "Cambridge criterion". If this were the only condition on changes, Socrates would change by becoming shorter than Theaetetus when the latter grows, and I would change each time a train leaves Johannesburg. But this seems preposterous. The loss of relational properties or historical properties such as having been sat on by Columbus may not reflect real changes in the objects concerned. Call all such suspect properties Cambridge properties (this would include Goodman's 'grue'), then it may be said that genuine changes consist in the loss or gain of non-Cambridge properties. But this is rather an unhelpful and narrow circle; a genuine change involves alteration of a genuine property, and a genuine property is one involved in a genuine change. The circle may be widened by employing the notion of causality. Take any two artifacts A and B, such that while A was sat on by Columbus, B was not, although it was made from the same wood as A, according to the same design, etc. As far as genuine properties are concerned, one would want to say that it must be possible for A and B to share all of these. Which is just to say that one believes their causal effects in the world will be the same. Of course, it is not ruled out apriori that there is no difference in the causal properties of A and B merely since none are observable (even at a micro-level). One could allow for such a difference if either A or B registered an effect (on an instrument or otherwise) which the other does not. The present supposition is only that if A and B's dispositions to influence and be influenced were the same, then they would share all their genuine and intrinsic properties. On this view, the identities of intrinsic properties (their natures) are determined by their potential for contributing to the causal powers of things. Take any property P; it will have various such potentialities which can be specified by saying that P, in combination with other properties Q, R,..., gives rise to causal power Y. Such specifications, which need not be complete for any property in question, reveals its intrinsic nature. For example, being knife-shaped may be specified so as to reveal its causal power for cutting butter by considering its co-instantiation with the property of being made of steel.[22]

Applying a theory of this sort to the supervenience claim made earlier, would result in anti-reductivism in the following way. Taking the terms of the unity relation for continuants as momentary property-instantiations (rather than momentary-stages, which already presupposes that such stages are unified), allows one to ask the following two questions:

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(1) How must property-instantiations occurring at the same time be related in order to have the same subject (i.e., be properties of one and the same thing?;

(2) How must property-instantiations occurring at different times be related in order to have the same subject?

These yield two distinct problems of identity, that of synchronic identity and that of diachronic identity. This is of course what Wiggins will not allow (cf. SS, p.70). He will not even dignify the synchronic with the predicate 'identity', preferring to call such conceptions "...principles of boundary drawing,..." (ibid.). But his position here begs the question against the theorist who is not convinced that the distinction between boundary drawing principles and diachronic principles of reidentification disappears when either are fully specified. It may be that the distinction becomes empty when one simply equates reidentification and identity, as Wiggins does. However, this does not mean that a distinct, synchronic application of identity is either incoherent or indispensable. In footnote sixteen on the same page, Wiggins rests his case against synchronic identity upon the asymmetrical relation between the specific sortal involved and the concept of continuity. The sortal determines the relevant character of the continuity; and the opposite dependence is inconceivable, it is claimed, because there is no purely general, unspecific notion of continuity. Now, Wiggins operates with a quite naive view of the available options open to someone who wants to reconstruct ordinary continuants. Take for instance this genuine continuant horse, Buchephalus. In saying that Buchephalus was yesterday in the market-place and is now in the stable, one is saying that the horse that was at p at t is the same as the horse now (t1) at p1. In order to successfully accomplish such a reidentification, a diachronic notion of horse is necessarily presupposed. A synchronic notion of horse would be sufficient only for judgements of the following forms: 'This thing here now is a horse' or 'this (pointing) horse is not the same as that (pointing) horse'. Wiggins claims that any reconstruction must operate solely with the above synchronic notion as a primitive, plus the idea of general continuity. But this is stacking the deck in his own favour. It was already conceded on page 47 that reconstruction cannot proceed solely in terms of continuity. The issue is rather whether the only admissible additional condition must be a sortal-specifying one. The importance of Shoemaker's project lies in its unconventionally determined answer to synchronic identity, and the answer is one arrived at without employing sortals. This works as follows.

