The Philosophical Review, LXXXIX, No. 4 (October 1980)

A MORE GENERAL THEORY OF DEFINITE DESCRIPTIONS*

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Russell's analysis of definite descriptions works well enough for definite *singular* descriptions like 'the author of *Waverley*', which are formed from a singular *count* predicate like 'is an author of *Waverley*'. The Russellian analysis fails when the contained predicate is *mass* or *plural*, as in the definite descriptions 'the gold in Zurich' and 'the people in Auckland'. I offer a unified theory that accounts for all three types of definite description, and that provides a more general account of the word 'the'.

1. Definite Mass Descriptions. Phrases like 'the coffee in this room' and 'the gold in Zurich' are common and ordinary definite descriptions, and are often "proper," in the sense that they denote single objects—a single quantity of coffee or a single quantity of gold. Yet their contained predicates, 'is coffee in this room' and 'is gold in Zurich', apply to more than one object.

For example, suppose that there are two cups of coffee in this room. Then there is such a thing as the coffee in this room; the definite description 'the coffee in this room' is proper. Yet the coffee in one cup is coffee in this room, and so is the coffee in the other cup; the *mass predicate* 'is coffee in this room' applies to more than one object. So there is such a thing as the coffee in this room, but there is no such thing as the one and only thing which is coffee in this room. Of course, this situation does not depend on the division of the coffee in the room into separate cupfuls; even if there were only one cup of coffee in this room, it would have a very large number of proper parts each satisfying the predicate 'is coffee in this room'.

* Versions of this paper have been read at the Victoria University of Wellington and the University of Auckland. I thank Max Cresswell, Thomas Forster, Fred Kroon, Rita Nolan, Arnim von Stechow, Richard Suiter, Christine Swanton, Martin Tweedale, Julian Young, and the referees for their good comments and discussion. This work was supported by grants from the North Carolina Employment Security Commission.

The definite mass description 'the coffee in this room' is therefore not analyzable as the Russellian '$(\imath x \cdot x$ is coffee in this room)'. The definite mass description is quite proper, but the Russellian expression is not. The uniqueness condition required by the Russellian description is bound to fail. '$(\imath x \cdot x$ is coffee in this room)' is as improper as '$(\imath x \cdot x$ is an author of *Principia Mathematica*)'.

Helen Cartwright made this point about mass reference fifteen years ago (1965, p. 481), but there still seem to be writers who miss it. For example, Richard E. Grandy writes '$(\imath x(x$ is in the yard))' for 'the stuff in the yard' (p. 295). Later, on the same page, he simply skirts the problem completely by writing '$(\imath x$ $(x$ is the [*sic*] stuff in the yard))'.

A definite mass description such as 'the gold in Zurich' denotes the *sum* or *totality* of all that to which the predicate applies—the total sum of all that is gold in Zurich. The most natural way to specify such a sum is as the least upper bound of the quantities of gold in Zurich relative to the *part of* relation $\leq$:

$$(1) \qquad (\imath x)\ [(Gy \supset_y y \leq x) \,.\, (z)((Gy \supset_y y \leq z) \supset x \leq z)]$$

—the unique x which includes everything that is gold in Zurich, and which is included in anything z that also includes everything that is gold in Zurich.[1]

Quine has observed that mass terms are *cumulative*: "any sum

[1] There are other ways to specify the sum of the objects satisfying a predicate G (Leonard and Goodman, p. 47; Cartwright 1975b, p. 163 in *Noûs*, p. 197 in Pelletier; Goodman, p. 37). However, the version used here is the most straightforward way to express this sum as the $\leq$-least upper bound. It is also a convenient form for reducing (2) to (3) later. Furthermore, it can be used with *quasi-mereologies* (see note 8), but those other versions cannot.

I use Peano's subscript variables with '$\supset$' and '$\equiv$' to indicate universal quantification when I happen to feel that this yields more readable expressions; I occasionally use dots as parentheses for similar reasons.

'is gold in Zurich' does not mean 'is made out of gold in Zurich'. The predicate does not apply to objects like a gold statue, but rather to the gold in the statue. Being gold in Zurich is being sọme gold in Zurich; 'some' is pronounced "sm" here (see Cartwright 1965, pp. 471–72). Generally, 'some' is pronounced "sm" with mass terms and plural terms. I will spell it 'sm' to distinguish it from the 'some' in, e.g., 'some bureaucrat has rejected my application'.

of parts which are water is water."[2] So suppose we analyze 'the G' as the sum of all that is G, i.e., as (1). Then Quine's observation implies that whenever G is an instantiated *mass* predicate, 'G (the G)' will hold. This seems intuitively desirable: the tea in China is tea in China, the (world's) water is water, etc.

