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THEORIES OF MATTER

"Matter" may be defined, according to the *Oxford English Dictionary*, as "The substance, or the substances collectively, out of which a physical object is made or of which it consists". And while the *O.E.D.* is not the ultimate authority on words, nor is it, I believe, far wrong in this particular case. The definition is, as I shall argue in this paper, in substantial harmony with a tradition of some antiquity, according to which material objects do not constitute a somehow 'fundamental category' for ontology; and it is in conflict with a more contemporary view which maintains precisely that they do. .

According to the older kind of view, material objects are in fact derivative from or dependent upon a more fundamental category of material stuff or matter, exemplified by the ancient 'elements': earth, air, fire and water. "Most of those who first philosophised", says Aristotle at *Metaphysics* 983b, supposed that "that from which all things come, that from which they first arise and into which at last they go... is elemental and primary in things". But serious obstacles have long appeared to confound the plausible development of this kind of view, and it is with an examination of some of these that I shall primarily be concerned in what follows.¹

My plan will be to make (i) a preliminary identification of a general doctrine, which (ii) seems incompatible with an understanding of the concept of matter; to support this identification by showing that (iii) while the doctrine presupposes that what there is must be countable, (iv) matter is not countable, and thus that (v) and (vi) attempts to understand matter which presuppose the doctrine will inevitably go wrong. Finally, I suggest (vii) reasons why the concept of matter may fail to be distinguished from the concept of an object..

1. THE ONTOLOGY OF OBJECTS

It would seem that there exists a curious and elusive but nonetheless widely accepted doctrine, which I propose to call 'the ontology of objects'. The historical origins of this doctrine are obscure, although it may perhaps be traced to certain Eleatic teachings. Nor is the doctrine always clearly or explicitly formulated - nor even clearly recognised when it is employed. Instead, it often tends to function as an implicit or unstated framework for enquiry; and its influence does not seem to be confined within philosophy, at least within philosophy more narrowly construed. In fact, however, the ontology involves a single essential belief: a belief to the effect that our world is (or must somehow be conceived by us as being) quite generally a world of 'objects' or 'individuals' or 'things', no matter whether concrete or abstract, whether particular or universal.²

"We are prone", Quine (1958) has written, "to talk and think of objects ... for how else is there to talk?" (p. 1). And where Quine speaks of "objects", Strawson (1959) for his part speaks of "individuals": "So anything whatever can appear as a logical subject, an individual. If we define 'being an individual' as 'being able to appear as an individual', then anything whatever is an individual" (p. 227). Which is just to say, as Strawson (1950) once put it, that the world is the "totality of things" (p. 198).³ And Straws on here appears to

echo Leibniz (1697), who speaks of "the world or aggregate of finite things" (p. 32). Another of the many who assume a 'world of individuals' is the (self-styled) nominalist Nelson Goodman: but this doctrine is shared by 'nominalists' and 'realists' alike. Thus in his 'Universals and Metaphysical Realism', Alan Donagan (1963) remarks that one of the fundamental metaphysical questions about the world is the question "what sorts of individuals does it contain?" (p. 157). Locke's particularism is a specific form of this same doctrine, as are, I am inclined to think, doctrines which may be discerned in at least some of the writings of Hobbes and Aristotle. I have chosen to label the doctrine 'the ontology of objects', though it might just as aptly have been labeled 'ontological individualism', had we thought fit to ignore the fact that some have preferred (on account of Russell's paradox) to reserve the term 'individual' for objects if the lowest 'type' so that, e.g., objects which are classes of individuals are not themselves counted as individuals. On the other hand, little if any substance can be made to hang upon the choice of labels.

The ontology of objects is a puzzling doctrine. Thus on the one hand, the doctrine is presented as placing no restrictions *whatsoever* upon what in general there may be. It is not, for example, presented as requiring that objects be material or physical or concrete or particular, though such requirements might be added to it. In this respect, in fact, the doctrine is presented as assuming that there is no more to the idea of an object than there is to the idea of a *logical subject*. Strawson and Russell, for example, are quite explicit about this. For Strawson (1959), "anything whatever can appear as a logical subject, an individual"; and the phrase "one object", Russell (1903) writes, "seems to mean merely 'a logical subject in some proposition'" (p. 136). But if this opinion is right, and the doctrine does exclude precisely nothing, then to say we speak only of objects will be to state a purely *trivial* truth. And this surely *is* puzzling, for on the other hand, the doctrine also *seems* to be supposed to be substantial. It seems at any rate thought to be sufficiently significant to be worthy of repeated emphasis. There are the makings of a dilemma here, one which Quine (1958) appears to dimly sense when he remarks that to say we speak of objects "seems *almost* to say nothing at all" (p. 1, italics mine). Unfortunately, Quine does not specify in what way the doctrine may not indeed be (quite) empty, apart from making some obscure remarks about its relationship to "our present Western conceptual scheme" (p. 25).

2. A PROBLEM WITH THE DOCTRINE

I want to argue that these intimations of substantiality are well-founded, and that the doctrine is indeed far from trivial. Pervasive though it seems to be, the ontology of objects would nonetheless appear to be quite fundamentally mistaken. For suppose that we consider the implications of this doctrine, for our conception of the spatio-temporal constitution of our world. Evidently, it is a consequence of the ontology of objects that there can be nothing which substantially occupies space, nothing which is bulky or material, apart from material *objects*, and paradigmatically, such things as sheep and statues, moons and planets, rocks and trees and tables. In speaking of "that aggregate of all bodies, the universe", Hobbes (1651, 111, 34) articulates succinctly just such a picture of the world; and it is a picture which many others have embraced, both before, and especially after Hobbes. But there would seem to be good reason for believing that this

Hobbes-like consequence of the object ontology is simply not defensible, and thus, that the object ontology itself must be rejected.

The Hobbesian world-picture appears, in fact, to be open to an extremely elementary yet quite decisive objection. It looks very much as if this view of the material world as a world of nothing but material objects or 'bodies' - a view which is, and must be, at least as widespread as the general ontology of objects, and which often appears to be regarded as the very epitome of 'common sense' - is *necessarily* false or incoherent.

For in the first place (as the dictionary has it) material objects are precisely those objects that consist of *matter*, stuff which may in fact persist, while the objects that it constitute decay, disintegrate or otherwise cease to be.⁴ Lumps of gold, to take a simple case, consist of nothing but gold, impurities apart; and human beings consist largely of water (and whereas a lump of gold cannot continue to exist if it is used to make e.g. a pair of earrings, the gold of which it consisted can, and will persist, present in the pair of earrings).

And secondly, if we pose the question of wherein the concepts of matter and material object differ, the answer would appear to be that they differ *precisely* with respect to the concept of objecthood. For if it is a truism that materiality or space-occupancy is what the concepts have in common (and indeed material objects occupy space just *because* they consist of matter, of space-filling, material stuff - that is why they are *material*), it is surely just as much a truism that objecthood, pure and simple, is what distinguishes them.

Thus it would seem that while the advocates of Hobbes' concept of the universe, or of the ontology of objects quite generally, suppose themselves to be at home in recognising the existence of sheep and rocks and planets, they are nonetheless incapable of recognising the existence of those very substances, like water, carbon, oxygen, and so on, of which these objects are composed: a rather curious predicament.

As an objection not only to the picture of the world portrayed by Hobbes, but also to the overall ontology of objects, the point - simple though it is - is still I think decisive; and if it is, then any attempt to comprehend matter within the framework of the object ontology is doomed to certain failure.

But this may seem a somewhat sweeping claim, and in the remainder of the paper I shall be concerned to do little more than just defend it and explain its basis, so that we may hope to be a little clearer as to why matter should be, as I claim it is, so refractory to those analyses which presuppose the adequacy of the object ontology.