Given the theory of properties according to which these cannot be specified independently of causal effects in the world, there is a prima facie reason for favouring a non-reductionist (non-conventionalist) answer to question (1) above; the question as to the synchronic unity conditions of momentary property-instantiations into stages. Take again the properties of being knife-shaped and of being made of steel. If these are synchronically co-instantiated in the same

subject at a time, then it will be able to cut butter. The significance for the question of non-reductionism is simply that, if one cannot specify a property without also specifying the consequences of its co-instantiation with other properties, i.e., without specifying its synchronic unity relations, then it is hard to see how synchronic identity (i.e., the being of stages) can be an optional logical construction. The constraints imposed by the intrinsic natures of properties preclude conventional decisions about what constitutes a momentary stage. How could two simultaneous instantiations of the property of being knife-shaped and that of being made of steel be instantiations in one subject (i.e., be related by the synchronic unity relation) if their co-instantiation does not guarantee the presence of the potentiality to cut butter? If it is objected that the exercise of a causal power presupposes persistence, i.e., that cutting butter takes time, this may be granted without undermining the present project. (If it is said that cutting butter need not imply continuants, another example may be chosen. For instance, the causal power any Aids-carrier has to infect those who have sexual relations with him or her). A momentary knife-stage has certain powers the exercise of which imply duration. But this is a distinct issue which relates to question (2) above and to an unconventional answer to what constitues a single life-history. Of course, the above outline has moved at a very simplistic level and one may have doubts about its extendability to complex wholes such as living organisms. Such doubts are unfounded, though, given natural properties (a plausible assumption I shall argue for in the next chapter) and the fact that even Wigginsian substances are subject to the fundamental, basic laws of science (cf. SS, p. 85, and p.133). As subject to these laws, even a horse is theoretically specifiable as the instantiation of a set of natural (perhaps quantum mechanical) properties. Any simultaneous co-instantiation of such properties will determine certain potentialities realizable only over time. Note however that the specific causal powers are determinate at any momentary horse-stage. Such potentialities might include the capacity to burn up x amount of calories a day, of self-regulation and molecular renewal at a rate y by means of enzymatic degradative and synthesizing reactions of a character z, etc. (cf. SS, p.86). All these causal powers may be seen as supervenient upon the nature of those properties so co-instantiated as to constitute a horse-stage. Actually, the whole of a living substance's "principle of activity", as Wiggins calls it (SS, p.70), is a supervenient feature; in fact it is hard to see how it could not be given that the causal powers of any momentary stage are. Wiggins grants, of course, that the developmental laws of living substances are superveneient upon basic physical laws. But he denies that they are reducible. This is not, however, good enough. One cannot simply use the notion of supervenience because it sounds nice or appears to explain problematic phenomena of dependence. Following Kim (1984) and Blackburn (1985), it would seem that any significant use of the notion also commits one to reductionism in some sense (cf. Chapter three). This does not preclude my agreeing with Wiggins that "None of this entails that science has shown that every explanation in any way worth having can eventually find expression at this deeper level." (SS, p.133, fn.5). The point is simply that explanations at the level of supervenient phenomena are reducible, if Wiggins is serious in his use of

'supervenience', and the fact that such explanations are practically indispensable should not count against philosophical attempts to explain the supervenient in terms of that on which they supervene. (cf. Horgan, (1982)). I am aware of the disputability of my claims concerning reduction. I attempt to render them less dogmatic in Chapter three.

None of the above is to be seen as implying that Wiggins resorts to what Armstrong ((1978), p.62) calls "Essentialist Realism", i.e., to the view that there exist irreducibly substantival universals such as being a horse or being gold. Wiggins can grant that no such super-universals (enfolding and explaining ordinary properties) correspond to his substance sortals. This is not to say that kinds do not.

