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REAL VAGUENESS

The nature of vagueness is investigated via a preliminary definition and a discussion of the classical sorites paradox; this is carried further by asking for the origins of vagueness and a critique of several attempts to remove it from language. It is shown that such attempts are ill motivated and doomed for failure since vagueness is not just a matter of ignorance but firmly grounded in epistemic and metaphysical facts. Finally, the philosophical interest of real vagueness is illustrated by the concept of "natural kind", which is essential to realism/anti-realism debates.

Take the classical example: if you collect grains of sand together, some of those agglomerations will deserve the name of "heap" and others will not. There are collections where the predicate "heap" clearly applies and there are collections where the predicate "heap" clearly does not apply. And yet, there are further collections where the predicate "heap" neither clearly applies nor clearly fails to apply, where we are at liberty to say that they are heaps or that they are non-heaps. This is not because we need some further information about those collections – we may well know everything we want to know about them and still feel that they somehow resist inquiry whether they *really* are heaps or not. They are *borderline cases* with respect to the predicate "heap". For the vagueness of the predicate "heap", it is irrelevant whether there *actually* happen to be borderline cases, what matters is that there could be cases where the predicate neither clearly applies nor clearly fails to apply. This shall be our definition:

(V)   A predicate f is vague if and only if f allows for borderline cases.

We thus have the *positive extension* where the predicate applies (the heaps), the *negative extension* where the predicate does not apply (the non-heaps) and a *penumbra* of borderline cases "in between". Negative and positive extensions are not separated by a sharp line. There are reasons other than vagueness why a predicate may fail to draw that

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line, which we want to get out of the way: first, some uses of the predicate may be *relative*, as in "This person is above average height", where the extensions remain undefined because it was not specified with respect to *which* population the person is said to be above average height. If the meaning of the utterance is fully spelled out, what may have appeared to be vagueness will disappear. Second, lexical *ambiguity* such as in the word "bank" or grammatical ambiguity such as in "Hunting lions can be dangerous" will result in non-clear cases (though not borderline cases). Again, the obscurity evaporates once the meaning is spelled out. With vague predicates such as "heap" things are different: there is no need to spell out and indeed no possibility of doing so: there is no fact of meaning unknown here.

The classical puzzle connected with vagueness is the sorites paradox (so named after the Greek σωρός for heap): imagine a series of many collections of grains of sand, starting by a collection of just one grain – call it C 1 –, and going on to a collection that definitely forms a heap, say C 1 000 000. We feel certain that one single grain cannot make the difference between a heap and a non-heap, so we agree with the following principle:

(P)   If some collection with n grains is a heap then a collection with n-1 grains
       must also be a heap.

So, if C 1 000 000 is a heap, then C 999 999 is a heap; but reapplying the above principle, if C 999 999 is a heap, so must be C 999 998, and so forth. We end up saying – absurdly – that C 1 forms a heap, that one grain of sand forms a heap. This is the paradox. (See Sainsbury 1989, Ch. 2.)

Arguments with the same structure and similarly unacceptable solutions can be produced for any vague predicate. We believe in principles like: "If a man with n hair on his head is bald then a man with n plus1 hair must also be bald" or "If a person of age n is an adult, then a person who's age is n minus one minute must also be an adult". Given some kind of ordering and a relevant small difference we can make up such a principle to reproduce the sorites. This is the first hint at some ordering or continuum underlying vague predicates: there is a smooth transition from heap to non-heap just as there is a transition from a man with a full head of hair to a bald man or from child to adult.

The standard reaction to the sorites and vagueness in general is to *sharpen* the predicates, to draw a line between their negative and positive extension (see Sainsbury 1989, 34–40 and Fine 1975). If we were to define a heap* to contain, e. g., at least 100 000 grains, then there is a clear divide between negative and positive extension and *P* becomes false: one grain *can* indeed make the difference between a heap* and a non-

heap*. The sorites would be blocked. However, to sharpen "heap" is to *change* its meaning, to define a different predicate – "heap", as opposed to "heap*", did not have a clear divide between its positive and negative extensions. In Fine's "supervaluational" account, the concept of sharpening which is meant to serve of an *explanation* of the meaning of vague terms rather than for their abolition: a predicate is true of an object just in case it is true of that object under all permissible sharpenings, it is false of an object just in case it is false of that object under all permissible sharpenings. This account faces the problem that there is no strict divide between permissible and non-permissible sharpenings, in other words: there is no strict divide between the penumbra and the positive and negative extensions respectively. The predicate "object that falls in the penumbra of 'heap'" is vague. This also shows that there are possible borderline cases with respect to "vague" – it is itself a vague predicate. So (1) there is more than one permissible sharpening with "heap" and (2) it is vague which sharpenings are permissible – notwithstanding the fact that there *are* sharpenings that clearly are permissible and others that clearly are non-permissible, just as there are objects that clearly are heaps and others that clearly are non-heaps. (For details of "second order vagueness", see Sainsbury 1991, Wright 1992 and Hyde 1994·)

It is important to note that sharpenings are not an easy way to rid oneself of vagueness. To develop a sharpening is complex and there is no criterion to tell that all possible borderline cases have actually been excluded. If one were to sharpen the term "heap of sand" for example, it would not suffice just to set a number, as we did above. One would have to define what counts as a *grain*, a grain *of sand*, how much other stuff is permitted inside the heap, when a grain should count as *part* of the collection, which *shape* is necessary for the collection to form a heap, etc. etc. There are two problems: (1) We cannot know a priori that we have thought of everything. (2) We cannot exclude that predicates used in the sharpening themselves stand in need of a sharpening, in which case the possibility of borderline cases would creep in again and spread to the predicate that we initially tried to sharpen. We must hope for a solid base of non-vague predicates at some point but this hope is hard to justify since almost any predicate one can think of turns out to be vague.

