

DRAFT

Variables, Generality and Existence: considerations on the notion of a concept-script

‘We persist in breaking reality down somehow into a multiplicity of identifiable and discriminable objects, to be referred to by singular and general terms’. W. V. O. Quine, ‘Speaking of Objects’

‘Seldom if ever does Nature operate in closed and separate compartments, and she has not done so in distributing the earth’s water supply. Rain, falling on the land, settles down through pores and cracks in soil and rock, penetrating deeper and deeper until it reaches a zone where all the pores of rock are filled with water, a dark, subsurface sea, rising under the hills, sinking beneath valleys. This groundwater is always on the move, sometimes at a pace so slow that it travels no more than 50 feet a year, sometimes rapidly, by comparison, so that it moves nearly a tenth of a mile in a day. It travels by unseen waterways, until here and there it comes to the surface as a spring, or perhaps is tapped to feed a well. But mostly it contributes to streams and so to rivers. Except for what enters streams directly as rain or surface runoff, all the running water of the earth’s surface was at one time groundwater. And so, in a very real and frightening sense, pollution of the groundwater is pollution of water everywhere’. Rachel Carson, *Silent Spring*

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1. *Ontology and concept-script*. In that semantic tradition of which Frege and Russell are among the most distinguished members, the project of formalising natural-language sentences is not simply a matter of developing smooth and effective techniques for the representation of reasoning. Over and above the representation of valid inference as valid, and invalid inference as invalid, there is a further objective. Logic in this tradition is what Frege himself famously calls a *concept-script*, the import of the notion being chiefly that in *natural* languages, as Frege emphasizes, ‘the connection of words corresponds only partially to the structure of concepts’, thereby compelling the logician to ‘conduct an ongoing struggle against language and grammar, insofar as they fail to give clear expression to the logical’.¹ In the more recent past, a kindred overall approach is forcefully expounded in the work of Quine, who writes, albeit with a positivistic slant, that

the simplification and clarification of logical theory to which a canonical logical notation contributes is not only algorithmic, it is also conceptual... each elimination of obscure constructions or notions that we manage to achieve, by paraphrase into more lucid elements, is a clarification of the conceptual scheme of science.²

The approach is one with which I find myself in general sympathy, and the contrast between clear and less-than-clear ‘expressions of the logical’ is fundamental to the framework of this piece. Though it has not always received the understanding and respect which it deserves, the ideal of a logically transparent language represents no merely interesting episode in the history of ideas. It embodies, rather, a permanently valid insight, an enduringly valuable ideal for any analytical approach to philosophy. The remarks which follow constitute the summary outline for an elucidation and defense of this ideal — and also for an exploration of its limits.³

Now Frege’s clear expression of the logical is clarity as to the form of what is *said*; and since clarity concerning what is said must call for clarity concerning what one talks *about*, or what is said to *be*, clear expression of the logical is also clear expression of the *ontological*. Indeed, the two concerns may well be seen as more or less identical; hence Quine, again, in stressing the relationship of logic to ontology, insists that ‘the quest of a simplest, clearest overall pattern of canonical notation is not to be distinguished from a quest of ultimate categories, a limning of the most general traits of reality’.⁴ Or as he also writes, to ‘paraphrase a sentence into the canonical notation of quantification is, *first and foremost*, to make its ontic content explicit’.⁵ This emphasis

upon the ontic content and its explicit or transparent formulation is to be found also in Russell, who writes of what he calls a 'logically perfect language' that it must be such as to '*show at a glance* the logical structure of the facts asserted or denied'.⁶

At the end of the day, the notation which 'thus confronts us as a scheme for systems of the world', Quine tells us, is precisely

that structure so well understood by present-day logicians, the logic of quantification or calculus of predicates... all traits of reality worthy of the name can be set down in an idiom of this austere form if in any idiom.⁷

And let us, in this connection, agree to put entirely to one side all issues relating to extensionalism in metaphysics, issues which in any case it might perhaps be possible address in *some* 'idiom of this austere form, if in any'. There nevertheless remains, as it seems to me, a quite specific question as to whether and in what sense Quine's assertion is correct. The question focusses upon, but does not concern exclusively, a category of nouns which are sometimes characterized as *mass* nouns, but which, for reasons I shall not pursue, I here describe as nouns which are *non-count*. Non-count nouns (*NCNs* for short) are one of two great categories into which common nouns may be exhaustively divided, the other, evidently, being that of count nouns (*CNs*).

2. *Two great semantic categories.* *CNs* include words like 'number', 'sheep' and 'car', *NCNs* such words as 'water', 'gold' and 'trash'. With *CNs* we may ask, almost truistically, 'How many...?', whereas with *NCNs*, whether abstract or concrete, we may only ask 'How much...?'.⁸ In the nature of the case, *CNs* alone accept numerical adjectives ('one', 'two', etc.) along with the quantifiers 'every', 'each', 'a number of', 'few' and 'many' ('so few', 'too few', 'so many', 'too many').⁹ *NCNs* by contrast characteristically accept either 'a degree of' or 'an amount of', as well as 'much' and 'little' ('so much', 'too much', 'so little', 'too little').¹⁰

NCNs typically receive no significant examination, perhaps not even a single mention, in standard logic texts. They do not figure in such texts, because they simply do not figure in our logico-semantic canon.¹¹ Here I mean to raise the question of just what their logico-semantic status is, in relation to the concepts and the apparatus of the canon. The general import of the arguments which follow is that the 'facts which are asserted or denied' through using *NCNs* are at least semantically distinct from those involving *CNs*; and more particularly, that while a formal system of quantifiers and variables is reasonably well-suited to the intrinsic logic of *CNs*, the same cannot be said for that of *NCNs*.