To return now to the second question posed on page 51, it concerns the specification of a unity relation for non-simultaneous property-instantiations (this is just the problem of identity through time). Now, it has already been said that causal powers are exercised over time. To specify a causal power C possessed by an x-stage, one has to say what will happen to x in various circumstances and interactions, i.e., what will happen if x remains in such and such circumstances. Hence power-specification involves what will happen to the subject over time. Keeping in mind the nature of a property as specified in terms of its contribution to the causal powers of the subject, it can be seen that, since the specification of the power involves persistence, the nature of the property itself must include the persistence conditions of its subject. This has important implications for the truth-conditions of any predication; 'Fa' can be determinately true or false only if there is a non-conventional answer to which future happenings to count as episodes in the history of a. Therefore, the answer to (2) is that non-simultaneous property-instantiations must be non-conventionally united in order to constitute a single history. This ties the basic laws describing the natures of properties intimately to those (developmental) laws specifying what happens to a thing with certain properties over time. Abstracting from external influences, one arrives at the notion of a 'pure history', a history which shows what is normal for x in the sense that it is property-preserving. This needs to be qualified, of course, for the biological realm. There are certain parameters of growth for, e.g., an oak tree, which makes a bonsai an oddity. The notion of a pure history allows one to recapture Aristotelian intuitions without conflating formal and final causes (cf. the Physics). Shoemaker employs the notion of 'immanent causality' for property-preserving relations, and then makes such intra-stage connection both a necessary and sufficient condition for any series of stages to constitute a single history (the sufficiency of the condition saves the supervenience claim in (V)). That this adequately reconstructs the common-sensical continuant ontology, even for artifacts where convention plays an important role, may be seen by considering the distinction between the use of 'table' and 'klable'. It is to be kept in mind that tables are optional logical constructions only if their status is akin to those of klables. The idea is to introduce an object having a gerrymandered series of stages as its history, hence reducing the ontological distance between

ordinary continuants and arbitrary sums. Suppose I have one table in the kitchen and one in the study, then there exists a 'klable' having as its history the stages of the kitchen table from midnight to noon, and the stages of the table in the study from noon to midnight. Then there is an entity which shares the properties of tables at specific moments but have klable-histories. Now, while such rules of use might appear to make 'klable' a sortal, it does not. From the possible truth of 'The klable is now made of oak but was made of maple an hour ago', one cannot infer that something was made of maple and then of oak. This result is similar to what Wiggins establishes in the case of Lot's wife. 'Klable' is at most part of an idiosyncratic code to talk about tables. It is of course open to the proponent of this line of thought to resort to explicit definition in order to make 'klable' syntactically a sortal. But that does not mean that there are any klables, that one is now obliged to quantify over them. One does not define into existence bizarre entities merely with a string of words.

This concludes the case for viewing continuants as not ontologically on a par with sums or sets of momentary stages whilst proceeding solely in terms of a Humean notion of identity. If the Wigginsian objects that there is more to transtemporal identity and persistence than the non-reductionist answers to (1) and (2), it is not clear what else she wants. She has her continuant ontology intact, she has the formal rigour of identity, what else? I was not party to the conception of identity as 'coincidence as a substance'; and if the additional conditions are proffered on the grounds that they are required by the determinacy of individuation, the above outline has shown that this may not be so. If properties can play the basic role assigned to them above, then any continuity between property-instantiations registered in the use of a sortal will be supervenient on more fundamental causal relations between the stages. Sortals are a sort of short-hand, only practically indispensable in most of an individuator's everyday commerce with the world. The above simply serves to alert one to the possibility in theory of individuation without sortals. Should it be said that sortals are necessary in order to individuate properties, the correct response to this somewhat desperate manoeuvre is to invoke all of Wiggins' conditions on sortals and then to ask what the coming into existence and ceasing to be of a property (not any instantiation) would be.

Wiggins will be quick to point out that his theory is not "...a theory of recognition or perceptual discrimination at all". (SS, p.218). I grant that this is effective against people such as Michael Ayers who argues against Wiggins by employing a primitive notion of 'natural unity' and does not question Wiggins' presuppositions concerning identity. For that is the crux, as Wiggins himself says: "The theory Ayers attacked was a theory of identiy - of what it is for this entity to be distinct from that entity..." (SS, p.218). I hope to have given reasons in this and the preceding section to doubt that one's theory of the distinctness of objects needs to be more than Humean. Wiggins consistently refuses to recognize anything but diachronic individuation, even for unidentified entities: "... if a man picks up some strange thing and, not yet knowing