Another nice effect of defining 'the G' as (1) is that when G applies to exactly one object, 'the G' so defined does denote that object; 'the $G = (\imath x \cdot Gx)$' will hold. (Exercise: this depends on the reflexivity and antisymmetry of $\leq$.) So the Russellian definite singular description emerges as a species of definite mass description. For example, if my room contains exactly one article of furniture, 'the furniture in my room', defined on the pattern of (1), and '($\imath x \cdot x$ is furniture in my room)' both denote that article. If there are several articles of furniture, the latter is improper, like 'the author of *PM*', but the former denotes the totality of all that furniture.

Another interesting side effect occurs with certain terms like 'pizza' and 'apple', which can be count *or* mass. If there is *one* apple on the table, then 'the apple on the table' when defined using (1) denotes it regardless of whether the contained predicate is the mass predicate 'is sm apple', which is true of many parts of the apple, or the count predicate 'is an apple', true only of the whole apple.

It would be nice to have a general theory of definite descriptions in which the Russellian ones did emerge as a species. But (1) will not quite do the job, because it lets in too much. If G is the predicate 'is an author of *PM*', then (1) unfortunately denotes something like the "sum individual" Whitehead + Russell, or perhaps the class {Whitehead, Russell}, whereas the definite description 'the author of *PM*' should fail to denote. (1) was

[2] (Quine 1960, p. 91.) It is important to notice that to be cumulative, G must apply to the sum of *any* set, finite or infinite, of items satisfying G. This point is sometimes missed. For example, Richard E. Grandy calls a predicate F cumulative if "the sum of any two [*sic*] F's is itself F" (p. 298). Goodman simply lacks the concept; he calls a predicate *collective* if it is satisfied by the sum of every *two* individuals that satisfy it severally (p. 39). He then makes the common error of concluding that any such predicate will always be satisfied by *any* sum of individuals that satisfy it severally. All that actually follows is that such a predicate will be satisfied by any sum of a *finite number* of individuals that satisfy it severally.

intended as the analysis of 'the *G*' for mass predicates; it does work for them, but seems limited to them and to predicates satisfied by one object.

However, a small repair will eliminate this problem. Add the requirement that x satisfy G:

$$(2)\ (\imath x)\ [Gx\ .\ (Gy \supset_y y \leq x)\ .\ (z)\ ((Gy \supset_y y \leq z) \supset x \leq z)].$$

When G is mass it is cumulative, so this is no different from (1); when G applies to just one object this is no restriction either (G will be trivially cumulative). So none of the virtues of (1) are lost by replacing it with (2). Now most *count* terms are not cumulative, so that if G is a singular count term, 'the *G*' defined as (2) will usually fail to denote if G is satisfied by more than one object. Using (2), 'the author of *PM*' no longer denotes anything, since the sum of Whitehead and Russell is not an author of *PM*. This was the effect desired.

There are a few apparent count terms which are cumulative, however. If my room contains a large table made by joining two smaller tables, 'the table in my room' will, on my account, denote the large sum-table, whereas one might think this description should be improper like 'the author of *PM*'. But actually, if in such a situation I said, "Put the bread on the table," wouldn't I be referring to the large sum-table? I believe so. Hence this is a count-term counterexample to Russell's analysis, but not to my account.

It is not completely clear what a count term is. But consider a definite mass description such as 'the beer on the table'. This requires a notion of sum as in (2) for its analysis. Now add a *nominal measure word*, such as 'pint', to form the new definite description 'the pint of beer on the table'. Notice that if there are only .9 pints of beer on the table, this new description fails, since the predicate 'is one pint of beer on the table' applies to nothing. If there are 1.1 pints of beer on the table, then that description also fails—not merely because the predicate applies to a large number of items (i.e., to every one-pint part of the

1.1 pints)—but because it fails to apply to their sum.[3] This is another case where (2) is preferable to (1) in not assigning a denotation to such a description. If there are exactly 1.0 pints of beer on the table, then the predicate is true of just one item, namely that 1.0 pints of beer.