3. THE MEANING OF THE DOCTRINE

Now it may well be that, in some unspecified sense of 'analysis', the notion of an object is "too simple to admit of analysis", as Frege once remarked: but simple though the notion be, it is not as if there is just nothing *at all* that can be said about it. For we can at the very least say of the idea of an object or individual or thing that it is, precisely, the idea of *an* object or individual or thing - that it is the idea of a single item, of *one* among possible others. Correlatively, we may say that the idea of a world of objects (individuals, things) is at the very least the idea of a *plurality* or *multiplicity* of existents. 'Objects', 'individuals' and 'things' are themselves plural terms; objects may be many, few or none, and each object singly must be counted as one.

These may seem to be resounding truisms, and perhaps they are; but they give us just the

purchase on the notion of an object that we shall need. 'Object' is indeed a dummy count noun, supplying no principle of counting for the things to which it can apply, and standing in instead for determinate species terms e.g. like 'dog' or 'star'; but it remains true that whatever can be counted as an object must still be counted as one, whatever its kind may be, physical or otherwise.

There is in this connection a curious idea, unfortunately all too common, that "a number cannot be uniquely ascribed to a physical object", as Geach (1951, p. 213) puts it. The idea appears to rest on an unaccountable confusion between the fact that 'object' is a dummy count noun, and thus supplies no principle of counting, and the falsehood that when we refer to some *specific* object as a 'this' we may *still* lack any principle of counting. Thus Geach continues "A pile of playing cards has a definite weight but not a definite number; 'How heavy is this?' makes sense as it stands, but 'How many is this?' does not make sense without some added word, expressed or understood - 'how many packs?' or 'how many cards?' or 'how many suits?'"'. Apart from the fact that in such cases the question ought to have been 'how many are these?' and not 'how many is this?', the pile of cards of which Geach speaks is clearly *one* - one *pile*, and if we know that 'this' refers to the pile (the 'added word, expressed or understood'), there can be no *question* of the number of its reference. Any physical object must be of some kind, and we cannot even know which is the object that is talked about unless we know the kind. Geach's odd remarks on this may have some connection with his thesis on the "relativity of identity"; yet very similar remarks abound in other writers. Thus Barrington Jones (1974) writes that "the terms 'everything' and 'anything' are not genuine sortals but 'dummies'. One cannot even begin to count every *thing* in the room, since one has no principle of individuation" (p.497, italics in original). And so far, we may think, so good. But Jones continues, as if it were a consequence, "Is *a table* one thing or several?" (italics mine). The required rejoinder to this (apparently) rhetorical question with its (implicitly) indefinite answer would be a definite '*one*': the table is (that is, is *identical* with) one object, viz., a table, though it may *consist of* ever so many different things (legs, screws, nails, fibers, molecules or what-have-you).

Jones also uses an example which perhaps he finds in Frege: Frege (1884) claims that one pair of boots may be the very same "physical and tangible phenomenon" as two boots (p. 33e). But 'physical and tangible phenomenon' is just as much a dummy term as 'object', and if we are to ask: what *kind* of phenomenon might this be? (what general term covers the identity relationship alleged between the one pair and the two boots), we will be hard put to find an answer. In fact, I suggest, two boots cannot be *a* physical or tangible phenomenon, for they are *two*; and in the ordinary sense of 'pair', the two boots may well outlive the pair. Thus if I give one to Mr. A, who lacks a boot, and the other to Mr. B, who also lacks a boot, are we not inclined to say that while my boots (which still indeed exist) have contributed to these two (*new*) pairs, there exists no third pair of boots which they alone still constitute?

In the hope of obviating such confusion, then, our point may be expressed more formally as follows. We may say that if some concept *F* is indeed the concept of an object, then if and when we speak of this *F*, that *F* or the other *F*, we speak in each and every case of *just one F*. In precisely this sense, a world of objects or individuals or things can be none other than a world of countables. In just this sense, countability must be a necessary condition of

objecthood.⁵ Whether it must be sufficient, on the other hand - whether five blows on the head, for example, must be counted as five objects - is far from clear, and would even seem intuitively unlikely, but need not in any case concern us here.

This, then, it would seem, is the basic significance or presupposition of the ontology of objects; and assertions of this basic presupposition are not themselves uncommon in the literature. Thus Locke (1690) remarks that amongst "all the ideas we have, ... there is none more simple, than that of *unity*, or one... every idea in our understanding, every thought in our minds, brings this idea along with it ... For number applies itself to ... everything that either does exist or can be imagined" (pp. 121-122, italics in original). Likewise Russell (1903): "Whatever ... may occur in any true or false proposition... I can a *term*. This, then, is the widest word in the philosophical vocabulary. I shall use as synonymous with it the words unit, individual and entity... anything... that can be mentioned, is sure to be a term..." (p. 43, italics in original). So too it is with Geach (1951), for whom number "applies to everything thinkable" (p.213). Leibniz (1687), remarks with similar force that being and one are convertible terms: "I do not conceive of any reality at all without genuine unity" (p. 80).

The question of whether we must always speak of objects - whether there is some unshakeable connection between the notions of object and logical subject - seems therefore to reduce to or to presuppose the question of whether everything we speak of can be counted. Now we have already cited evidence of a most general and schematic character indicating that the concepts of matter and material object differ precisely with respect to objecthood; and it would appear that we may now add as confirmation of this claim the fact that while we may indeed speak of matter, of e.g. the water in some glass - that is, while (some) matter may appear as the logical subject in some proposition - it does not *seem* that matter can be counted.

It is not at any rate good English to speak of 'one water' or 'two golds', and the basis of this fact would appear to be that matter simply lacks the oneness or unity of objects. (If I throw the water from a glass and scatter it, that water is not thereby 'broken' or 'destroyed'. But if I throw the glass itself and 'scatter' - or shatter - it, that glass *is* thereby broken or destroyed.) If this point on counting can be shown more formally, then, we shall have some independent confirmation of our claim that matter is not comprehensible within the framework of the ontology of objects.

4. MATTER AND COUNTING

We have at this point to record the fact that it has been supposed quite explicitly that matter *can* be counted, and is not thereby in conflict with the object ontology, even though, as it would seem, we have no ordinary count noun with which to do the job. Helen Cartwright (1965, 1970), most notably, has argued in effect that if we have e.g. two distinct glasses of water, then there *must* be some concept '*F*' such that the water in one glass will be one *F* and the water in the other glass another *F*. Equally, she has argued that if the gold of which a certain ring is made is the same gold as the gold of which some other ring was made, then there must be one *G* which that gold is (on the inverse Quinean principle, perhaps, of no identity without entity - a principle which is, I would argue, false). The concept Cartwright introduces here is the concept of a *quantity*, technically

construed. It is obviously not enough, therefore, to simply point to the fact that expressions like 'two waters' and 'one gold' are not good English: that matter is not thus countable stands in need of proof.

Such a proof does I think exist, and it can be best presented in the form of a *reductio*, by starting with the assumption that matter can indeed be counted. The assumption, then, is that any phrase of the form 'this water', 'that bronze', 'the gold in my ring', etc., can be replaced by (and will be thus equivalent to) a phrase of the form 'this *F*', where '*F*' represents some (possibly technical) count noun. 'Quantity of matter' ('quantity of water', 'quantity of gold') is the count noun suggested by Cartwright, but one might equally suggest a noun like 'instance of matter', so that e.g. the water in this glass could be supposed to be countable simply as one instance of water. All we actually need, however, is the purely formal assumption that phrases of the form 'this water' can be replaced by phrases of the form 'this *F*', where '*F*' represents just some count noun or other.