2. Extreme Reactions
The "epistemic theory of vagueness" favoured by Williamsson (1992a, 1992b) and Sorensen (1991, 1994) argues that our inability to locate the dividing line between negative and positive extensions should not let us infer that there *is* no such line.

Vagueness is said to be an essentially epistemic problem since there is a dividing line between the extensions, which is epistemically inaccessible to us. Williamsson and Sorensen rightly insist that there is no knockdown argument against the existence of such a dividing line, but this negative argument is insufficient to support their view. There is no basis for the postulation of such a line: the continuous ordering from collection C_1 to collection $C_{1\,000\,000}$ has no *natural* divide, as Williamsson himself admits (1992a, 236), and the *meaning* of "heap" does not distinguish such a divide either – that is precisely what makes it a vague predicate after all. A statistical result saying that the average speaker of English tends to attribute the predicate "heap" from, say, $C_{345\,671}$ onwards does not show that there is a sharp divide inherent in the meaning of "heap" since the average speaker would equally emphasise that there is *no* sharp divide here. Vagueness is not a matter of ignorance.

The second extreme reaction is Michael Tye's (1990), who argues that the vagueness of *objects* is at the source of vagueness in language. (See also Ruth Manor in the present volume.) To use his example: the term "Mount Everest" is vague because it is not clear where the mountain ends and where it begins, the mountain does not have sharp boundaries – it is vague. The vagueness of the term just corresponds to that of the object it refers to. This vagueness of things is not a necessary condition for vagueness though: our term "heap" would be vague even if all heaps were perfectly definite. If we assume that all collections in the C-series would be precise in all respects, we would still have borderline cases.

"Vagueness of objects" is not a notion that can be explained independently from that of predicates anyway. The term "Mount Everest" is not vague properly speaking, and it does not fit our definition *V* above: there are no possible borderline cases to being the Mount Everest – which is hardly astonishing for a singular term. To be sure, we can form vague predicates like "is a part of Mount Everest" or "is an essential part of Mount Everest" with the help of the singular term "Mount Everest" and these are the predicates Tye relies upon and which are of interest to the present analysis.

Vagueness affects far more predicates than one may have thought: one does not think of tables as vague but surely there are borderline cases to the predicate "table". Just imagine a wooden table rotting away in the course of the years until it is turned to dust and soil. Here we have a continuum analogous to that of C_1 to $C_{1\,000\,000}$ within which there will be points that constitute borderline cases for the predicate "table". A similar scenario can be thought up for almost any predicate – keeping in mind that borderline cases need not be actual. Even in hard science borderline cases appear

possible: "gold atom" might have a borderline case while an atom is going through some unstable transition or fission, even if that borderline case exists only for a very short time. The same appears to be the case with subatomic particles when they are split in high energy physics. The sole predicates with which we can *exclude* borderline cases a priori appear to be those which are necessary or contradictory, as in the realm of mathematics or in predicates such as "married bachelor", where we can know that the positive extensions of both conjuncts cannot overlap even though they do lack clear delineation from their respective negative extensions.

Vagueness is not only very widespread and hard to remove, it is also grounded in metaphysical facts: the Himalayas is a mess of slopes and peaks, and humans have the habit of calling some of them by the name of "Mount Everest", drawing an imprecise line in the continua of rock and soil they are facing. No object distinguishes itself as *the Mount Everest* prior to this activity. In order to get along with the world we need to cut up the continua and to distinguish some stretches on them as this or that object or kind of object. Continua, not objects, are the basis for vagueness. The heaps come in a continuum from one grain to many, and indeed in several continua as that of sand to non-sand, heap-shape to non-heap shape etc. We call parts of this overlap a "heap" and others "non-heaps". Analogous continua underlie all vague predicates.

If we wish, we can sharpen the predicate in order to exclude borderline cases in our practice but we cannot know that we have effectively removed vagueness thereby – given the unavailability of non-vague expressions to use in the sharpenings we rather have to assume that we did not. But this does not matter to us and it is possible for the remaining vagueness to pass widely unnoticed.

Epistemic matters are relevant in that it is our inability to locate precise points on the continua that leads us to use vague predicates. In many cases we would be ill advised even to try using a sharpened predicate like heap* because we cannot *identify* a precise number of grains without undue effort for the relevant purpose.

Finally, let me indicate some of the philosophical relevance of vagueness thus conceived. In the realism debates, the concept of "natural kind" plays a central role in that it is used by realists to ensure reference stability across different theories "about the same thing". It follows from the above that there are no well sliced up kinds out there "naturally", since paradigmatic natural kinds such as "tiger" clearly permit borderline cases (see Kripke 1980, 119ff). Does the notion of natural kind dissolve in the face of vagueness?

The continua of heaps or of visible light waves have no natural discontinuity, it is just that English speakers tend to differentiate a certain stretch on the continuum and label them "blue" or "heap". These are conventional decisions that could well have been made otherwise – and indeed *are* made otherwise in other languages. With tigers or pieces of gold, on the other hand, we have compelling pragmatic reasons to slice up the continuum in some particular way. We group certain objects under one predicate because they appear much more frequently and are more stable than others. These normal, frequent gold atoms are playing a particular role in the world. and thus strongly suggest themselves as the extension of our predicate. Since it is that role we wish to describe, a different slicing up of the continuum could well be said to be a mistake, rather than just a different convention. The world suggests more or less strongly that we make the predicates in a particular way, given our epistemic needs and limitations. This leads to a renewed concept of natural kind in which it is doubtful whether it can serve the realist.

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borderline case
natural kind
realism
sorites
vagueness

Kripke
Sainsbury
Sorensen
Tye
Williamson