More generally, the Russellian analysis does give the correct analysis of definite descriptions whose contained predicate consists of a mass term governed by a noncumulative nominal measure word. This is at least one species of count noun phrase: 'cup of coffee', 'slice of pie', etc. Sharvy 1978 showed that all apparent count nouns can be reparsed as combinations of nominal measure words and cumulative predicates, as in Chinese.

The syntax of a definite description does not reveal whether the contained predicate is mass or count. Suppose that on my table are a heap of cake crumbs and a cake of soap. Then the definite description 'the cake on the table' is ambiguous, because it can be generated from two distinct predicates: (i) 'is cake on the table', or (ii) 'is *a* cake on the table'. The heap of crumbs is cake but is not *a* cake; the soap is *a* cake but is not cake. (See Sharvy 1978 for more examples on this pattern.) David M. Perlmutter has argued that the indefinite article is derived from the numeral 'one'. So the second predicate here is actually (ii′) 'is *one* cake on the table'. On the count sense of the contained predicate, the definite description 'the cake on the table' does then mean 'the one cake on the table', as Russell thought. But this is not because 'the' means 'the one'; rather, it is because 'one' is actually in the contained predicate (ii′).

Even so, when we do have a cumulative count term, such as 'set of men in Auckland', 'quantity of coffee in this room', or 'table in my room' (where my room contains two tables joined

[3] Christine Swanton observed that if there is a pint glass of beer on the table and also a half-pint glass, 'the pint of beer on the table' could properly be used to refer to the beer in the pint glass. My solution to this objection is that in such a use 'pint' means 'spatially connected but separated pint'. In that sense, if on the table are a two-pint jugful, three pint glassfuls, and six half-pints, when I ask you how many pints of beer are on the table, you answer, 'Three'. A pint consisting of the beer in two half-pints does not count because it is not connected; a pint contained within the two-pint jug does not count because it is not separate. I think that we simply have here a common, but distinct, use of words like 'pint'. It is a "container" use rather than an "amount" use.

to make a third), definite descriptions such as 'the set of men in Auckland' and 'the quantity of coffee in this room' are not 'the *one* set of men in Auckland' or 'the *one* quantity of coffee in this room' (there are many such sets and many such quantities) in the inverted *iota* sense. Rather, such expressions denote the set of all men in Auckland and the quantity of all the coffee in this room.

By the way, I include as a mass term any result of qualifying a mass term so that the resulting term is still cumulative. Thus 'gold in Zurich' is a mass term resulting from so qualifying the mass term 'gold'. On the other hand, the phrase 'gold worth less than $100' is not cumulative in any universe containing more than $100 worth of gold—its extension will not contain the sum of the items that satisfy it. That is precisely why the definite description 'the gold worth less than $100' will fail to denote in such a universe.

I will not use (2) as my analysis of 'the *G*'. But that is *only* because (2) can be simplified considerably. The least upper bound of the items satisfying a predicate *G* need not itself satisfy *G*. But if it does (and (2) says it does), then it can be more easily specified as the "largest" *G*:

$$(3)\quad (\imath x)\,(Gx\;.\;(Gy \supset_y y \leq x)).$$

(2) can be shortened to this because the contained conditions of the two expressions are equivalent. The first conjunct of the contained condition in (2) obviously implies the third conjunct, so it can be dropped, yielding (3).

One application of this new theory of descriptions arises with Quine's suggestion that names be reparsed as general terms. Hochberg (p. 553) objected that predicates like 'socratizes' are not ordinary general terms, for they are required to apply to just one object. Quine responded (1960, pp. 182–83) that the predicate 'is a socrates' could be a general term true of many items—of Socrates's spatiotemporal parts. Then he writes 'Socrates' not as '$(\imath x \cdot x$ is a socrates)', but rather as '$(\imath x)$ (y is a socrates $\equiv_y y \leq x$)'. On the natural assumption that being a socrates is *dissective* (true of any part of anything it is true of), this is equivalent to the instance of (3) with G read as 'is a socrates': '(ιx) (x is a socrates . (y is a socrates $\supset_y y \leq x$))'.

This latter form using (3) is preferable to Quine's, because it allows 'Socrates' to be defined *without having to decide* whether being a socrates is a property of one object only (Socrates) or of many (his parts). Either way, 'the socrates', using (3) as its analysis, denotes the one whole Socrates. This is similar to the situation where there is one pizza on the table; the definite description 'the pizza on the table' denotes it whether 'pizza' is read as a count term or as a mass term. Also, the form of (3) is preferable to Quine's version, because the pattern in (3) does not require the predicate G to be dissective.