Now *the* most fundamental feature of *NCNs* consists precisely in the fact that they are *non-count*. What then is it to be *count*? *CNs*, or their occurrences, are semantically *either* singular ('thing', 'apple', 'piece of clothing') *or* plural ('things', 'apples',

‘clothes’). To be non-count (‘stuff’, ‘water’, ‘clothing’) is therefore to be *neither* singular *nor* plural. NCNs are then semantically *non-singular*, simply in virtue of being non-count; and it is this which underlies their often noted kinship with the plural — plural nouns themselves, self-evidently, are non-singular. The relationships between the semantics of CNs and NCNs may then be briefly represented in the following tableau (and here, of course, the equation ‘Non-singular + non-plural = non-count’ is tacitly affirmed):

Table I

| | 1. Singular (‘one’) | 2. Non-singular (‘not-one’) |
|--------------------------------------|---|---------------------------------------|
| 3. Plural (‘many’) | X X X | ‘things’ ‘apples’ ‘clothes’ |
| 4. Non-plural (‘not-many’) | ‘thing’ ‘apple’ ‘piece of clothing’ | ‘stuff’ ‘water’ ‘clothing’ |

The singular / non-singular contrasts are epitomized in Table I by those between ‘thing’ on the one hand, and ‘things’ and ‘stuff’ on the other; and the inclusion of the contrast between ‘clothes’ and ‘clothing’, alongside that of ‘apples’ and ‘water’, serves to emphasize the point that these contrasts are first and foremost *semantic* or quasi-semantic, as opposed to *metaphysical* or ontic contrasts (it being assumed that the ‘clothes’ / ‘clothing’ contrast itself is essentially a semantic one).¹²

What has to be the most obviously significant dimension of the contrast of CNs and NCNs consists in its correspondence with the distinction between what is and is not *countable*. At bottom, what this contrast embodies are distinct modalities of *quantity* or of *amount* — modalities which I propose to call ‘discrete’ and ‘continuous’ quantity. And though at first blush this contrast of discrete and continuous quantity might *sound* ontological, I have suggested that this is not, or not immediately, the case. The contrast is related to, though it does not coincide with, one of distinct modes for the *determination* and *specification* of quantity or amount — modes I shall call ‘counting’ and ‘measuring’.

3. *Continuity and discreteness.* ‘Counting’, as I intend to use the term, denotes the determination or specification of quantity through the use of natural number-related expressions — ‘one horse’, ‘two shirts’, ‘so many things’, ‘too few clothes’, ‘a dozen eggs’, ‘a single professor’, etc. In this preferred and intuitive sense, it is a truism that counting is applicable to the denotata of CNs *exclusively*. Measurement by contrast, while typically involving the use of numerals, is applicable to the denotata of both CNs and NCNs alike: we may speak both of ‘75 ccs of poppy seeds’ and of ‘75 ccs of water’, both of ‘2.5 kilos of apples’ and of ‘50 kilos of clothing’. In contrast with counting, *any* real number can in principle be assigned to the measure of an amount of something. The concept of weight, for instance, is such that it is intelligible to assign a weight of *n* kilos (where ‘*n*’ represents an integer), or of $n \times \Pi$ kilos, to a quantity of snow (rice, apples, clothing, underwear, water, etc.). And though measurement is applicable to the denotata of both NCNs and CNs, the denotata of NCNs, as such, may be *only* measured and not also counted. It is the latter which I call ‘continuous’ quantity; that which can be counted I refer to as ‘discrete’.

The non-ontic nature of this contrast is particularly obvious in the opposition of such words as the CN ‘clothes’ and its cognate NCN ‘clothing’. Though ‘clothing’ is continuous and ‘clothes’ discrete, to say that *there is* clothing here or there is to say no more than that *there are* clothes here or there — it is to commit one to the existence merely of individual pieces. In this respect there is good sense in Quine’s remark: ‘The contrast lies in the terms and not in the stuff they name... “shoe”... and “footwear” range over exactly the same scattered stuff’.¹³ For this reason, the semantic or quasi-semantic contrast between the two modalities of quantity seems best understood via the contrast of the two modalities for the determination and / or specification of quantity, rather than *vice-versa*. Though *pieces* of clothing may be counted, clothing *as such* is measured but not counted (such-and-such a volume, such-and-such a weight; any real number might be assigned to a measure of an amount of clothing). Though there are *units* of clothing, and in spite of the *ontological* equivalence of such ‘collective’ NCNs as ‘clothing’ with CNs, such NCNs are no less *semantically* non-count than ‘pure’ NCNs like ‘water’ and ‘mashed potato’. While there is a clear sense to talk of the smallest number of clothes — a single item of clothing — there is no clear sense to talk of the smallest amount of clothing; is one woollen winter coat the same amount of clothing as a single nylon stocking? It is false to call individual items of clothing, furniture, etc. *smallest amounts* of clothing, furniture, etc. In fact the very idea of *the* amount of clothing (or of cotton, snow, or sand) in a given region, as such and without qualification, seems lacking in significance. There is no unique measure of the amount of clothing in a warehouse; this might be specified, e.g., by volume, or by weight, or indeed by counting the number of bales; and these different measures cannot be expected to be correlated in any uniquely determinate way.¹⁴ The notion of continuous quantity seems relative to some specific *measure* of amount. Discrete quantity, by contrast, is a privileged modality of quantity

and counting seems a privileged modality for the determination of quantity; there is exactly *one* non-relative way of determining the quantity of eggs or pieces of clothing in a box, which is precisely to count them.¹⁵ While both ‘clothes’ and ‘clothing’ apply to what they are true of *en masse*, they do so *via* crucially distinct modalities for the specification of quantity.