On this basis, then, let us suppose that we have two statues *X* and *Y*, both of which consist of bronze. The bronze of which *X* is composed will, on our assumption, be countable as one *F*; and the bronze of which *Y* is composed as another *F*. Let us suppose further that we proceed to melt the statues down, with a view to making one larger statue *Z*. The bronze constituting *Z* will then have come from *X* and *Y*. Now to say that the bronze constituting *Z* has come from *X* and *Y* is, on our present assumption, to say that the *one F* constituting *Z* has come from *X* and *Y*; and to say this is to commit oneself to the view that there *is* only one *F* constituting *Z*. However, it is plain that in reality, *Z* may just as well be said to consist of the bronze from *X* and the bronze from *Y*, and these are, on our same assumption, *two other Fs*. (The physical fusion is in fact quite inessential to our point: if *X* and *Y* were, let us suppose, in region *R*, then we could refer simply to the bronze in *R*, and this would generate precisely the same difficulty, implying that there was only one *F* in *R*.)

We seem thus clearly obliged to conclude that our original assumption was illegitimate, leading as it did to contradiction. The bronze of some statue (the water in some glass, etc.) *cannot* be an *F*, whatever count noun '*F*' may be, for the very notion of such a thing is incoherent. The bronze of some statue is not an *F* of any kind, not e.g. a 'quantity' or 'instance' of bronze: rather, it is just *bronze* - a certain amount or quantity of bronze, to be sure, but then we might have the very same amount or quantity of bronze in a different and co-existing statue.⁶

The bronze of some statue is not an *F* of any kind, and hence, not an object or individual or thing of any kind, and our original claim would seem confirmed. We have argued that the bronze can be no such thing, since to count it as one, as a unity, is to invite incoherence. And this is not a purely 'abstract' point, a point of 'mere' conceptual significance. On the contrary, it has a profoundly concrete meaning.

An object, we have argued, must have unity. An object of any kind must consequently have the kind of unity appropriate to objects of its kind, and a *material* object must therefore have a *material* unity. The loss of an object's unity - in the case of a material object the loss of its material unity - must therefore involve the loss of its objecthood. Specifically, for example, a unitary chunk of bronze cannot persist if it is broken into a plurality of pieces. And here, needless to say, it is the unitary *chunk* that is destroyed, not the *bronze*; for the bronze has no such unity to be destroyed. It is all the same whether it

exists in a unitary chunk or in a plurality of pieces, for it is perfectly capable of persisting through such changes. It can persist through being broken, divided, dissolved, scattered, or ground to dust.

Another way of putting this would be to say that whereas the notion of a material object of any kind involves some notion of built-in limitation or essential boundary - essential to the identity and unity of objects of its kind - the notion of matter of any kind does not (it is, as the tradition has it, 'formless'). As Quine (1960) puts it in the jargon of semantics, full-fledged general terms like 'apple' and 'rabbit' must have "built-in modes of dividing their reference" (p. 91). Objecthood or individuality presupposes oneness or unity, which in the case of physical objects must be physical oneness or physical unity: an obvious point, perhaps, but one that is sufficient in itself, when recognised and understood for what it is, to disqualify matter's purported claims to objecthood.⁷

It is because e.g. this bronze is not a unity, that we cannot think of this, that and the other bronze as a plurality of 'bronzes', distinct entities; and only objects composed of bronze may be so-called. The distinctness that some bronze may have from some more bronze is, as I shall argue in due course, a purely *contingent* affair, and may thus be contrasted with the essential distinctness between objects.

In formal terms, what the attempt to construe phrases like 'this bronze' as phrases like 'this *F*', where '*F*' represents some count noun, actually amounted to, was an attempt to classify *mass* nouns as *count* nouns of some kind, i.e., to deny the difference; but since the difference is all too real, such an attempt was bound to end in incoherence.

Objection. It may be felt that our conclusion is in some respect wrongheaded; that it should not have been that matter is not *countable*, in the sense that the bronze of which some statue is composed cannot be counted as one, but rather that there must be some fundamental arbitrariness about *how* matter is to be counted - that mass nouns supply no one determinate principle or procedure for counting that to which they are applied, so that whereas our statue might indeed have been said to consist of just one *F*, from (as it may be put) a certain arbitrary standpoint, from another such standpoint it might equally well have been said to consist of two, three, or ever so many *F*s. The thought behind this vaguely formed objection may perhaps be brought out as follows (and here I introduce an example drawn from Wiggins (1967)».

Wiggins argues that although 'crown' is an individuating term, still there may be no determinate way of counting the number of crowns in a certain region. He writes: "The Pope's crown is made of crowns. There is no definite answer, when the Pope is wearing his crown, to the question 'how many crowns does he have on his head?'" (p. 40). The suggestion is, perhaps, that when something of a kind has things of the same kind as parts, indeterminacy of the required sort may exist for counting - and so, the thought may go, it is with bronze, since 'parts' of bronze may well be bronze.

Now we might in any case have doubts about the Wiggins-type example: the larger squares upon a sheet of graph paper, for instance, can be viewed as consisting of the smaller squares, but it is unquestionably possible to go about determining the total number of squares in any given region of the sheet. The seeming indeterminacy of Wiggins' question has a different source, I think: the rather uninteresting indeterminacy or vagueness of 'on his head'. However, examples of this kind are fundamentally unhelpful for the case at issue, and to find them in any way relevant is to miss the essential force of

our argument. That is, were Wiggins right about his 'crown' example, it would be clearly impermissible to speak of *the* crown on that pious person's head, since the use of the definite article would imply, contrary to Wiggins' stated multiplicity, quite unambiguous *uniqueness*. In the case of some statue, however, we can and do speak of the bronze of which the statue is composed; and this would mean, were 'bronze' indeed replaceable by some count noun, that there would be just one 'bronze' of which the statue were composed, questions about the applicability of principles of counting notwithstanding.

It is only fair to point out here that Cartwright has attempted to incorporate just such a point into her thesis. For she attempts, at least in (1965), to define an *F* such that it will be a 'totality' of bronze (to be explained); and this attempt deserves some scrutiny.

The idea is that for e.g. some statue, there *will* be just one thing which is the totality of gold of which that statue is composed. We must note in the first place that in (1970) Cartwright introduces quantities by analogy with sets. We are supposed to be able to proceed from 'the gold of which my tooth is made...' to 'the quantity- of gold of which my tooth is made' ...' in the way that we are supposed to be able to proceed from 'the cats we had in Harlem...' to 'the set of cats we had in Harlem.. '. But it is clear that this latter move cannot be exactly as it seems; for there is no such thing as *the* set of cats we had in Harlem. That is, corresponding to a-given number of cats there is a rather larger number of sets of cats, not just one (for *n* cats there are $2^R - 1$ non-empty sets of cats). Clearly, the move thus represented must actually be a move from 'the cats we had in Harlem ...' to 'the set of *all* the cats we had in Harlem ...'; and analogously, the move from 'the gold of which my tooth is made...' must really be a move to 'the quantity of *all* the gold of which my tooth is made ...' (or more perspicaciously, perhaps, to 'the totality of gold in my tooth').

As Cartwright notes in (1965), what "the water Heraclitus bathed in yesterday" requires is a variable *x* "such that *x* is *all* of the water Heraclitus bathed in yesterday" (p. 481), for we *cannot* go from that referring expression to a variable *x* for which there is "exactly one *x* such that *x* is some water, and Heraclitus bathed in *x* yesterday" (p.481), since, as Cartwright points out, even if Heraclitus took only one bath yesterday, he "bathed in most of what he bathed in as well as all of it; he bathed in all but a quart and all but a pint ..." (p. 481).