I will not define 'the G' as (3), however. But again, this is only because there is a way of reducing (3) to something that is equivalent but shorter. A discussion of uniqueness and the *indefinite* article will yield our definition of 'the G'.

2. *The Indefinite Article.* One problem with (3) is that it explicitly uses Russell's inverted *iota*, and so might seem to be dependent on Russell's analysis of definite descriptions. But I want a more general analysis, of which the Russellian description will be a special case. The solution to this problem emerges as a bonus when we solve another aesthetic difficulty: that (3) is still too long. (3) is too long, in that it will yield excessively complex formulas when eliminated from its contexts. 'F(the G)' would expand to:

$$(\exists x)\ (Gx\ .\ (Gy \supset_y y \leq x)\ .\ \{(z)\ (Gz\ .\ (Gy \supset_y y \leq z)\ .\supset z = x)\}\ .\ Fx)\ .$$

But the conjunct within braces is redundant; it is a consequence of the first two conjuncts, given the antisymmetry of $\leq$.[4] That is, if anything is a $\leq$-maximal G then nothing else is, so to *say* that nothing else is is redundant. I would raise a similar ob-

[4] By *antisymmetry* is meant that $(x)\ (z)\ (x \leq z\ .\ z \leq x\ .\supset x = z)$. To prove the redundancy of the clause within braces, use Gx and note that then $(y)\ (Gy \supset y \leq z)$ implies $x \leq z$. Then the second conjunct $(y)\ (Gy \supset y \leq x)$ and Gz imply $z \leq x$. Then antisymmetry yields $z = x$.

jection to the common practice of defining the extension of a predicate G as:

$$(\iota x)\,(y \,\varepsilon\, x \equiv_{y} Gy)\ .$$

Given extensionality (the antisymmetry of $\subseteq$), at most one item x satisfies the contained condition, so the "nothing else does" clause that appears in the expansion of contexts containing this expression is redundant.

The Russellian 'the' in (3), that is, the 'ι', could then be 'a'. Sharvy 1972b defined an incomplete symbol to express the indefinite article:

$$(\text{ə}y \cdot Gy)\ .$$

This is pronounced 'a y such that Gy', or simply 'a G' (or, when G is mass or plural, 'sm G'). It has no meaning in isolation, but we may write '$F(\text{ə}y \cdot Gy)$', or better, '$(\text{ə}y \cdot Gy)Fy$', for '$(\exists y)(Gy \cdot Fy)$'.

The schwa 'ə' was chosen for its pronunciation and for being a lower-case '$\exists$'. The notation gives us an incomplete symbol for expressions like 'a man'; recall that such expressions were grouped by Russell (1905) along with definite descriptions as "denoting expressions." The 'ə' is a cousin of Hilbert's 'ε'; however, his '$\varepsilon_x A(x)$' somehow denotes a particular representative A, and it is taken as a primitive rather than as an incomplete symbol. (See Hilbert and Bernays, vol. 1, pp. 392–407; vol. 2, pp. 1–16; and Leisenring, pp. 4–6, 33–34. Leisenring suggests that their 'η' (vol. 2, p. 10) represents the indefinite article.)

But with this alteration of (3) we have our definition of 'the G':

$$(4)\quad (\text{ə}x)\,(Gx\ .\ (Gy \supset_{y} y \leq x))$$

—a G that every G is part of; sm G that all G is part of. This deserves a notation. I will use a *mu*, and write:

$$(\mu x \cdot Gx)$$

as an abbreviation of (4). The style is intended as an incomplete symbol or complex quantifier as in Sharvy 1969 and Sharvy 1972a. This style has the advantage of preserving notationally the oft-ignored essence of Russell's "On Denoting," which is simply that what he (unfortunately) calls "denoting expressions" (e.g., 'a man', 'nobody', 'the chicken on the table') are *quantifier nouns* (see also Sharvy 1972a, p. 157). As quantifiers, they make it possible for ambiguities of *scope* to occur. The sentence 'a woman has not arrived' is ambiguous as to the relative scope of 'a woman' and 'not'. The two senses are easily distinguished when 'a woman' is viewed as a quantifier noun using the present notation: '$\sim$(ə$x \cdot x$ is a woman) (x has arrived)' vs. '(ə$x \cdot x$ is a woman)$\sim$(x has arrived)'. The sentence 'I believe Benjamin's fool's gold is real gold' is ambiguous in just the same way: 'I believe ($\mu x \cdot x$ is Benjamin's fool's gold)(x is real gold)' vs. '($\mu x \cdot x$ is Benjamin's fool's gold) I believe (x is real gold)'. Of course the latter of these is more likely, but both are at least sensible.