what it is, keeps it in his pocket or his desk drawer, then the diachronically stable mode of persistence which it promises or exemplifies cannot help,... but provide the man with the assurance that [Ef] (f is a well defined thing kind, and this strange thing belongs in f)." (SS, p.218). This is a sharp retreat from earlier statements that, in whichever way an individuator apprehends an object incorrectly, she apprehends it in at least one way correctly, i.e., subsumes it under some sortal. Now it is said that a thinker can single something out without knowing what she has singled it out as at all. 'That big blue thing' and similar descriptive subsumptions do not count, on Wiggins' own grounds and because of his rejection of perceptual discrimination per se as an adequate individuating basis. If this is not to degenerate simply into a terminological dispute about who is entitled to use 'individuation' and who not, it needs to be recognized that the distinction between criteria of distinctness and criteria of reidentification is a real one. Only on the Wigginsian assumption that the distinction collapses is it possible to refuse to call anything a singling out which does not either use or presuppose a sortal. That the distinction is in fact a real one, may be seen by considering Strawson's notion of a 'feature-placing language' (Individuals, Chapter six, section six). Strawson commences with the trivial truth that the introduction of particulars into discourse presupposes criteria of distinctness. Restricted to mass terms, such criteria are nothing more than multiplicity of placings, e.g., 'There's water here, and here, and there,...' This proceeds simply by means of particularizing divisions of the featue in question ('pool of water', 'lump of gold') and placing. But how is this to work for 'cat', 'apple' or 'horse'? Strawson thinks it logically possible "...that one should recognize the features without possessing the conceptual resources for identifying reference to the corresponding particulars." (ibid., p.206). This would mean that one could recognize the presence of a cat and yet not think of it as a unique cat; one can say 'cat again' on two different occasions without worrying about whether the same or different cat-particulars are in question. The criteria of distinctness entailed by the notion of a cat- or horse-feature would include characteristic shape, and pattern of spatio temporal occupation. Now, these criteria are only a basis for reidentification criteria. The latter adds to the former the idea of a continuous path of such a characteristic pattern, and that of identity: "The decisive conceptual step to cat-particulars is taken when the case of 'more cat' or 'cat again' is subdivided into the case of 'another cat' and the case of 'the same cat again'." (ibid., p.207).

In the following chapter, I examine Wiggins' appropriation of Putnam's theory of natural kind terms, as well as the link between substance sortals and universals. I show that Wiggins can consistently utilize Putnam's theory and countenance universals without thereby compromising his professed nominalism.

CHAPTER III

HORSENESS IS THE WHATNESS OF ALLHORSE : natural kinds, universals and essentialism

This final chapter examines, amongst other things, the way in which Wiggins links the formal conditions laid down on adequate individuative predicates to natural kind terms. Some attention is given to the details of a Putnamian theory of such terms, and to the question of whether Wiggins is committed to natural kinds. I also outline a theory of universals which the Wigginsian is free to accept without being committed to single universals corresponding to each substance sortal. In section four, the issue of essentialism is addressed. I defend some version of essentialism briefly, although Wiggins' own derivation of essentialism is found to be wanting.

Section 1
Sortals and Natural Kind Terms

Wiggins intends to give substantive content to the formal conditions laid down upon sortals in the following way: "Let us say... that a particular continuant x belongs to a natural kind, or is a natural thing, if and only if x has a principle of activity corresponding to the nomological basis of that or those extension-involving sortal identifications which answer truly the question 'what is x?'" (SS, p.89). Relating this firstly to his overall theory of individuation, one should note that only extension-involving predicates can be substance sortals. They provide a real definition in the Aristotelian or Leibnizean sense, a definition whose "... correctness or incorrectness... depends crucially on the facts about these [real] specimens." (SS, p.10). It is said further, that the sense (i.e., contribution to truth-conditions, cf. SS, p.79 fn.2) of these predicates are extension-involving, so that a Fregean semantic theory can remain intact. What is at issue here is a correction in detail about how a particular class of expressions make their contribution to truth-conditions, how sense determines reference by being reference-involving (SS, p.212, note 3.24). It is clear from this line taken by Wiggins that he is not concerned with alleged refutations of a Fregean, descriptive theory of reference by causal-historical or direct reference proposals. And this is for the best, for it is uncertain whether the views of Kripke, Putnam and others have in fact refuted the descriptive theory (cf. Lewis (1984), 'On Putnam's Paradox'). I think not, but I shall ignore the complexities of the debate.