The point of these manouvers, then, is clear: but it may be doubted whether they can achieve their purpose. For one thing, the effective move from 'the gold of which my tooth is made...' to 'all the gold of which my tooth is made...' is one which involves a shift in meaning, indeed the importation of an additional concept, that of totality. Just as we cannot move from 'Tigers have four legs' to 'All tigers have four legs' (since some may unfortunately have lost their limbs, even though a normal and uninjured tiger has four legs), or from 'Water is good to drink' to 'All water is good to drink' (since some of it may be poisoned or polluted, even though ideally it is just what we need), or from 'Snow is white' to 'All snow is white' (since in our cities it is often dirty), so in the nongeneric cases we have no license to move from 'This stuff is *G*' to 'All this stuff is *G*'. If, for example, this gold is tarnished, we cannot conclude that all this gold is tarnished (whatever that may mean, if anything). A closely analogous block exists between 'the *Hs* ...' and 'all the *Hs* ...' (where '*H*' is some count noun): thus the fact that I can see the leaves in such-and-such a pile does not mean that I can see all the leaves in that pile. Consider also the difference between what happens if we prefix 'the cats' and 'all the cats' with 'the set of'. There is such

a set as the set of all the cats we had in Harlem; but there is no such set as the set of the cats we had in Harlem, for suppose our cats were *a*, *b*, *c* and *d*. Then those cats are contained in various sets, for example in the sets $\{a, b\}$ and $\{c, d\}$, as well as $\{a, b, c\}$ and $\{d\}$, and $\{a, b, c, d\}$.

And secondly, the proposal that there is just one thing which is the quantity of all the gold in my tooth will not in any case avoid the earlier *reductio*, appearances notwithstanding; for what exactly *is* it that we are claiming there is only one of in my tooth? - of what concept is this object an instance? What, in other words, is the general term corresponding to the definite referring expression 'the quantity of all the gold in my tooth'? It can only be 'the quantity of all of *some* gold in my tooth' - '*the* quantity', since there can be only one totality; and this in fact reduces simply to '*a* quantity of gold in my tooth'. Clearly, the expression 'the quantity of all of some gold in my tooth' does not *denote*: there are many such things, if there are any. The only way a denotation can be secured is by the use of such expressions as 'the quantity of all of some gold which is *this* gold'. And the quantity of all this gold, which is what the expression denotes, is just one of the many (if any) quantities of (all of some) gold which are in my tooth - which one, depending on the reference of 'this'.

5. THE PROPER CONCEPT OF A QUANTITY

Although Cartwright's proposal is therefore not coherent as it stands, the proposal is by no means without interest, and there are some worthwhile lessons to be learned from it. Although there can be no object which some matter *is*, Cartwright's proposal may best be understood as a proposal that there will be just one object which all of (and only) it will constitute, so long as it continues to exist, and no matter how dispersed or scattered it may become. Thus construed, the proposal would not, of course, amount to the view that all of it will constitute a certain material object, something like a chunk of matter, since such objects are precisely not capable of persisting through dispersal, and they are capable of persisting through change or loss of substance. The proposal would be analogous rather to the proposal that for some objects (e.g. the pigeons on our roof), it is possible to conceive of an object - in this case a set - which all (and *only*) those things will constitute, so long as they continue to exist, and no matter how dispersed or scattered they might become. The set in question will be the set of *all* the birds on our roof, since 'the set of birds on our roof' denotes nothing; corresponding to *n* birds on our roof there are $2^n - 1$ non-empty sets of birds. There is no one set which contains those birds, but there is one set that contains them all. Just as, for pigeons, we may posit a set containing all those pigeons, so, perhaps, for some gold (e.g. the gold in my tooth) we may posit a - containing all that gold. 'The quantity of gold in my tooth' then will denote nothing, since corresponding to so much gold in my tooth there will be ever so many quantities of gold in it, if there are any; but 'the quantity of all the gold in my tooth' will denote at most one thing.

Unfortunately, Cartwright is driven to suppose that the gold in my tooth is *identical* with this object, rather than that all of that gold *constitutes* it. Among other things, she fails to make, or rather fails to make explicitly and consistently, the crucial distinction between the notions of constitution (or its converse, containment) and identity; and she in fact equivocates on whether all of some matter is identical with a quantity of matter (as she

would like to maintain), or whether it merely constitutes such a thing. A set cannot be identical with its members, for they may be many, few or none, while the set itself must be one; and so we adopt the device of saying, rather, that it *contains* them or that they *constitute* it. (As Geach (1953) notes, "the ideas of a class as many" is "radically incoherent" (p. 225).) Analogously, a quantity of matter cannot be identical with, but rather constituted of, the matter it contains (which will be all of such-and-such matter, e.g. all of the gold in my tooth), for the quantity must be one, while its matter can be neither one nor many. (To assume relationships of identity either of these cases, instead of relationships of constitution or containment, would generate the kind of incoherence pointed up in the *reductio*.)⁸

(i) Cartwright's explicit thesis in 'Quantities' is that what a phrase like 'this gold' denotes is identical with what a phrase like 'this quantity of gold' denotes. Identities like

The gold of which my ring is made is the same gold as the gold of which Aunt Suzie's ring was made

are, Cartwright argues, "*equivalent* to identities like

(5) The quantity of gold of which my ring is made = the quantity of gold of which Aunt Suzie's ring was made" (p. 28, italics mine).

(ii) On the other hand, there are other occasions when Cartwright is, no doubt unwittingly, equivocal as to whether the relationship is indeed one of identity as against constitution; she remarks that given the truth of the former identity, "there is *one* thing which that gold *is or constitutes*" (p. 28, first italics only in original), and that what "it *is or constitutes* is a quantity of gold in a quite special sense of the word" (p. 28, italics mine).

(iii) Furthermore, there are numerous occasions on which she either tacitly or explicitly, but at any rate quite unequivocally, acknowledges that the relationship in question must be one of constitution and not one of identity. Thus she says of 'gold' that it "does not individuate gold, but it *does ... individuate*" (p. 27, italics in original). What Cartwright is suggesting here, of course, is that 'gold' individuates not gold but quantities of gold - thereby implying that there is a difference. And she goes on: "Suppose now that I have before me a cup filled with coffee. My claim is that there is a non-empty set, *Q*, of quantities of coffee, each of which *contains* some of the coffee in my cup and one of which *contains* all of it" (p. 31, italics mine). **In** general, it would seem that we must conclude that the relationship that Cartwright would like to see between matter and quantities of matter - the relationship of identity, essential in this context to a defender of the object ontology - is not the one that she does in fact see.

Now there remain some reservations about the concept of a quantity, even when not inconsistently construed, as containing, rather than being identical with, some matter.

(i) There would seem to be no determinate principles for counting quantities: just how, for example, would we go about counting the number of quantities of bronze in a single statue? (Bronze being a mixture, it even lacks those 'smallest units' which might otherwise serve as some kind of basis here.)

(ii) It is not at all obvious what the identity-criteria of quantities could be. With sets there is no problem: their identity-criteria are a function of the identity-criteria of objects they contain. Likewise, the identity-criteria of a quantity would have to be a function of the

identity-criteria of the matter it contained. But in what could this latter consist? The answer to this question - a question to which I shall return - is far from being clear.

(iii) Even if the concept of a quantity were in all respects legitimate, it would nonetheless be an artificial or fabricated concept. It certainly does not *in fact* follow, if what I have is some gold, that I have a quantity of gold. (Indeed no more does the existence of a certain set follow, I should think, from the existence of some pigeons on our roof.) The existence of quantities could at best be taken seriously if it could be shown that the concept were not only coherent but also had some genuine explanatory value, and was not merely a case of multiplying entities beyond necessity; so far as I can see, however, it has none. (To say that there is, e.g., some bronze which is the bronze of some particular statue's torso, is not to say that there is some object in the world which is that bronze. Such talk, in contrast with talk of 'quantities', does not generate potentially indefinite and indeterminate sets of countables - it generates no sets of countables at all.)

Finally, and what is perhaps of most importance, there is a fundamental oddity in Cartwright's intended thesis in 'Quantities'. Cartwright proposes that matter must exist in the form of objects she calls 'quantities', which are by her own account analogous to those paradigmatic non-concrete objects, sets. It must surely seem extremely queer that something than which nothing could be more *concrete* should be conceived to be, or to be very like, a kind of *abstract* entity. However, this is no mere eccentricity of Cartwright's theory. Rather, it is an inevitable consequence of accepting the ontology of objects, that one cannot so much as recognise a *distinction* between the concepts of matter and material object, so long as one also recognises matter to be what it trivially is, that is, substantial or material. (We might expect the orthodox ontology to be embraced by any Bishop Berkeley.)