Though not directly ontological, the contrast of discrete and continuous quantity is linked to certain ontic contrasts. Counting does of course involve discrete units; and though what is measured may consist of discrete units, measurement as such does not require it, and there are ontic category-differences *within* the semantic category of NCNs. Thus, contrast the two groups of NCNs (a) ‘furniture’, ‘footwear’ and ‘clothing’ and (b) ‘rubble’, ‘sand’ and ‘snow’, with group (c) ‘mashed potato’, ‘wine’ and ‘water’. Group (a) may be said to be ‘object-involving’ in that they are semantically ‘atomic’ — there are units of furniture, clothing, etc. (individual pieces of furniture, pieces of clothing, etc.) standardly not divisible into smaller units of furniture, clothing, etc. It is part of the *meaning* of such an NCN that like a typical CN, it ranges over discrete pieces, units or elements of what the NCN denotes; indeed the very *identity* of some furniture is not to be distinguished from that of some pieces of furniture. And group (b), though not thus atomic, are object-involving in that they may be said to be semantically ‘particulate’: it’s part of their meaning that what these words denote consists of discrete grains, flakes, bits, etc. etc., the difference being that the identity of some sand (snow, etc.) is not dependent on that of certain particular grains (flakes, etc.).

In contrast with groups (a) and (b), no such object-involving concepts enter into the meanings of the group (c) terms. Thus whereas to say that there is furniture or clothing in some region is to say that there pieces or units of furniture or clothing in that region, to say that there is wine or mashed potato in some region is not to say that there are objects characterisable as ‘pieces’ or ‘units’ of wine or mashed potato in that region. In the nature of the case, there is here no comparable notion of a piece or unit.¹⁶ Justice can and should be done to the ontic contrast between the idea of a range of discrete countables and that of an homogeneous medium or what Michael Hallet calls an ‘undifferentiated material’; but it must be done within the framework of an appropriately semantical conception of the CN / NCN contrast itself.

4. *The essential non-singularity of quantified non-count sentences.* CNs are either singular or plural, and as such, they or their occurrences are prone to vary in semantic value, even within the scope of a single argument.¹⁷ But NCNs are neither singular nor plural, and are incapable of variations in semantic value. Whether in the context of regular quantified sentences, or in referential contexts, they are non-singular in all of their occurrences; I review the former contexts first. And here, the non-singularity of NCNs is reflected in the twin facts that they do not combine with the singular

quantifiers such as ‘each’ and ‘every’, ‘a’ and ‘one’; and that the quantifiers with which they do combine, for instance ‘all’ and ‘some’, are themselves essentially non-singular, combining also with plural, but never with singular CNs.¹⁸ And being also non-plural, there is a truistic sense in which the non-count form is never, unlike that of many plural sentences, reducible to singular form.

Consider then what are, from the standpoint of their quantifiers, a group of ‘standardly’ quantified non-count sentences:

- [1a] All water is pure
- [2a] Some water is pure
- [3a] No water is pure
- [4a] Some water is not pure.

The quantifiers here involved are more familiarly combined with plural nouns — ‘men’, ‘Greeks’, ‘cars’ etc. — and plural verbs; in fact group [a] may be compared with what I’ll call a ‘classical base set’ of simple quantified CN sentences such as are represented in the standard predicate calculus —

- [1b] All cars pollute
- [2b] Some cars pollute
- [3b] No cars pollute
- [4b] Some cars do not pollute.

So far as the group [a] sentences are concerned, however, there is no standard recipe for the representation or understanding of their structure; non-count constructions do not enter into standard predicate calculus. (There are, as I have noted, suggestions and proposals which are matters of contention).

Now the group [b] sentences are, in fact, uniformly plural; but the quantifiers they involve are not peculiarly plural; they are rather, and more generally, non-singular, governing both plural count and non-count sentences alike. That is, subject to certain qualifications, the *only* bare general terms or predicates with which ‘all’ and ‘some’ *cannot* be conjoined are those which are singular in form. ‘All tree’, ‘all person’ and ‘all number’ just make no sense; they are not grammatically well-formed.¹⁹ The case of ‘some’ is more complex than that of ‘all’ since ‘some’ is ambiguous; it’s necessary to distinguish its use with either singular or plural CNs to speak of unidentified individuals — ‘Some turkey / turkeys spilled my wine’ — from the sense I here intend, in which it calls for either plural CNs or NCNs, as in, e.g., ‘I’ll have some soup’ or ‘We’ll boil some eggs’, where it may be said to be the non-singular indefinite article, signifying indefinite or indeterminate amount or quantity. In this latter sense, ‘some’ no more combines with singular CNs than does ‘all’; to thus speak of ‘some tree’ or ‘some person’ would be to enforce a non-count sense on ‘tree’ or ‘person’.