The second point to note about Wiggins' proposal is that he explicitly links his sortals to natural kind terms and to the Leibnizean notion of a principle of activity. This confident appropriation

is based on a specific account of kinds and real essence, that of Putnam.[1] That the account must be one operating with the notion of real rather than nominal essence, arises from the insufficiency of the latter to provide a very important conceptual service. The dialectic is as follows:

(i) Given the conditions specified in D, D(i) and D(ii) (cf. p.28), natural kind terms appear to be excellent candidates for the role of sortals (i.e., presupposing all of Wiggins' individuation theory);

(ii) But two further conditions on substance concepts are D(iv) and D(v). According to the former, a substance concept must determine what can and cannot befall members of its extension, which changes are compatible with survival. According to D(v), a substance concept must determine a principle of activity for its members (cf. SS, pp.68-70);

(iii) Any sortal must determine what is at issue in an assertion of identity; this it does by virtue of a natural kind identification;

(iv) But in order to determine what is at issue in an identity statement, the sortal should provide a necessary and sufficient principle to individuate members of its extension through their life-histories, i.e., the sortal must make a conceptual link between identity (coincidence) questions and, via the priniciple of activity for its members, the aposteriori causal/dispositional properties of those members.

This is heady stuff. If science discovers necessities, as the position of Putnam presupposes, Wiggins intimates that such causal necessities are also conceptual necessities. For only an account of substantives operating with such causal necessity can explain "...our actual understanding of natural kind substantives." (SS, p.78) and satisfy the conceptual preconditions of individuation. Nominal accounts of natural kinds will be purely conceptual, and hence too weak to get a grip on the real world. This link between causal and conceptual inflexibility is an enormously important one. But Wiggins does not give one enough reason to believe in it. He needs some outside help, to which I shall return later.

The following questions may arise concerning the grafting of natural kinds onto sortals. Firstly, what is a natural kind term? And are all natural kind terms sortals and vice versa? What is it to be a member of a natural kind? What are natural kinds, classes of objects or abstract

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[1] As developed in 'Is semantics Possible?' and 'The Meaning of "Meaning"', both in Putnam (1975b). Wiggins ignores, wisely, I think, the manner of stating the issues in the latter article.

objects? Are all Aristotelian identifications natural kind ones? It will be seen that very few of these questions are actually answered by Wiggins. He simply assumes that satisfactory answers are available within the Putnamian tradition. I shall examine the presuppositions of Putnam's programme in detail, but first it needs to be ascertained exactly how much Wiggins appropriates and how.

It will be noted that Chapter three of Sameness and Substance makes no mention at all of Putnam's 'The meaning of "Meaning"'. The issues are stated without any recourse to Twin Earth situations. And this is for the best as well. Twin Earth scenarios have become a sort of philosopher's pet in this area, but its function is really no more than philosophical (over-)dramatization. As a method, Twin Earth-cases are best left to philosophers of mind. The issues it raises are more suited to discussions concerning the content of mental attitudes or states.

Wiggins' main concern is with the isolation of a 'pre-empiricist' notion of substance. And this is what he takes the Putnam programme to achieve by combining deixis and the nomological. He summarises Putnam's counter-proposal (to nominal essence accounts of natural kinds) as follows: "...x is an f... if and only if, given good exemplars of the kind..., the most explanatory and comprehensive true theoretical description of the kind that the exemplars exemplify would group x alongside these exemplars." (SS, p.79-80). It is clear that the primary concern here is with the articulation of natural kinds. This delimiting of kinds proceeds via paradigm samples or instances of it being grouped together, thus providing a basis for the inclusion or exclusion of any further objects. The fact that the grouping proceeds by means of indexical indication of an instance is a bonus, but surely not unproblematic. In his article 'Natural Kinds', Mellor (1977) views the possibility of kinds without paradigms ('archetypes') as counting against the deitic-nomological view : "Some archetypal natural kinds have the wrong archetypes; others have none at all. Consider elements high in the periodic table that do not occur in nature and have never been made. There are names for them, but there may never be archetypes to constrain the use of the names". The point is simply that an extension-involving predicate cannot be answerable to its extension if there is none. And this point holds not only for esoteric elements, but also for species which have died out. Can Dodos not be articulated as a natural kind because it is impossible to say 'A dodo is relevantly similar to that animal'? There are intuitions here which would make of kinds (species or mass substances) abstract, eternal objects, thus 'trivializing' the connection between a kind and its actual instances. By this I mean that the existence of the kind is not contingently dependent on its having actual instances. One wants (perhaps) to say that water would exist even if the earth were to be devoid of water-samples. The issues here are complex, and I shall deal with this problem in its proper context. (cf. p.64). To return to the issue at hand, it is one thing to say that natural kinds are specified by pointing to good exemplars which are then grouped by a theory, quite another to spell out what a