I argued earlier that theories of matter which presuppose the ontology of objects must be doomed to failure, and if this is right, there will be just three general alternatives open to one who would understand the concept of matter, two of which are wrong. Each of these alternatives can in fact be found in recent literature, and this may perhaps be counted as a further confirmation of our basic thesis.

(i) If on the one hand one does recognise matter for what it trivially is, as material, and also understands the concept as the concept of an object, then it cannot be distinguished from, or must be 'reduced' to, the concept of a material object. This is perhaps the most common misconception, and may be found in Hobbes and Quine (to mention but two): the assumption that 'matter' is somehow synonymous with 'body'.

(ii) If on the other hand one recognises matter to be distinct from material objects, as it is, while not distinguishing it from objects altogether generally, then one must conceive of matter as somehow nonmaterial. This is Cartwright's approach (though needless to say, this aspect of her thesis is one that she is not concerned to emphasize).

(iii) Finally, one may recognise the concept of matter to be distinct from that of material object, and simply *reject* the ontology of objects, thus laying the basis for a suitably 'materialistic' and non-reductionist theory of matter. Such an approach can be found, perhaps expressed obscurely and certainly not consistently, in the work of Strawson - whose work thus represents, if somewhat falteringly, a major breach in the received ontology.

6. THE OTHER TWO ALTERNATIVES

We have already studied (ii), and it is time to turn to (i) and (Hi). (a) Quine's reductionism. Throughout his writings, Quine appears to make much of the fact that words for matter are 'pre-individuative'; that they do not involve talk of objects. Quine (1958) speaks specifically of 'water' as pre-individuative (pp. 7, 8, 10, etc.). Such pre-individuative terms do not involve talk of objects: it is only when one uses "*individuable* terms like 'apple' that he can properly be said to (be) speaking of objects" (p. 8, italics in original). Curiously enough, however, nowhere does Quine *identify* a pre-individuative use of mass nouns. Although this is a category of noun "ill fitting the dichotomy into general and singular", nevertheless the "philosophical mind sees its way of pressing this archaic category into the dichotomy" (p. 10), & nowhere is *it* explained why, if mass nouns can indeed be "smoothly reconstrued" (p. 10) as general and singular, the category should be one ill fitting that dichotomy.

Quine's concession to the 'pre-individuative' character of talk of matter is thus no concession at all; this character is not to be understood, but to be dismissed as 'infantile' or 'immature' or 'archaic'. As is well enough known by now, Quine views mass nouns in their role as 'singular terms' (that is, before the copula, in grammatical subject-position) as the proper names of scattered objects. Thus "In 'Water is a fluid' ... the mass term is much on a par with the singular term of... 'Agnes is a lamb'. A mass term used thus in subject position differs none from such singular terms as "'Agnes', unless the scattered stuff that it names be denied the status of a single sprawling object" (Quine (1960), p. 98).

In their role as 'general terms', on the other hand, mass nouns are viewed as applying to those things that are bodies or bits of matter. Thus, "After 'this', as after 'is', we do best to view a bulk term as a general term. 'Water' so used amounts to the general term 'body of water' conceived as applying equally to a river, a puddle, and the contents of a glass" (*ibid.*, p. 101).

These bodies or bits of matter, furthermore, are said to be related to the overall scattered object as parts to whole: "There remain, besides the world's water as a total scattered object, sundry parts which are lakes, pools, drops and molecules ..." (*ibid.*, p. 98).

Thus Quine locates matter squarely, if somewhat foggily, within the framework of the object ontology. Now his theory will not in any case withstand close scrutiny. It is not, for example, at all plausible to say that after 'this', 'water' amounts to 'body of water'; for it is compatible with supposing that this body of water (which may for example be a lake) will be here tomorrow, to suppose that this water (which presently constitutes it) will not, and will perhaps be in the sea.

What, on the other hand, of the status of Quine's scattered object and its name? And what of its relation to its 'parts'? Although the underlying structure of Quine's ideas cannot be said to be translucent, nonetheless it is not difficult to see that for Quine, the difference between matter and bodies, bits of matter, is a difference with no real difference - the merely superficial appearance of a difference, designed to seem to do justice to what Quine is acute enough to recognise as a troublesome difference between mass nouns and count nouns. There are perhaps two rather different strains in Quine's thinking here, and we shall deal with them separately. (I am less concerned to criticise the errors and inconsistencies

in Quine's view, however, than to show how it exemplifies what I have claimed to be the inevitable consequence of producing a theory of matter based upon the object ontology.)

(i) The 'physical' conception. Quine's 'Water', if so we may refer to it, is supposed to be in some way a 'sum' of parts which are bodies of water. Now since Quine remarks that "any sum of parts which are water is water" (*ibid.*, p. 91), and since he also holds that 'water' after 'is' may be construed as a general term of the form 'body (or bit) of water', we may conclude that any sum of parts which are *bodies* of water will be a *body* of water - much, perhaps, as all the seven seas together constitute a single mass of water. So Water must itself be just another sprawling mass or body of water, the biggest one there is; and in support of this we may point to Quine's (1960) much-favoured analogy between 'water' and 'red' (pp. 91-121), and his (1950) idea that Red is "the largest red thing in the universe" (p. 72). Such scattered masses need not boggle us, since as Quine reassures us, even the 'tightest' objects have a scattered substructure. The only mystery about all this, then, concerns the reasons for dignifying the largest mass of water - which could just be the water in a certain bottle, if that were all the water in the world - with a *proper name*; but while this may help to save appearances, it cannot be of any consequence, since it follows from a well-known doctrine of Quine's that names can be 'eliminated'.

All there really are, we may conclude, are bodies of water large and small, and the largest one being honorifically, but quite superfluously, labelled 'Water'. (The fact that the seas of Earth and Venus, if such there be, do not in fact constitute a single larger mass of water, and the fact that there is not in fact - although perhaps there might be - one allinclusive mass of the world's water, need not concern us here, since I was primarily interested in showing that for Quine, matter and body are not distinct.)

(ii) The 'logical' or 'mereological' conception. It is clear enough from a number of Quine's (1960) remarks - pp. 52, 54, 61, 98n, 181-2 - that he conceives his scattered object as the 'fusion', in Goodman's sense,⁹ or the mereological sum or whole, in Lesniewski's original sense, of those objects of which 'water' as a general term is true, i.e. (for Quine) of all bodies of water. (In fact, the relationship of 'Water' as singular term to 'water' as general term is just analogous to the relationship of 'gavagai' to 'rabbit' when, as Quine proposes, 'gavagai' is construed as "a singular term naming the fusion, in Goodman's sense, of all rabbits: that single though discontinuous portion of the spatiotemporal world that consists of rabbits" (*ibid.*, p. 52).)

And whatever we may think of the idea of a Lesniewskian sum in general, it is clear that since 'water' as a general term (as in 'this water') does not in fact apply to objects, the mereological fusion of what it *does* apply to cannot be an object *either*. In addition, the whole idea that such a 'singular' term as 'water' used before the copula functions as a definite referring expression is misleading. For in the kinds of cases emphasized by Quine, 'water' has an essentially generic significance, comparable to that of 'rye' in 'Rye is made in Canada' or to that of 'man' in 'Man is an animal'. In 'Water is a fluid', 'Water' names (if we may put it so) the kind. And Quine is not altogether unaware of this, for he remarks that 'water' in this context has the "air of the abstract singular" (*ibid.*, p. 120), a remark which is re-inforced by the close analogy between 'lions' in 'Lions are numerous' and 'lamb' in 'Lamb is scarce'; since Quine remarks that 'Lions' here "does the work of an abstract singular term designating the *extension* of the general term (i.e. the class of all the things of which the general term is true)" (*ibid.*, p. 134, italics in original), even though 'lamb' is

used as a "singular term to name that scattered object which is the world's lamb meat" (*ibid.*, p. 99).