It now turns out that we have a theory of descriptions that differs from Russell's in only the smallest way. Whereas Russell's '($\iota x \cdot Gx$)Fx' expands to:

$$(\exists x)\ (Gx\ .\ (Gy \supset_y y = x)\ .\ Fx)\ ,$$

my '($\mu x \cdot Gx$)Fx' expands to

$$(\exists x)\ (Gx\ .\ (Gy \supset_y y \leq x)\ .\ Fx)\ .$$

'$\leq$' just replaces '$=$'. This new theory works for both definite singular descriptions and definite mass descriptions. I will now consider

3. Definite Plural Descriptions. Phrases like 'the sheep in New Zealand' and 'the people in Auckland' are also ordinary and common definite descriptions, and they do denote. But because their contained predicates are *plural predicates* like 'are people in Auckland', which apply to more than one object, such expressions are not subject to a Russellian analysis. There is no such thing as ($\iota x \cdot x$ are people in Auckland), since a number of distinct items satisfy the predicate—the men in Auckland are people in Auckland, and so are the women in Auckland and the children in Auckland.

The definite plural description 'the people in Auckland' designates the *sum* or *totality* of all the people in Auckland. This is the sum of all that to which the predicate 'are people in Auckland' applies: the sum of all the items such as the women in Auckland, the children in Auckland, etc., that satisfy the plural predicate 'are people in Auckland'.

What sort of entity is the denotation of a definite plural description such as 'the children in Auckland'? A first attempt might be to say that such expressions denote *sets* or *classes*. Then a *sum* of such items would be the *union* of such classes. Russell would insist on calling the people in Auckland a "class as many" (1903, pp. 68–72, 76–77). But if the predicate 'are people in Auckland' is taken to apply to *x* just if *x* is a set of people in Auckland,[5] then the definite plural description 'the people in Auckland' refers to the union of these sets: $\bigcup\{x$: x is a set of people in Auckland$\}$. So let us first consider set-theoretic union as a candidate for the sort of sum needed here in the analysis of definite plural descriptions.

This might seem more complicated than '$\{x$: x is a person in Auckland$\}$', which refers to the same class. But the former expression has the advantage of preserving the predicate as a plural predicate, as it appeared in the original definite plural description. A standard definition of union is $\bigcup\alpha = \{x\colon (\exists y)(x \,\varepsilon\, y \,.\, y \,\varepsilon\, \alpha)\}$ (cf. Quine 1963, p. 53). In my notation this would be written:

$$\bigcup\alpha = \{x\colon x \,\varepsilon\, (\,\ni y \cdot y \,\varepsilon\, \alpha\,)\}$$

—the *x*'s that are a member of some member of α. Quine observes

[5] I do not say 'nonempty' simply because it would be redundant: no class *of people* is empty. I do include the singletons, so that {Sharvy} are people in Auckland. This might seem odd. However, the instances or instantiations of 'all men are mortal' include sentences like 'Sharvy is mortal' along with sentences like 'the men in Auckland are mortal'; thus, the plural does include the singular. Notice that 'all men are mortal' should be symbolized '(x) $(x$ are men $\supset$ x are mortal$)$'; logic students are generally wrongly taught to write '(x) $(x$ is a man $\supset$ x is mortal$)$', which is more properly a symbolization of 'every man is mortal', which has the singular subject 'every man'.

that if everything is a class, this definition implies that the union $\bigcup \{x\}$ of a singleton is its member x; this effect is preserved for an apparent nonclass by identifying it with its own unit class. So with this convention, if G applies to exactly one object, then $\bigcup\{x\colon Gx\} = (\,\iota x \cdot Gx\,)$. So the Russellian definite singular description again emerges, here as a species of definite plural description.[6] This would occur with, e.g., 'the men in this room' if there were exactly one man in the room.

Notice also that plural predicates, like mass predicates, are cumulative: any sum of parts which are cats are cats. So 'G(the G)' holds for any instantiated plural predicate when 'the G' is defined as such a sum: the men in Auckland are men in Auckland, the poor are poor, etc.