theoretical description must look like in order to accomplish this. It is at this point that natural laws enter upon the stage; a necessary condition for the existence of a natural kind is the discovery of laws collecting together its actual extension. Note that this reliance on actual extension will be sufficient only if one also accepts, as Wiggins does, that necessity and possibility in general reduces to natural or physical necessity. Thus, every kind which is a natural one has a nomological basis, and this basis determines a typical principle of activity for typical members. This relates to Wiggins' own project as follows: the above scenario of kind-articulation lays down conditions for a term to stand for a natural kind, i.e., to stand for a substance in the sense of D(ii). Now, any term does so stand only if there is a nomological grounding for kind-membership, i.e., if there are laws which circumscribe the interactions and changes of an f (horse) or a g (cypress tree). This reiterates the link between physical, law-based necessity and the conceptual necessity of using substance sortals in order to single out determinately. Although it is not at all obvious (in fact the contrary seems to be the case after Hume) that laws are all that easy to come by, the existence of laws in a sense stronger than that of regularity will be granted for the moment.

It is specifically the nature of the introduction or debut of natural kind terms which tempers the apriorism of Wiggins' abstract conditions on sortals. For it means that principles of individuation can be discovered. The debut of a kind term is such that one and the same concept or predicate of what it is to be an f can be "...unfolded gradually in a succession of different and improving conceptions." (SS,p.82). This means that the actual theoretical description which currently groups fs together could be inadequate, its associated laws unknown, and therefore it could underdetermine the conditions any x must satisfy in order to be an f. In Wiggins' own terms, this merely allows that an individuator could be wrong about the persistence conditions associated with a kind, not that she could proceed without some such conditions. I might initially think that tadpoles constitute a kind only to discover that the nomologically grounded resemblances between them and frogs prove me wrong. Individuators are then committed to scientific standards of similarity and their associated principles of activity. The arbitration of persistence and identity questions are therefore not only logically constrained via the denial of R, and D(ii), but also empirically grounded in the actual activities of kind-members. Even though the principle of activity for a kind K is empirically discovered, it is closely tied to the conceptual aspects of individuation and sortal identity. It gives the conceptual effect, Wiggins claims, of rendering 'x coincides with y under aardvark' both an equivalence and a congruence relation. It seems strange that Wiggins should claim this function for principles of activity; in his own terms that was never in question. Perhaps the point is simply that, insofar as kind-specific activities are law-based, coincidence and persistence through change or alteration of matter is completely unconventional (as opposed to, say, artifacts, whose persistence conditions are not so straightforwardly tied to cessation of function or issue in a distinction between 'the normal' and interference. All this is no doubt due to the lack of natural laws of development

for artifacts. Cf. SS, pp. 90-99).[2] It should be noted however, that principles of activities of substances are throughout construed as supervenient upon more basic fundamental laws of nature. It is these that collect together, around the focus of a paradigm, the extensions of natural kind predicates. As such, they are conditions of existence of the members of the relevant kind. Wiggins' advocation of all the D principles thus hinges on the existence of laws. His insistence on substance sortals hinges on the availability of predicates with the semantics uncovered by Putnam Despite his preference for semantical fact, his procedure in chapter three conforms to Strawson's elucidation of transcendental arguments: "It is not that on the one hand we have a conceptual scheme which presents us with a certain problem of... [the determinacy of individuation]; while on the other hand there exist... [natural kind terms] to make possible the solution of such problems. It is only because the solution is possible that the problem exists. So with all transcendental arguments." (Individuals, p.40).