Further, it is no more incompatible with water's being concrete that 'water' before the copula be an abstract singular term, in Quine's sense, than it is incompatible with lions being concrete, that 'lions' before the copula be an abstract singular term; and it may just be that Quine is misled by his own terminology here. For although the characterisation 'abstract singular' may not be wholly inappropriate for terms like 'roundness' or 'humility', it goes against the grain perhaps for the generic use of common nouns with such obviously *concrete* significance as 'water'.

Unfortunately, however, it is possible for Quine's somewhat equivocal views on the significance of mass nouns before the copula to co-exist together in a framework which is tailor-made to accommodate such contrary conceptions - I have in mind Quine's thesis of the 'indeterminacy of parsing terms' with respect to 'stimulus meaning'. The intersection of this thesis with Quine's vacillation over mass nouns is clearly represented in the following:

A further alternative likewise compatible with the same old stimulus meaning is to take 'gavagai' as a singular term naming the fusion, in Goodman's sense, of all rabbits: that single though discontinuous portion of the spatiotemporal world that consists of rabbits. Thus even the distinction between general and singular term is independent of stimulus meaning. The same point can be seen by considering, conversely, the singular term 'Bernard J. Ortcutt': it differs none in stimulus meaning from a general term true of each of the good dean's temporal segments, and none from a general term true of each of his spatial parts. And a still further alternative in the case of 'gavagai' is to take it as a singular term naming a recurrent universal, rabbithood. The distinction between concrete and abstract object, as well as that between general and singular term, is independent of stimulus meaning. (*ibid.*, p. 52).

Again, I am less concerned with questions of consistency or error here, than with the general structure of Quine's view. According to the mereological conception, the 'rabbit-fusion' and 'Water' are constructs defined in terms of their parts, which are rabbits and bodies of water respectively. ('Water' is defined in terms of 'body of water'.) Thus apart from Quine's (1960) thesis on the elimination of names, 'Water' as much as 'Socrates' (see pp. 181-182 especially) being capable of being eliminated, 'Water' is in any case introduced via 'body of water'. Thus Quine, whose primary inclination - indeterminacy notwithstanding - is to treat his water as concrete, presents us with an analysis (or analyses) in which talk of water actually evaporates, or equally, boils down to talk of bodies of water, even though on the surface there is the appearance of a difference. In so far as Quine (as with all reductionists) does not even really recognise the special status of that which he purports to recognise, it is dubious whether we can say that he has a theory of matter at all. And this, as I have argued, is the inevitable consequence of accepting the ontology of objects, while rightly recognising the concreteness of such stuff as water.

(b) Strawson's partial breakthrough. Recent work upon material stuff, in the form most commonly (though not exclusively) of work on concrete mass nouns, has seen the

beginnings of what may well become a break with the ontology of objects. For it is a consequence of accepting that ontology, as I have argued, that the production of internally coherent theories of matter must be precluded from the start. And it is I think fair to say that the more perceptive among contemporary theorists of matter have expressed their qualms, wittingly or otherwise, about the status of the object ontology. Thus in 'Heraclitus and the Bath Water' Cartwright remarked that given the truth of

Heraclitus bathed in some water yesterday and bathed in the same water today, "one would *not* have supposed that Heraclitus bathed in a thing - still less that he bathed in an object or individual" (p. 474, italics mine); and this, in spite of her final, though still somewhat hesitant, conclusion to the contrary. And Quine, as we have seen, appears to be quite explicit about the 'pre-individuative' character of mass nouns, though he goes no way at all to showing what this might involve, and is indeed primarily concerned to refute his own suggestion.

But there is one writer (so far as I am aware he is the only one) who has advanced beyond expressing qualms about the status of the object ontology, and who, in so far as he has recognised a distinction between the concepts of matter and material object - for he has not done so consistently - has recognised the necessity for outright rejection of the object ontology. This writer is Strawson, and unlike Quine or Cartwright, he has laid the basis for a both coherently 'materialistic' and non-reductionist theory of matter.

According to Strawson (1959), when we make a 'feature-placing' statement by the use of some such sentence as 'There is water here', we are not speaking of any 'particular', and hence any material object, at all. Such sentences

neither contain any part which introduces a particular, nor any expression used in such a way that its use presupposes the use of expressions to introduce particulars. Of course, when these sentences are used, the combination of their use with the tense of the verb and the demonstrative adverbs, if any, which they contain, yields a statement of the *incidence* of the universal feature they introduce. For this much at least is essential to any language in which singular empirical statements could be made at all: viz. the introduction of general concepts and the indication of their incidence (p. 203, my italics).

Similarly, Strawson (1954) remarks elsewhere that feature-placing sentences contain the material-name of a general thing ... but none contains any expression which can be construed as serving to make a definite or indefinite mention of individual *instances* of those general things (p. 38, my italics).

Now there is more perhaps than just a single strand to Strawson's thinking in these passages; but their central thrust, I suggest, is clear. It is essentially that assertions of the existence of matter - or indefinite references to its 'incidence' - are *categorially distinct from any talk of objects*. Although a concept must of course be 'satisfied' if we are to say that something of the kind exists, this does not in the case of material stuff involve the notion of an *instance* of the concept. Strawson (1959) remarks that it is easy to find "convincing cases where we operate, not with the notion of particular instances of, e.g., gold or snow, but merely with the notion of the universal feature itself and the notion of placing" (p. 205). (The talk of 'general things' and 'universal features' is best construed as talk of *kinds* of stuff or matter *concepts*, and not - though this is certainly one strand in

Strawson's thinking - as talk of murky 'concrete universals'; for Strawson does after all speak in the same breath of 'feature-universals or feature-concepts', and of snow, water, coal and gold as "general kinds of stuff" (p. 202».

And if Strawson is right about all this, as I have argued in effect that he is, then of course when we make definite reference to the incidence of matter - when we move from 'There is water here' to 'the water that is here' - we do not refer to individual instances or objects either. 'The water that is here' cannot serve to designate an object.

This crucial step, however, is one that Strawson feels unable to take, and it is here that Strawson does *not* consistently recognise a distinction between talk of matter and talk of objects. For expressions making definite reference to matter, when they are considered at all (which is infrequently) are considered to be elliptical for definite references to objects; and Straws on not only speaks of the incidence of feature-concepts, but also of their *instances*, which are characterised by him (for such is the logic of 'instance') as instances of things. Thus Strawson (1954) mentions such expressions as "This (patch of) snow" (p. 38) and "being (a piece of) gold" (p. 29); and pools of water and pieces of gold are said to be precisely instances of water and of gold (p. 38). And if a pool of water is an instance of 'water', then 'water' is not mass but count, and stands in for determinate count nouns such as 'pool of water', 'drop of water', and the like - which is to say, expressions like 'this water' are just elliptical for expressions like 'this pool of water' (even though we may not know exactly *which* count noun the mass noun *is* elliptical for).

The tension between rejection and acceptance of the object ontology would seem most acute in Strawson's conception of the move from talk of 'features' to talk of 'particulars'; for it is central to his theory that *more* is involved in the idea of an instance of water, than is involved in the idea of water itself. The move to instances involves the adoption of 'criteria of distinctness and identity', it involves the introduction of 'particularising divisions'; yet it is clear that there *can* be nothing more to instances of a concept than is contained within the concept itself.

Strawson's theory lacks the *consistent* recognition of a distinction, between the concepts of matter and material object that we find in Cartwright's; but in so far as it does involve a recognition of that distinction, it also involves a rejection of the object ontology itself, and thus makes possible an adequate conception of matter as concrete - a 'materialistic' theory of matter, impossible within the framework of the object ontology.