The analysis of definite plural description as union is not entirely satisfactory. One reason is that it explicitly uses the mechanism of class abstraction and the membership relation in a way that requires that such definite plural descriptions do denote classes. Now there is no problem about what 'the people in Auckland' denotes: it denotes the people in Auckland. Whether the people in Auckland are a *set* or *class* is an ontological question that should be discussed elsewhere. (Indeed, ontological questions generally should be independent of a theory of descriptions: we should be able to explain phrases like 'the first symphony of Beethoven' without discussing the ontological nature of symphonies.) My aim here is simply to explain plural definite descriptions like 'the people in Auckland' in a way that remains neutral on that ontological question by avoiding explicitly set-theoretic notions.

Another reason to turn away from the above analysis of 'the G' as '$\bigcup\{x\colon Gx\}$' is that it lacks generality. It lets in too much

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[6] I thank W. V. Quine for calling my attention to this passage. 'one object' means 'one *class*'. Consider the predicate 'are men and women in this room', and suppose the room contains just one man, m, and one woman, w. Then only one object, $\{m,w\}$ satisfies that predicate, and $\bigcup\{\alpha\colon \alpha$ are men and women in this room$\} = \bigcup\{\{m,w\}\} = \{m,w\} = (\,\iota\alpha \cdot \alpha$ are men and women in this room). See note 8 also.

Consider the definite description 'the square root of 2'. This is ordinarily used to refer to the *positive* square root of 2. My theory explains this; if real numbers are defined in the usual way as lower cuts of rationals (cf. Russell 1903, ch. 33), the positive root is the union of the negative and positive roots.

when applied to a *singular* definite description whose contained predicate applies to more than one object: 'the author of *PM*' would denote {Whitehead, Russell}. This was Frege's convention (§11), but it is clearly artificial; 'the author of *PM*' should fail to denote.

And finally, '$\cup\{x\colon Gx\}$' just doesn't look enough like the analysis given earlier of definite *mass* descriptions. Mass terms and plural terms are alike in numerous ways, and it would be nice if their uses in forming definite descriptions had analyses that reflected this similarity. Specifically, we should express summation without using the membership relation ε, which has no analogue in the semantics of mass terms.

The solution is to observe that there is a *part of* relation available: the men in Auckland are part of the people in Auckland. (This relation looks very much like the relation of being a non-empty subset of.) Writing it as '$\leq$', we may then define 'the *G*' for plural predicates as (4) above: sm *G* that all *G* are part of.

The requirement in (4) that *x* satisfy *G* is useful for distinguishing the definite plural description 'the authors of *PM*' from the definite singular description 'the author of *PM*'. The former denotes Whitehead and Russell, as it should.[7] Without the requirement that *x* satisfy *G*, using (1) or simply union, so would the latter. But although Whitehead and Russell are author*s* of *PM*, they are not *an author* of *PM*. That requirement also leads to the intuitively correct results for expressions like 'the Wilmington Ten' and 'the five men in this room'. If there are only four men in this room, the description 'the five men in this room' fails to denote because the predicate 'are five men in this room' applies to nothing. If there are six men in this room, then that description also fails to denote—not because that predicate applies to more than one item (i.e., to every part of the six containing just five men), but because it fails to apply to their sum.

A word of caution about *part* is needed here. I am taking it in what I think is its plain and ordinary sense. However, Goodman, Quine, and other writers on the theory of parts (mereology) have used it in an extended sense which is not appropriate here.

[7] But it does not denote Whitehead, and it does not denote Russell. The property of being denoted by an expression is not dissective. I may refer to something without referring to each of its parts.

The difference is that these writers combine mereology with a kind of *materialism*. (An exception is Foradori.)

Thus Quine writes, "there are parts of water, sugar, and furniture too small to count as water, sugar, furniture" (1960, p. 99). Here, by 'parts of furniture' he means something like 'spatiotemporally determined parts of the material constituting the world's furniture'; by 'parts of water' he means 'spatiotemporally determined parts of the world's water'. However, in the ordinary sense of 'part', the parts of water are hydrogen and oxygen. In the ordinary sense of part, shrimp is a part of shrimp salad. Here, the words 'shrimp' and 'shrimp salad' refer to types or kinds, and not to the world's shrimp and the world's shrimp salad. Indeed, the world's shrimp is not part of the world's shrimp salad.