A key difference between groups [a] and [b] is that the latter group, being plural

sentences of a relatively simple type, can be paraphrased as singular, whereas non-count sentences can never be so paraphrased. And singular paraphrases of quantified plural sentences are crucial to their representation in standard predicate calculus, since sentences in that calculus are always cast as singular.²⁰ Insofar as there is such a thing as a ‘standard’ modern logic, that logic is not simply one of CNs — it is one of CNs which are either in, or are reducible to, the *singular form*, and correspondingly of predicates which are distributive in form, which are true of objects one by one. Group [a], however, cannot be paraphrased or reduced into singular form; they are *essentially* non-singular; and their kinship with the (*unreduced*) plural sentences of group [b] is absolutely vital to an understanding of their structure.

Nevertheless, it is the fact that these sentences are essentially non-singular, and not that they are *non-plural*, which precludes the possibility of singular paraphrase or equivalence; for there are plural sentences which are likewise irreducible. Much as grammar prohibits analysis of the quantified *non-count* group along the singular lines of the classical base set, so it prohibits representation of the *plural count* sentences

[1c] All cattle have tails

and

[2c] Some clothes are tailored

as the singular sentences

[1c'] *Each cattle has a tail

and

[2c'] *At least one clothe is tailored.

It's the merest truism that where a quantified subject expression involves a plural invariable noun, as in [1c] and [2c], no *non-plural* sentence, quantified or otherwise, involving that same noun can be constructed. These sentences are irreducible in an obviously weaker sense than that in which the group [a] sentences are irreducible; there are cognate CNs in terms of which they may be ‘paraphrased’ — [2c], for instance, may be paraphrased as ‘At least one *item of clothing* is tailored’.²¹ But *qua* plural invariable nouns, they cannot shift in semantic value from non-singular to singular; any string of words having a singular form which contains such a noun is bound to be ungrammatical. In this obvious if superficial sense they are *essentially* non-singular.²²

Now it is precisely a feature of the essentially non-singular universal and existential quantifiers ‘all’ and ‘some’ that they are able to license inferences involving non-singular nouns in a way that ‘each’ and ‘every’ cannot. For instance, even when no move is possible to ‘this F’, ‘all’ permits a direct connection between ‘all Fs’ and ‘these Fs’. An essentially plural quantified sentence such as

[1d] All clothes are made of polyester

has the power to *directly* license inferences between such non-quantified non-singular sentences as

These things are clothes
and

These things are made of polyester.²³

By the same token, [1d] might be said to ‘distribute collectively’ over whatever things *are clothes* — these clothes, the clothes on the first trans-Atlantic passenger flight, the clothes now in your bedroom, etc. Unsurprisingly, a similar point — and one which should seem almost equally trivial — may be made regarding NCNs. As with an essentially plural sentence like [1d], the essentially non-singular

[1e] All clothing is made of polyester

(or a compound hypothetical equivalent, e.g. ‘If some stuff is clothing it’s made of polyester’) can directly license inferences between such non-quantified sentences as

This stuff is clothing

and

This stuff is made of polyester.²⁴

Again, ‘clothing’ may be said to range over clothing much as ‘clothes’ ranges over clothes — that is, perforce, *en masse*. And since NCNs do not, like plural invariable nouns, vary in semantic value, being always non-singular, these non-quantified sentences in turn, like plural referential sentences, must be non-singular. In other words, the essential non-singularity of NCNs is reflected not only in the non-singularity of quantification involving NCNs; it is also reflected in the non-singularity of reference and definite denoting based upon such nouns. It is to this issue that I now turn.

5. *The essential non-singularity of non-count reference.* To say that non-count definite descriptions in particular are non-singular is to say precisely that they do not denote in accordance with Russell’s Theory of Descriptions (RTD) — that their denoting mechanism is not the one identified by Russell. For RTD is explicitly a theory of *singular* descriptions — of ‘*the* in the singular’ as Russell puts it — where a singular description is one commonly having the form of ‘the F’ and purporting to denote a single F, or denoting at most a single F. Briefly, Russell’s theory involves the claim that it’s a necessary condition of a definite description’s counting as singular that if the description (or sentence containing it) is to denote, the term or concept ‘F’ itself should apply, contextually or otherwise, *uniquely*. This seems to me to be correct; and it seems, furthermore, that the nature of NCNs is such that they are simply *incapable* of having unique application.

To illustrate the Russellian point, consider a sentence whose semantic value is, on account of ambiguity, unclear. For example,

[5a] The sheep in Russell’s meadow slept

may be read as either singular or plural, but such a sentence can be disambiguated in context by its truth-conditions. Thus if ‘the sheep in Russell’s meadow’ is singular — if, that is, it purports to denote a *single* sheep — then the sentence must be construed as

[5b] The *one* (or *single*) sheep in Russell's meadow slept, which in turn entails

[5c] *There is* exactly one sheep in Russell's meadow.

It follows that if the description 'the sheep in Russell's meadow' purports to designate a single sheep, then the contained predicate 'sheep in Russell's meadow' itself must be supposed to be true of just one thing — that is, to apply uniquely. If on the other hand 'the sheep in Russell's meadow' is non-singular, no such implication will obtain.

And given this bonding of the singularity of a definite description with the uniqueness of application of its contained predicate, it seems plain that non-count descriptions must indeed be semantically non-singular. For if, by parity of reasoning,

[5a'] The clothing in the warehouse is made of polyester
were semantically singular, thereby denoting a single 'clothing-object', individual or thing, then it could not but mean

[5b'] The *one* (or *single*) 'clothing-object' in the warehouse is made of polyester.