7. DISTINCTNESS AND CRITERIA OF DISTINCTNESS

(a) Identification. The temptation to objectify matter or to 'entify' it, to assimilate talk of matter to talk of objects, seems at its strongest when one is confronted with the role of mass nouns in definite reference. This at any rate is indicated by the theories we have just considered: for in those it was just the cases of indefinite and *generic* 'reference' (Strawson's "There is water here" and Quine's "Water is a fluid") which were recognised to be perhaps distinct from talk of objects in some way - which were recognised indeed *as* talk of matter.

Now there is I think a simple explanation for these facts, and it concerns a misconception about what definite reference must involve. For it is just definite reference that is most closely associated with the idea of *particularity*; definite reference, unlike

generic and (perhaps) indefinite reference, is always reference to something in particular - that is why there is something definite about it. And particularity, to the philosophical mind, tends to be associated firmly with objecthood. In fact, however, 'particularity' is just another word for 'thisness', distinctness or discreteness, the basis of our ability to identify,¹⁰ and hence to definitely refer. Thus particularity - the condition of being something in particular such that not only objects, but also matter, may well possess particularity. We may speak of 'this particular stuff' as well as of 'this particular thing', without in any way compromising the ontological contrast. Particularity is no exclusive feature of 'particulars', of concrete objects. Thus it is quite wrong to suppose that one can always move from 'this particular _____' to 'this particular' simpliciter, since the latter carries a connotation of thinghood or individuality which the former, if I am right, does not. To have 'thisness' is not necessarily to be a 'this'. (There is a correlated conflation on the formal level of definite reference, reference to something in particular, with *singular* reference, reference to something countable, and a failure to recognise that the latter is a narrower notion than the former. The result is the ontologically loaded characterisation of definite referring expressions as 'singular terms'.) Thus the misconception that mass nouns in definite reference apply to objects, in brief, results from the assumption that particularity brings with it objecthood.

Now though not only objects, but also matter may be particular, matter and objects relate to particularity in quite different ways. That is, whereas objects are *essentially* particular, matter itself is just *contingently* so. To put the point in terms of identifiability, we may say that so long as objects continue to exist we *must* be able to identify them; but with matter this is simply not the case. (Another and more traditional way of putting these points would be to say that whereas objects have 'criteria of distinctness / identification', matter, as I mean to argue, has none.)

Consider then the contrast between the following two thought-experiments. Suppose firstly that there is an enclosure *A*, whose population at *t*₁ consists of two pigs (two material objects of a kind). At *t*₂ these pigs are herded out of *A*, one of them entering enclosure *B* and the other entering enclosure *C*. We may suppose that it is not known, at *t*₁, *which* pig will enter which enclosure, only that one must enter one and one the other. Now the population of *A* at *t*₁ *in fact* consists of the pig that will end up in *B* at *t*₂ and the pig that will end up in *C* at *t*₂, even though we do not know at *t*₁ which one of these is which. The pig that will be in *B* at *t*₂, like the pig that will be in *C* at *t*₂, can thus be *denoted* (in the Russellian sense) at *t*₁, even though we are not able to refer to it or identify it *as such*.¹¹ We are not able to identify it *as such*, that is, *as* the pig that will be in *B* at *t*₂; but the fact remains that we most certainly *are* able to identify it. It is obvious, that is, that there is a unique and specifiable procedure for dividing up the population of *A* into discrete parts, such that one of these will in fact be the pig that ends up in *B*, and the other will be the pig that ends up in *C*, even though *ex hypothesi* we cannot know which one is which. And this of course is because pigs, along with material objects quite generally, have a built-in structure or integrity or 'form', in virtue of which each one is distinct from every other, and can be picked out or identified at any time in its career.

Contrast this sort of case, now, with a case involving matter of some kind. Suppose that at *t*₁ we have a jug *A'* containing water; and suppose that at *t*₂ we pour this water into two glasses *B'* and *C'*. (And, on the assumption that it makes sense to suppose that we might

have known, we may suppose that we do not know, at t1, which water is to be poured into which glass). Now at t1, A' in fact contains the water which will be in R' at t2 and the water which will be in C' at t2; thus the water that will be in R', like the water that will be in C', can be denoted at t1. But it is plain that not only cannot we identify the water that will be in R' *as such*, we are unable to identify that water *at all*. For there is no specifiable procedure whereby the water in A' can be divided into discrete parts, such that one of these parts will consist of the water that ends up in R' and the other will consist of the water that ends up in C'.

Of course, to say that we are *unable* at t1 to identify the water that will end up in R' does not mean that we might not have *happened*, at t1, to identify that water. If we had dipped a cup into A' at that time, it is I suppose conceivable that the water we would collect in the cup might by accident be the very same as the water we later pour into R'. But there is an obvious difference between the ability to identify something, grounded in its intrinsic distinctness, and the accidental identification of something grounded in no intrinsic distinctness; and it is the former we are guaranteed with objects, so long as they exist, and that we are in no way guaranteed with matter.

This, then, is the difference; water, along with matter altogether generally, has no built-in structure or integrity of 'form', in virtue of which there is a guarantee that we will be able to pick out and distinguish some of it from some more of it. And to lack such built-in form or structure is to lack essential or intrinsic distinctness - it is to lack the traditional criteria of distinctness or identification.

(b) *Re-identification*. Criteria of re-identification, I shall argue, quite trivially presuppose criteria of identification, and thus since matter lacks the latter, it must also lack the former. But the idea of re-identification should not be confused with certain other ideas with which it may very well *be* confused, and finally, therefore, I shall draw the necessary distinctions. We must distinguish the *possibility* of identifying and re-identifying from the possession of *criteria* of identification and re-identification, and we must distinguish all of these from the possession of criteria of *identity*.

Firstly, although we must distinguish criteria of identification from criteria of re-identification, the former criteria are presupposed by the latter. For to re-identify something must involve (i) identifying it, and (ii), judging on some basis that what has been identified is the same as what was identified on some earlier occasion. Criteria of re-identification thus involve both criteria of identification and criteria of identity, if the latter are understood (in the normal way) as constituting the basis for judgements of sameness over time. On the other hand, criteria of identity may be understood in such a way as *not* to presuppose criteria of identification or re-identification.

The identity of anything is intimately bound up with its existence; so that for something of kind *F* to lose its identity is not to be distinguished from that *F*'s ceasing to *be*. Now in the case of material objects, for a thing to cease to be is not to be distinguished from our ceasing to be able to identify it; but with matter this is not the case. Some matter may persist between times t1 and t2, but this does not mean that we are automatically entitled to ask questions of the form "what are the necessary and sufficient conditions for the *F* (*F*' being here a mass noun) identified at t1 to be the same *F* - if it is the same *F* - as the *F* identified at t2?"; for we need not be able to independently identify the stuff identified at

some one time at any *other* time.

A question such as the above runs together criteria of re-identification and criteria of identity (which in the case of material objects come to the same thing, since to be is to be identifiable for them), and in the case of matter these kinds of criteria must be clearly distinguished, for it is not incompatible with matter's lacking criteria of re-identification, that it should have criteria of identity. That is, though there is no *guarantee* that we may be able to identify and re-identify some matter, nonetheless, in the right circumstances, we may *in fact* be able to do these things. The water in the green jug may be the water I purchased in a bottle yesterday; and we may ask in virtue of *what* that water is the same. (And it is here that criteria of identity come in.) On the other hand, it is far from clear what such identity criteria might be. With material objects we (think we) have a clear enough criterion in spatio-temporal continuity, but such a criterion is inapplicable to matter, which may persist through being crushed, ground up, scattered, dissolved and so on. We could perhaps attempt to pin the identity of matter upon the identity of constituents (grains, flakes, molecules or what-have-you); but, as Cartwright (1965) has pointed out, there are grave difficulties about any such attempt. We may have the same salt but not the same molecules of salt, for example, since molecules are capable of dissociating and re-associating in different ways. On the other hand, if we cannot pin the identity of matter on the identity of constituents, it is difficult to see what *else* is left to pin it on, and we may find ourselves in sympathy with Quine's (1964) claim that a mass term like 'water' does not "primarily admit 'same' ", and that when it does, "some special individuating standard is understood from the circumstances. Typically, 'same sugar' might allude to sameness of shipment" (p. 102).