Now, my furniture is part of the world's furniture, and the chair in my billiard room is part of my furniture. But is a leg of that chair part of my furniture? I doubt it. In a distinguishable sense of 'part', a leg of my chair is *a* part of that chair and *a* part of my furniture. In the plural of that same sense, the legs are part*s* of my furniture. But those legs are not *part* of my furniture. The *matter of* the legs is part of the matter of the furniture; also, the *chairs* in my billiard room *are* part of my furniture. But the legs of the chairs are not part of the furniture. The men in Auckland are part of the men and women in Auckland, but the arms of the men in Auckland are not part of the men and women in Auckland. The explanation is *not* that the arms fail to satisfy the contained predicate 'are men and women in Auckland', for the men in Auckland also fail to be men and women in Auckland. Rather, the explanation is that *x* are part of *y* in this ordinary sense just if *x* are *some of y*.

Notice the difference between 'some' and 'some of'. It's true that some of the men and women in Auckland are men, but false that some men and women in Auckland are men. It's true that some of the whiskey-and-water in my glass is water, but false that some whiskey-and-water in my glass is water. 'part of' and 'some of' seem to be synonymous here; examples like these occur with mass and plural predicates that are not dissective. The legs of my chair are not part of my furniture, because it's false that they are some of my furniture. Given our understanding of 'part' then, being furniture and being men in Auckland are dissective properties; it is compounds like 'are men and women' that fail to be dissective.

So only articles of furniture count as part of my furniture. It is a totally distinct feature of Goodman's system that causes his notion of 'part' to be broader than mine, so that, e.g., the chair legs are also part of my furniture. That feature is a sort of *materialism*. The set of my tables $\neq$ the set of my table tops and legs; but the *matter of* my tables = the *matter of* my tops and legs. If we remove this materialism from mereology, we have a purer theory of part and whole, and consequently of sum. The mereological sum, then, of my articles of furniture is my furniture, and not the *matter of* my furniture.

With this ordinary and intended sense of 'part', then, the expressions 'the counties of Utah' and 'the townships of Utah' will have distinct denotations, as they should. Without the distinction made above, they might appear to collapse into the same object, since the *territory occupied by* the counties is identical to that occupied by the townships; (μx) (x is territory of (μy) (y are counties, etc.)) = etc.

What sort of entity is denoted by the definite plural description 'the men in Auckland'? This question contains the mistaken implication that this phrase denotes *a single* entity. But the phrase 'the men in Auckland' obviously denotes the men in Auckland. One might ask, "What sort of entit*ies* are *those*?" But the answer is easy: they are entities that eat, drink, sleep, and are numerous.

The error to avoid is an insistence on the singular. 'the men in Auckland' is not a singular term—it is a plural term. This should hardly need to be said. But some writers have gone astray by failing to see that plurals are plural, and so insisting that they must denote something singular. For example, Richard E. Grandy says that in the sentence 'Lions are widespread', " 'lions' must be a singular [*sic*] term denoting the class of lions" (p. 297). Given this, it will follow that a certain class is widespread (which does not seem as odd to me as it might to many). But what seems odd is that Grandy claims that it does not follow from his statement that any class is widespread; apparently he prefers to give up the indiscernibility of identicals rather than the dogma that classes are "abstract."

Now the words 'set' and 'class' have uses as dummy nominal measure words whose only function is the syntactic one of turning a plural into an apparent singular:

> the rational numbers *are* countable → the set of rational numbers *is* countable.

But no semantic consequences follow from such a use of the words 'set' and 'class'. The rational numbers are the set of rational numbers; the set of rational numbers is the rational numbers. The people in this room weigh 1000 kilograms; the set of people in this room weighs 1000 kg. The men in this room are not abstract; the set of men in this room is not abstract. We can avoid Grandy's contortions simply by taking the plural seriously as a plural, and abandoning the fetish for the singular that pervades contemporary decadent Western ontology.

Along these same lines we can affirm that (i) 'the world's lions are widespread' and (ii) 'the world's lions are mammalian' do have the same logical form. In particular, the form of (ii) is 'Ml' and not '$(x)(Lx \supset Mx)$'; this is clear for (i). Question: how, then, does (ii), along with 'Aslan is a lion' imply 'Aslan is mammalian'? Answer: the implication is not a formal one at all, but depends on the fact that 'are mammalian' is dissective; 'are widespread' is not dissective. This situation is quite familiar: 'Ben weighs less than 60 kg' and 'Ben's nose is part of Ben' imply 'Ben's nose weighs less than 60 kg'. But again, the implication is not formal—it is not due to the logical form of these statements (this is easily seen by putting 'more' for 'less'). Rather, the implication holds because 'weighs less than 60 kg' is dissective.