And this in turn could not but entail

[5c'] *There is* exactly one 'clothing-object' in the warehouse.

But since whatever stuff is *some of* the clothing in the warehouse is *also* clothing in the warehouse, [5c'], hence [5b'], could not generally be true. The fact that 'the clothing in the warehouse' can have denotation, consistently with the contained predicate 'clothing in the warehouse' having what may be called 'multiple applicability', demonstrates that 'the clothing in the warehouse' cannot possibly mean 'the *one* ___ of clothing in the warehouse'.²⁵ It cannot, in short, be singular. There can be no such single thing or object as the clothing in the warehouse; that clothing is *so much* stuff (and, indeed, *so many* things) but it is no *unit*, hence no constituent element in the existence of clothing. There are of course objects which are made up of individual pieces of clothing, and which have their own 'higher' principles of individuation, such as individual wardrobes, outfits, and heaps of clothing. But the only *units* over which 'clothing' *as such* ranges are the individual pieces; there are no other objects into which clothing may be 'divided'.

The clothing in the warehouse may be said to be *some* clothing, and a certain *amount* of clothing, much as the sheep in Russell's meadow may be said to be *some* sheep, and a certain *number* of sheep, just in case the relevant occurrences of 'sheep' are non-singular. But in general, there can be no such (single) object — hence no such *category* of object — as *some clothing*. The *number* of items of clothing in the warehouse is not determined by, and has nothing to do with, the *kind* of thing they are. Nor, likewise does the *amount* of clothing in the warehouse have anything to do with the kind of stuff it is. While to be is, among other things, to be *an* individual, it is never to be *some* individuals or *some* stuff; there are simply no such categories of things. Non-singular

referring expressions such as ‘the (items of) clothing here’ and ‘the (items of) clothing there’ do not underpin or ‘ground’ general or quantified statements concerning (items of) clothing — they do not indicate in what the existence of (items of) clothing *consists*.

Given a certain range of objects, the semantics of singularity determine that there is *exactly one* way in which that range can be exhaustively configured or divided into potential recipients of such reference — namely, *at the joints*. Where a predicate ‘F’ is singular, the semantics of ‘F’ determine that there is just one fixed set of one-one correlations between singular references involving ‘F’ and Fs. But the semantics of ‘Fs’ (‘items of clothing’, say) impose no constraints upon the number of ways in which a range of objects may be exhaustively configured or divided — any combinations of F-objects, without restrictions upon number, are the potential correlates of a plural reference. They determine neither how many items nor what combinations of items may be referred to as ‘these Fs’, ‘those Fs’ or ‘the Fs’. There are potentially indefinitely many sets of one-many correlations between plural references and things. Contextual factors, not the semantics of plurality, determine the scope and content of any such reference — one such factor being the choices made by the speaker as to the scope and combination in a given reference or set of references. The correlations between plural reference and its objects are semantically *unconstrained*, and could perhaps be described as *arbitrary*. And as with plural reference there is — depending in part on one’s interests, and in part on accidental or ‘external’ conjunctions of units — enormous leeway as to the scope and content of such non-count references, a leeway which deserves, I think, to be characterised as *arbitrariness* in the style of reference itself, and as corresponding to the non-ontological character of such reference. And the *only* difference in these respects between a collective NCN like ‘clothing’ and a ‘pure’ NCN like ‘water’ is that there are *no* units over which the pure NCN can range.

6. *Non-singularity as singular*. Now I have urged that non-count reference is semantically non-singular much on a par with plural reference. The position is incompatible with that of those who, like Vere Chappell, suppose that non-count reference is straightforwardly singular — that ‘the gold in this ring’ denotes a unitary ‘parcel’ of gold much as ‘the cat in this bag’ might denote a unitary cat.²⁶ On the other hand, however, there are those who, on the basis of *acknowledging* the parallels of NCNs with those non-singular nouns which are plural, claim that non-count reference is nonetheless reference to units, to certain types of individual *aggregates*, so-called ‘portions’, ‘quantities’ or ‘masses’, and correlatively, that non-count quantification is quantification over such aggregates.

Unlike the ‘naive’ view of non-count reference, for which it is straightforwardly singular, this more sophisticated doctrine of non-count aggregates or ‘quantities’, which is due primarily to Helen Cartwright, is based upon the real parallels between non-count

and plural reference, on the one hand, along with a singular (and what can only be reductive) construal of the plural, on the other. Thus Cartwright maintains that a plural identity-statement such as

The cats we have in Boston are the same cats as the cats we had in Detroit
is equivalent to a singular set-theoretical identity-statement such as

The set of cats we have in Boston = the set of cats we had in Detroit.
'Identical cats', she writes, 'are one — one *cat* or one *set* of cats'. And on this basis, Cartwright maintains that identities such as

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

are 'equivalent to identities like

The quantity of gold of which my ring is made = the quantity of gold of which Aunt Suzie's ring was made'.²⁷

Correlatively, of the negative existential sentence

There isn't any water left in the tub

Cartwright remarks that we 'may set out the (apparently) equivalent

It is not the case that there is an *x* such that *x* is some water and *x* is left in the tub.'