Section 2

Putnam's Theory and Abstract Kinds

The actual mechanics of Putnam's theory receives little attention in Wiggins. I now turn to these details in order to establish precisely what Wiggins commits himself to. Here is Putnam: "Suppose I point to a glass of water and say 'this liquid is called water'. My 'ostensive definition' of water has the following empirical presupposition: that the body of liqiud I am pointing to bears a certain sameness relation (say, x is the same liquid as y,...) to most of the stuff I and other speakers in my linguistic community have on other occasions called 'water' ... the necessary and sufficient condition for being water is bearing the relation same [liquid] to the stuff in the glass, ..." (1973, pp.702-703). It follows from this that knowing the definition of the meaning of a natural kind term does not always enable one to tell when any given sample is a sample of water. Extrapolation on the basis of the presented sample allows one to say that water is colourless, odourless, etc., but this does not help when presented with a fresh sample. Especially if the same liquid relation is theoretical, as Putnam claims. Generally, while such ostensive definitions carry the presupposition that a kind has been singled out, it need not immediately be clear which kind, where this means that no algorithm is provided for the inclusion or exclusion of further samples.

It should be noted that same liquid (or same species, etc.) is an equivalence relation between samples. It is not a relation between the substance itself and any of its samples, or an identity relation between different liquid substances. The ambiguity between the 'is' of identity and that of instantiation arises from the way Putnam sometimes states the logical form of ostensive

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[2] For a general critique of Putnam's extension of his theory to artifacts, cf. S. Schwartz (1978), 'Putnam on Artifacts.'

definitions, using 'x is water in a world w iff x in w is the same liquid as...' instead of 'x is a sample of water in w iff x in w is a sample of the same liquid as ...'. In this context, Wiggins' link between identity and predication (if x is an f, then there is some f x is identical to) holds only at the sample level. No individual water sample is identical to the substance, anymore than an individual horse is identical with the species. This is a point which cuts across terms with divided reference ('horse'), in Quine's sense, and mass terms.

As a consequence of this point, it is always necessary to distinguish between the substance or species in question and the relations between two samples of the same substance (consubstantiality) or two individuals of the same species (conspecificity).[3] It is still unclear what sort of ontological status substances and species occupy in this framework. One suspects, however, that they are abstract universals. If this proves to be the case, it would be strange indeed for Wiggins to combine Aristotelian essentialism at the level of three-dimensional material continuants with an abstract essentialism.

In order to arrive at an adequate formalization of his notion of an ostensive definition, Putnam resorts to both crossworld relations and possible world slices of continuants (cf. 1973, p.705):

(1) For all worlds w and all x, if x exists in w, then x is a sample of water in w iff x-in-w bears the relation same liquid to this-in-the-actual-world.

It is evident from (1) that Putnam is concerned with crossworld consubstantiality (or conspecificity, for individuals) and not with crossworld identity. Rather than complicate ontology by resorting to possible world slices, it might be possible to state the issues here solely in terms of continuants. This means that an ostensive definition is to be found which eliminates such slices. One may retain, heuristically, the notion of possible worlds if only because it makes for ease of exposition in modal matters. A first attampt at reformulation might be the following non-modal definition:

(2) Something is a sample of water iff it is a sample of the same liquid as this.

Now, (2) is a universally quantified biconditional and will fix the extension of any natural kind term only with respect to the actual world. Insofar as Putnam thinks natural kind terms are rigid in virtue of the form of the appropriate ostensive definition, (2) will be inadequate. The above point may be reformulated to say that a natural kind term designates the Species or Substance, not its actual class of instances: "When 'tiger' is taken as a concrete name, it does

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[3] Although the examples concerning conspecificity in the text all relate to animals, the use of 'individuals' is required in order not to exclude, for example, plants.