4. Conclusion. For any given predicate G there is an appropriate *part of* or *some of* relation $\leq$ on the extension of G.[8] Notice that

[8] The structure $\langle\{x: Gx\},\leq\rangle$ is often a mereology, i.e., a model of the so-called calculus of individuals. But it may fail to be a mereology. I define a *quasi-mereology* to be any structure $\langle S,\leq\rangle$ where $\leq$ partially orders S (reflexive, transitive, antisymmetric), and where the $\leq$-least upper bound of α is a member of S for every nonempty subset α of S. One interesting type of quasi-mereology results from taking the algebraic direct product of two

for most singular count predicates, $\leq$ is just the identity relation: for 'is a shoe I own' $\leq$ is the identity relation, for the extension of that predicate contains no *two* objects of which either is part of the other. Regardless of how many shoes I own, $x \leq y$ only if $x = y$, for every x and y in that domain.

In all such cases, '$(\mu x \cdot Gx)$' defined as (4) comes out as desired, designating the gold in Zurich or the men in Auckland; and if I own just one shoe, '$(\mu x \cdot x$ is a shoe I own$)$' designates it, but otherwise that description fails. The analysis of 'the *G*' as (4) is therefore a general theory of definite descriptions, of which definite mass descriptions, definite plural descriptions, and Russellian definite singular count descriptions are species.[9]

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full mereologies. (This description of the situation is due to Mark Nixon.) For example, $\langle M, \subseteq \rangle \times \langle W, \subseteq \rangle$, where M is the set of sets of men and W is the set of sets of women, is isomorphic to $\langle MW, \subseteq \rangle$, where MW is the set of sets of men and women, i.e., of sets containing at least one man and one woman. $\langle MW, \subseteq \rangle$ is simply the corresponding quasi-mereology of the predicate 'are men and women'; this predicate is satisfied by the people in Auckland (they are men and women), but not by the men in Auckland. The structure fails to be a mereology because it is not properly closed under subtraction: there are sets a, b, each of which are men and women, and where $a - b$ is not null yet fails to be men and women; $a - b$ might just be men.

However, we can combine the mereologies $\langle M, \subseteq \rangle$ and $\langle W, \subseteq \rangle$ so that a mereology results. Add the null element to each, take the direct product, and then remove the null element:

$$(\langle M \cup \{\phi\}, \subseteq \rangle \times \langle W \cup \{\phi\}, \subseteq \rangle) - \langle \langle \phi, \phi \rangle, \subseteq \rangle.$$

This is isomorphic to the mereology corresponding to the predicate 'are adults', i.e., to the set of nonempty subsets of the set of all men and women, under subset: $\langle \mathcal{P}(\cup (M \cup W)) - \{\phi\}, \subseteq \rangle$.

[9] We have an account of the generic 'the' along these same lines. The New Zealand Flag is a New Zealand flag to which every New Zealand flag bears a certain relation $\leq$. This seems a little more natural if we add the syllables 'akes' or 'icipates' to the word 'part' in reading '$\leq$' here: the New Zealand Flag is that New Zealand flag in which every New Zealand flag participates. The fact that it participates in itself does not lead to a "third man" regress, because participation in, as a variant of the *part of* relation, is not used to *explain* predication; predication remains primary.

Of course, nothing in my discussion requires that there be such an entity (nor does anything here count against it). My theory is quite neutral. If there is such an entity, '$(\mu x \cdot x$ is a New Zealand flag$)$' picks it out. If there is no such entity, but merely a number of flags none of which bears $\leq$ to anything but itself, then $\leq$ is coextensive with the identity relation on those flags, and the situation is the same as for 'my shoe'. (John Bacon, however, claims

With this analysis and some thought about examples of definite mass descriptions and definite plural descriptions, we see that the primary use of 'the' is not to indicate uniqueness. Rather, it is to indicate totality; implication of uniqueness is a side effect.

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that "mass nouns and plurals are in the same onomastic boat as generic descriptions. All denote or none do" (p. 331).)

Finally, the One is a one that every one is part of; the Many are a/sm many that all many are part of.

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