Cartwright's view is grounded, then, in a conception of plural reference whereby such reference is supposed to denote 'classes', 'sets' or 'plural objects'. The conception is not unusual, and even traditional; thus for instance Russell writes in Chapter Seventeen of his *Introduction to Mathematical Philosophy*, that in

the present chapter we shall be concerned with *the* in the plural: the inhabitants of London, the sons of rich men, and so on. In other words, we shall be concerned with classes.²⁸

And E. J. Lowe writes 'I treat a plural noun phrase like "the planets" as denoting a set... construed... as being, quite simply, *a number of things...*'. And, Lowe continues, 'sets so conceived qualify as *objects...* the principle of extensionality provides them with determinate identity conditions'.²⁹ In short, there is here a genre of views which maintain that non-singular reference — reference to either 'the many' or 'the much' — is reference to some aggregated or collective *one*.³⁰ In effect, according to such views, non-singular reference is really (sometimes or always) singular reference writ large. I consider plural reference first.³¹

It's not difficult to understand the motivation for collective object-oriented views. Plural reference has what it seems natural to characterize as a semantically *collective* form: it involves the use of a *single* grammatical subject-expression, simple or compound, to pick out *several* objects all at once, *tous ensemble*. And in referring to several objects all at once, such reference circumscribes certain particular objects collectively, demarcating just these objects from the rest of what there is. And if we group or single out *these* objects and distinguish them collectively from *those*, do we

not *thereby* single out two unique and distinct groupings or collections?³²

Insofar as what is here at issue is the *identity* of ‘the many’ with some ‘one’, then the answer can hardly be ‘yes’ — many things cannot just *be* a single thing. It is a kind of truism that there is no such object — no such *single* object — as *the* object of a plural reference, that reference in the plural is to many things and not to one.³³ Its semantically collective form notwithstanding, plural reference cannot bring a novel category of objects into being: the very objects which are designated thus ‘collectively’ in the plural might equally be designated ‘individually’ or ‘distributively’ in the singular. The *categories* of objects in the singular and plural cases are the same; it is exclusively the modes of *correlation* which are different.³⁴ The mode of correlation for the plural is one-many; for the singular it is one-one. And in designating several distinct units all at once, plural reference is collective *only* in semantic form. Whereas the semantic form of singular reference encodes the corresponding *ontic* category or kind — objects, individuals or things are each and every one of them *a* unit, and reference in the singular is reference *to* a unit, the semantic form of plural reference embodies nothing other than the *semantic* element of collectivity. Such reference may be described as reference to *a number of units*, or equally to *some* or *several* units; and while there are of course such things as units — while there is such a category of being as *a unit* (*the unit, units*) — there is no thing which is (merely) *some* or *several* units, and *a fortiori*, there is no such *category* of being as ‘*some units*’, there are simply objects which are *units*.³⁵ Elementary though it is, this contrast in the semantic forms of singular and plural — the contrast e.g. between the meaning of the singular and non-singular indefinite articles, as in ‘*a car*’ versus ‘*some cars*’ — is therefore of signal metaphysical importance.³⁶ Given, then, the parallels of non-count and plural reference on which the theory of ‘quantities’ is based, a rejection of the singular construal of the plural undermines the theoretical basis for the suggested singular construal of the non-count case. Like plural reference, non-count reference is not just non-singular but is absolutely so. While some stuff may be supposed to *constitute* all sorts of things, ‘quantity-theoretical’ aggregates no less than regular physical aggregates, it is incorrect to think that it just *is* a single stuffy-object.

7. *Non-singular variables*. A kindred scepticism concerning ‘plural objects’ in particular is also voiced by George Boolos, for whom, though plural reference should be understood *as plural*, it has no distinctive ontological significance.³⁷ Boolos disarmingly remarks that it is

haywire to think that when you have some Cheerios, you are eating a *set* — what you’re doing is eating THE CHEERIOS... it doesn’t follow just from the fact that there are some Cheerios in the bowl that, as some who theorise about the semantics of plurals would have it, there is also a set of them all.³⁸

Perhaps most notably, Boolos explores the issue of the (non-reductive) formal

representation of plural sentences and inferences. His strategy is motivated in large part by cases such as that of the so-called Geach-Kaplan sentence ‘Some critics admire only one another’, proved by David Kaplan to be unformalisable in standard first-order predicate calculus (i.e. without the addition of the symbolism of set theory), and supposed on that account to require the introduction of such symbolism. However this sentence, Boolos suggests, may be represented without the use of such symbolism, but instead using plural variables, as

$$[\exists X][\exists x][Xx \ \& \ (x)(y)(Xx \ \& \ Axy \ \Rightarrow \ Xy \ \& \ x \neq y)].$$

The domain of discourse is here stipulated as consisting of the critics; the upper-case ‘X’ is a second-order plural variable ranging over individuals several at a time; and the expression ‘Xx’ is to be read as ‘x is one of X’. This then gives as a reading ‘There are some critics, each of whom admires someone, only if that person is one of them, and none of whom admires himself.’

At the core of Boolos’ work is the development of a formal representation for irreducibly plural sentences intended, among other things, to reflect his common sense ‘ontology of Cheerios’, a representation without recourse to the apparatus of set theory. Central to his approach, obviously, is the introduction of plural variables; and in addition to such relatively complex sentences involving cross reference, there are many relatively straightforward plural sentences which may be handled with the use of plural variables, being irreducible to singular form on account of their possession of collective predicates; one such example Boolos cites is ‘The rocks rained down’.³⁹ Boolos’ strategy is to develop a novel *symbolism* for the representation of plural sentences and inferences without a corresponding novel category of *objects* such as that of sets — a distinctive logic and semantics without a correspondingly distinct ontology. His plural variables are intended as a special *notational* device, which (he rightly insists) are to be construed as lacking special *ontological* significance. The collectivity of plural reference, hence of plural variables, is ‘merely semantic’ or non-ontological. Since, as Boolos in effect observes, there is no such thing as *the* (one, single) object of a plural reference, there is no such thing as *the* (one, single) value of a plural variable; such a variable has *some* values, *several* values, not just one.