I mention the question of identity criteria for matter, however, only to distinguish it from the question of criteria of re-identification, for an examination of the former question would not be central to our present concern, and would indeed take us far beyond it.

Re-identification must be distinguished from identity, then, and it must also be distinguished from two other notions with which it is particularly likely to be confused. Suppose we have two pieces of iron *V* and *W*; and suppose that these are ground up and the resulting heaps mixed together. Now we cannot expect someone to be able to pick out or identify within this larger pile, the iron of which *V* consisted, and distinguish it from the iron of which *W* consisted (let alone to identify the iron from *V as the iron from V*) - unless of course the iron from the one lump was of a somehow different kind from the iron from the other lump. The iron from *V*, like the iron from *W*, cannot be *identified*, and thus cannot be re-identified. I have belaboured the obvious here in order to distinguish it from two other points alluded to before. Our inability to identify or re-identify should not be confused with (i) an inability to *trace*, nor with an inability to (ii) d-identify, as I shall call it; for there may be no such inability.

(i) The point does not imply, then, that we cannot do what we obviously *can* do, that is, to trace the iron (or at any rate the constituents of the iron) from *V*, say, through its dissection and intermingling with the iron from *W*. We can clearly trace all the bits from *V*, and thereby trace the iron of which *V* consisted. But such tracing is very different from re-identifying. It does not involve (a) picking something out and (b) judging that it is the same as something independently identified earlier. It is in fact dependent upon the one original act of identification alone; it is essentially tied to that act. (Whether we must

always be able to trace constituents in this general way is a question which concerns the identity of matter, and cannot be considered here.)

(ii) Nor does the point imply that we could not, on the basis of identifying such constituent bits or grains of the iron from *V*, re-identify those bits at a later date, and thus identify the iron from *V* once more. But in the first place, I think that we should be extremely reluctant to call this procedure a case of re-identification. For again, it is not as if what we do is firstly, to pick out some iron, and secondly, to identify that iron *as* the iron originally in *V*, on the basis of identifying the constituent bits. For there is no question here of an *independent* identification of the iron from *V*. We can *only* identify it as: the iron with the same constituents as the iron which was in *V* - and such an identification would be parasitic or dependent in a direct way upon its original identification as the iron in *V*. It would not, for example, be possible to ask any non-question-begging questions about whether the stuff we had picked out on such a basis *was* the same as the stuff originally identified; for a condition of picking it out at all would be the supposition that it was. The case would thus not be a case of re-identification, as we have understood that term: it would be a quite special and parasitic form of identification. I'll call it d-identification to distinguish it from cases of genuine and independent re-identification. D-identification would of course involve information in addition to the information necessary to perform an original or independent identification, information about constituents. (To have identified some iron does not imply to have identified constituents; the former is a necessary condition of the latter, but in doing the latter we go beyond what is necessary for the former.)

I conclude then that the original claim that matter lacks criteria of identification and thereby criteria of re-identification is justified; and these facts do not preclude the possibility of either tracing constituent parts and thereby tracing matter or re-identifying constituent parts and thereby d-identifying matter. (On the other hand we should not I think too readily assume that such tracing and re-identifying of parts is always possible). This lack of criteria of identification is the material ground of the differences between material objects and the stuff of which they are composed, and once it is properly recognised, the basis for confusion in this area is gone.¹²

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NOTES

1 The paper is intended as a further development of certain ideas in Laycock (1972); and a familiarity with that paper, while not essential to the reading of this one, may nonetheless be of some help in understanding what I am about.

2 It might be objected that to talk of a single doctrine here would be at best misleading, since there are surely certain differences between the notions of object and individual and thing. But we can admit the possibility of such differences, and still maintain (as I argue presently) that there is a central core that all these notions - and not only these, but also such other general notions as those of 'entity', 'item' and 'existent' - have in common, something in virtue of which we are justified in speaking of a common doctrine in all these cases.

3 In fairness to Strawson, however, and in spite of his outspoken advocacy of the object ontology (in its more general and also more particular forms), it should be said that he has in fact come closer than any other writer I am aware of to outright rejection of this ontology - a point to which I will return in due course.

4 In general agreement with the O.E.D., I mean by 'matter' just those various natural kinds of substances of which the various kinds of material objects are composed. These substances are designated by mass nouns, and are nowadays the subject-matter of chemical enquiry.

5 Knowing what counts as one object of a certain kind, and what as another, may just conceivably not involve knowing how to go about determining the number of such objects in a given region of space. Such at least is Wiggins' (1967) claim; and if this claim were justified (which is itself by no means clear), then there would be another and more exacting sense of 'countable' in which countability would not even be a necessary condition of objecthood.

6 Thus that way of speaking of existence which employs the jargon of 'instantiation' for something of a kind to exist is for the concept of that kind to have instances - is wholly inadequate as a general way of speaking of existence.

7 cf. Aristotle at *Metaphysics* 1016a. Frege (1884), quite incomprehensibly in my view, opposes 'one' and 'unity' in physical objects. 'Unity', he says, is associated with 'being united' or 'undivided'; but not so 'one'. For when we say that 'Earth has one moon', he insists, "we do not mean to point out that our satellite is ... undivided" (p. 43e). But if our satellite were divided - and how else but into separate chunks of matter? then we would just not have one satellite any longer, but instead a number of them corresponding to the number of the separate chunks.

8 Although the argument against construing a reference to some matter as a reference to a single thing (a 'quantity') would apply equally against construing a reference to some objects as a reference to a single thing (a 'set'), it would I think be seriously mistaken to assimilate the former type of reference to the latter. The arguments in Cartwright (1970) against any such assimilation are much superior to those in Laycock (1972) in favour of it; and though there are undoubtedly analogies between mass and plural count nouns, mass nouns are I now believe more fundamental than any kind of count noun, singular or plural.

9 Goodman (1951) defines the sum of Dalmatians, for example, as 'that individual which overlaps all and only those individuals which overlap some Dalmatian' (where 'overlap'

can be roughly construed in the context as 'has as parts').

10 I use the term 'identify' in the favoured philosophical sense, as belonging to that cluster of notions which includes 'single out', 'mark off', 'point to', 'recognise', 'pick out', 'discriminate', 'separate out' and 'distinguish'. In this use the term is to be distinguished from its use in, e.g., 'Smith was identified as the murderer' and 'The insect was identified as belonging to such-and-such a species'.

11 For an account of this extremely valuable distinction see e.g. Donnellan (1966).

12 The fact, if such it really is, that matter is not countable, does not mean that matter cannot be *quantified*, at any rate in the ordinary sense of that term: for it is obvious that although matter cannot be counted, it can still be measured, and indeed 'quantification' in the ordinary sense is tied more intimately to measuring than it is to counting. On the other hand, it appears to be often assumed that the concept of number can be somehow introduced into first order quantification theory merely by adding identity, so that e.g. the statement that there are at least two things of kind *F* can be represented by

(Ex) (Ey) (Fx & Fy & x ≠ y).

But it should be clear that unless we have already *introduced* the concept of number in some way, this will not do. That is, we must already have supposed either that the predicate letters stand in for *count* nouns exclusively (an extremely restrictive supposition, ruling out such terms as 'red' and 'heavy'), or that variables cannot be placeholders for just any referring expressions - not e.g. for 'this water' - but only for referring expressions designating *objects*; for the fact that this water and that water are distinct does not, if our arguments are sound, that mean there are at least two objects in the world.

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