not rigidly designate what it then denotes, individual tigers; it is only when it is taken as an abstract name denoting tigerhood or the species, tiger, that it becomes a rigid designator." (Donnellan, (1973), p.712). It is clear that this is what Putnam intends, commiting himself to 'haecceitism with respect to natural kinds' (Salmon (1981), p.139), i.e., to the doctrine that one can identify a thing x of kind K with y of kind K in another world irrespective of similarities or qualitative concepts. The notion of kinds as crossworld entities needs to be reflected in the ostensive definition. But crossworld entities require crossworld relations. If, as in (1) above, one utilizes possible world slices, the same liquid (or whatever) relation can be binary. The point is that consubstantiality and conspecificity must, as equivalence relations, be treated as crossworld relations on Putnam's theory. Salmon has argued persuasively that the same effect can be had by treating them as four-place relations among continuants and possible worlds ((1981), pp.116-135). A mechanism for generating crossworld relations may be arrived at by considering a simple example. Take the non-transitive binary relation grand-student. This relation holds between x and y if x studied under someone who studied under y. Thus Davidson would be a grand-student of Carnap, since he studied under Carnap's pupil, Quine. The crossworld construal works as follows: if x studied under z in w1 and z studied under y in w2, then the grand-student relation holds between x and y across w1 and w2. The structural point is that crossworld relations require entities intermediate between possible worlds, e.g., z, which 'carry across' from w1 to w2. Consider now conspecificity as a crossworld relation. Take x, a natural organism in w1, and y a natural organism in w2. Then there are two intermediate entities, s and s1, such that s is the species x is a member of in w1, and s1 is the species y is a member of in w2. One will have a crossworld conspecificity relation between the continuants and the worlds iff s = s1. The identity of the species of which x and y are instances will be independent of the possible world one considers. According to this unpacking of the crossworld relations, one has :

(3) R(x,y) = (def.) R2(R1(x), R1(y)).

Let R be conspecificity, then R2 is identity and R1 is the relation between an organism and its species. Now, it is clear that the definiens invoives explicit ontological commitment to the intermediate entities, species or substances. If one is willing to accept this ontological baggage, it would seem that an answer to the objection raised by Mellor on page fifty-nine is available. One would not need a sample in order to specify a natural kind. But perhaps this answer depends on knowing the important structural properties of the kind, abstractly construed, so I shall return to Mellor's objection later.

To return to Putnam's ostensive definition, it was seen that (2) is inadequate as an analysis of consubstantiality in that its range is intraworld only. In order to obtain the effect of crossworld consubstantiality, the following is required:

(4) For every possible world w, x existing in w is a sample of water iff it is a sample in w of the same liquid this is a sample of in the actual world.

It is an effortless matter to substitute 'tiger' in order to arrive at the ostensive definition for species terms, or to generalize the logical form by using generic, natural kind term place-holders. For those who still feel uncomfortable with the universal quantification over worlds in (4), an attempt can be made to reduce possible worlds talk to talk of unreified modes in which things may be the case. Translating (4) into modal operator discourse yields:

(5) It is necessarily the case that x is a sample of water iff it is a sample of the same actual substance that this is actually a sample of.

The actuality operator here rigidifies the description (which is indexical) for the substance water. The same effect is obtained by using Kaplan's 'dthat' - operator (cf. Salmon, op.cit., p.145) to yield:

(6) It is necessarily the case that x is a sample of water iff it is a sample of dthat (the same substance that this is a sample of).

Note that, (6), like (5), depends only on the assumption that where there is no substance water, there is no water. It does not entail that the substance fails to exist when there are no water samples. I have strong intuitions which favour this. They would lead me to reject attempted reductions of species and substances to conspecific organisms and consubstantial samples (i.e., taking R in (3) as primitive). But what is one to say, then, of a substance with no samples? What does it mean to speak of existence in such a case? Perhaps scientists can come up with abstract specifications for such substances, and one could say 'The s which is thus and so, but not instantiated in our world (anymore?)'. In the case of plants and animals, it seems to be the case that the species presently around are a consequence of evolutionary accident, they are a mere subset of all possible configurations of matter and form which could have arisen. But if one must now have some abstract specification in order to catch hold of the species Dodo, must one also have such specifications for every merely possible species, past, present and future? Things become less problematic at a reductive level of properties, it is harder (conceptually) to speak of merely possible natural properties. One does not think that to each property-specification a universal corresponds. In the evolutionary scenario, if one wants to deny that a species s exists only if it has instances, it seems difficult to refuse merely possible species what one grants the extinct s, viz., an abstract corresponding universal or set of universals. Perhaps one should isolate the natural properties and let all the possible co-instantiations take care of themselves. I do not know how to solve this problem, and it would take more space that I have available to attempt to. It should be noted, however, that the

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