But there is no need to confine a Boolos-type strategy to the hard or semantically irreducible cases exclusively. Thus the sentence

[1d] All clothes are made of polyester.

could be represented semi-formally and simply as

[1d’] For all / any objects ζ , if ζ are clothes, then ζ are made of polyester — where ζ is a plural variable, and the substituends for the variable are themselves plural referring expressions (‘these objects’, ‘those objects’, ‘the objects on the first trans-Atlantic passenger flight’, and so on). Or again, purely symbolically, we may write

$(\zeta)(C\zeta \Rightarrow P\zeta)$,

where (ζ) is the matching non-singular universal quantifier. And parallel with such a plural logic, a non-count logic is surely possible. The sentence

[1e] All clothing is made of polyester

might be recast, somewhat in the manner of [1d], as

[1e'] For all / any stuff μ , if μ is clothing, then μ is made of polyester,

or again, as

[1e''] $(\mu)(C\mu \Rightarrow P\mu)$.

Akin to the semantically plural ζ , μ is a non-count variable; the expression ' (μ) ' is to represent a non-count universal quantifier corresponding to 'For all / any stuff μ '.

Expressions such as 'that clothing', 'the clothing in the warehouse', 'the clothing on the aircraft', etc., can then be treated as substituends for μ .

But given the non-singularity of non-count reference, there can be no such object as *the value* of a non-count variable. Much as a plural variable has *some values* (e.g. some clothes) and not one value, a non-count variable may be said to have **some value** (e.g. some clothing) and not one value. There is then a range of distinct substituends in cases of this kind; but there is no corresponding range of discrete values. The substituends range arbitrarily over the scattered clothing-stuff. As with Boolosian variables, there is here a distinctive category of variable which is non-ontological — which corresponds to no distinctive category of *object*, and takes only a certain arbitrarily chosen amount of stuff (*some* stuff) as 'value'. The clothing in the warehouse will be **some value** of the variable; and *whatever* is clothing in the warehouse — the clothing in this corner of the warehouse, for instance — is *some of* the clothing in the warehouse, i.e. **some of the value** of the variable, and also **some value** of the variable. But this, given the nice neat role that variables have been traditionally assigned, strikes me as representing a complete breakdown in the role of the variable as construed 'objectually'. To say that a variable has not *a* value but (in the non-singular, non-count sense) **some value**, seems a travesty of the whole conception of an objectual, variable-based logic.

Quine asserts, famously, that to be is to be the value of a variable. And here 'the value of a variable' is a singular expression — Quinean variables are semantically singular; the value of a Quinean variable can only be a single object, of whatever sort. Insofar then as it is necessary or desirable to formally represent irreducibly non-singular sentences — a question which may itself occasion controversy — Quine's assertion cannot be accepted. It cannot be accepted in the context of irreducibly plural sentences, not because it gets the *ontic* categories wrong, but because it is *semantically* inadequate.⁴⁰ And it is semantically inadequate simply because there are possibly true statements about objects which cannot be represented with the use of singular variables exclusively.⁴¹ However the semantic problem immediately becomes an ontological problem, when our focus shifts from irreducibly non-singular reference which is plural

to irreducibly non-singular reference which is non-count. The *semantic* problem is that some reference is irreducibly *non-singular*; the *ontological* problem, on the other hand, is that some reference is also *non-plural*. And the only difference in this regard between collective NCNs like ‘clothing’ and ‘pure’ NCNs like ‘water’ is that the latter specify *no* units over which the pure NCNs range. While there are lakes and clouds and rivers and so forth, there are *in* these lakes and clouds and rivers no *water-units*, no individuals or objects which are water. There is, quite simply, *water*.

8. *The essential singularity of concept-script*. But having acknowledged difficulties over irreducibly non-singular statements, there is a question as to whether these are really difficulties for a *Quinean* canonical notation, or whether they are difficulties for *any* well-constructed concept-script. We must consider in more detail what a concept-script requires. There are three chief factors in the notion of a concept-script; I sketch these out as follows: [i] First and foremost, the *semantics* of a sentence or a term in concept-script must be explicitly encoded in its *syntax* — syntax must directly encode meaning or semantic value. To take a very simple case, the syntactic form of ‘The sheep slept’ is conceptually non-ideal or defective — is sleep attributed to only one or to at least one sheep? [ii] Furthermore, to the extent that it has ontic significance, the *semantics* of the concept-script, in turn, must themselves directly codify the *ontic* categories involved. To understand the variables of the first-order predicate calculus, for instance, is to know that these take *individuals* exclusively as values. Whatever the metaphysical facts of the matter, the existence of a category of *predicables* is not acknowledged in this calculus; predicate letters do not here count as referential terms. Whether the calculus is indeed adequate, *qua* concept-script, depends of course on whether such a category is actually implicit in natural-language constructions, *independently* of the formal system, or not. [iii] Thus, a third constituent in the notion of concept-script is the requirement that the formal reconstruction must reproduce or replicate (and not reduce, replace or ‘explicate’) the ontic categories of the natural-language fragment at issue.⁴² At any rate, given a realistic view of categories, such as I myself embrace, clarification is one thing and explication quite another; in this regard I must dissent from Quine.

To the extent that it has ontic significance, then, the semantics of concept-script must directly codify the ontic categories which it involves. And in this regard, a plural referential symbolism is ruled out: ‘*some ___s*’ is *not* an ontic category, as Boolos himself makes crystal clear. The syntactico-semantic character and the ontology of plural reference are just incongruent; such reference is intrinsically non-ideal. There is a simple disconnect between semantics and ontology in one-many correlations. The semantic *form* of plural reference does not embody or reflect its ontic *content*; hence the symbolism for such reference *cannot* ‘show at a glance the logical structure of the facts asserted or denied’ and, to put it bluntly, invites the one who reflects on it to see its

collective form as the form *of a collection*. There is a very understandable and quite spontaneous tendency to regard such nonsingular terms as designating distinct objects, a tendency for the reflective thinker to interpret such reference as designating a collection — a tendency the existence of which I take to ‘empirically’ confirm the ideal language thesis. It is for this reason that there is an atmosphere of confusion; it is hardly surprising that the plural is a matter of contention. The collective form gets in the way, or intervenes. In not directly encoding the category of separate discrete units, but instead expressing collectivity, the semantic form of plural reference is non-ideal or defective. No such difficulties surround the understanding of reference which is singular; no parallel disagreement is widespread concerning the significance of singular referring expressions; hence, perhaps, their attraction to reflective thought..

Frege writes that clarity demands simply ‘the closest possible agreement between the relations of the signs and the relations of the things themselves’.⁴³ According to J. Alberto Coffa, the Fregean project involves ‘identifying a fragment of the German language’ — that which constitutes the natural-linguistic basis for Frege’s concept-script — such that ‘the grammatical form of every sentence in this fragment *mirrors isomorphically* the constituents of the content it expresses, as well as their arrangement in that content’.⁴⁴ And, in a strikingly similar fashion, Russell writes that in

a logically correct symbolism there will always be a certain fundamental *identity of structure* between a fact and the symbol for it... In a logically perfect language the words in a proposition would correspond *one by one* with the components of the corresponding fact, with the exception of such words as ‘or’, ‘not’, ‘if’, ‘then’, which have a different function.⁴⁵

And I have in effect argued here that Frege and Russell are exactly right: *qua non-ideal*, the character of plural and more generally non-singular reference strikingly exemplifies and validates this principle. An ideal referential symbolism can countenance only *one-one correlations* between the signifier and the signified; only here is there a structural isomorphism of syntax and being — a single symbol for a single individual or thing. Singular reference, with its one-one correlation between term and object, is rightly taken to be relatively well understood. In what is tantamount to simply *reproducing* the natural-language plural form within his formalism, Boolos has reproduced just those features of natural-language plural reference on the basis of which one of the original conceptions of a class or set arose. In short, so far as Boolos’ formalism is concerned, it remains open to one of the ‘collective entity’ persuasion to continue to insist that a number of objects — with which a plural variable is indisputably correlated — just *are* a ‘single many’ (and as a matter of fact, this is *exactly* the response to Boolos which Cartwright in particular has made).⁴⁶

Now the formal quest to clarify the nature of the ‘facts asserted or denied’ involves, of course, a quest to clarify what there is *not* — no shady present kings of France, no

golden mountains and so forth. A clear expression of the logical might then involve the isolation of what Gilbert Ryle once called ‘systematically misleading expressions’ — constructions which are alike in ‘misleading in a certain direction’ to the philosophical or reflective consciousness — expressions which may ‘suggest the existence of new sorts of objects’, expressions which ‘are all temptations to ... “multiply entities”...’.⁴⁷ By recasting natural-language sentences containing such expressions into ontically explicit form, their baneful influence is overcome. The application of a logico-semantical analysis to sentences or terms which might appear to posit ‘novel categories of objects’ aims at the liberation of reflective thought from reifying tendencies to which it is, notoriously, prone. And just such reifying tendencies assert themselves, so I have urged, when we are confronted by reference which is semantically non-singular

Conceiving of the the realm of the concrete as isomorphic with the discrete character of reference is eminently suited to the case of Newtonian bodies — discrete, ‘point-like’ substances, things which are *essentially* Aristotelian ‘this-somethings’. Simple reference involves talk of this and that, and Aristotle’s basic category is just a ‘this’ or ‘that’: substance by its very nature lends itself to being pointed out, distinguished and identified. The conception is tailor-made for boulders, horses, rabbits, snowflakes, planets and the like — things which can be counted and identified (and counted, of course, *one by one*). But while what Aristotle’s ‘horse’ or ‘man’ is true of is by nature a ‘this-something’ — remaining identifiable *qua this* so long as it endures — what ‘air’ or ‘water’ is true of is not. The application of demonstratives to stuff, if intended as picking out determinate and self-identical amounts of stuff, depends upon the stuff being *absolutely* ‘fixed’ or ‘bottled’ in discrete aggregates or bodies, or occupying physically demarcated volumes of space, a status it may and does lose without thereby ceasing to be. To the extent that it exists, the supposed isomorphism of reference with the realm of the concrete would seem to be a misconceived extension of the Aristotelian principle. And rather than attempting to contrive an account of this domain which fits into a pre-conceived and neat yet supposedly comprehensive notion of the mechanics of word-to-world relationships, our conception of those mechanics needs to be adapted to the shape of the particular domain of reality with which they are engaged.

NOTES

¹ ___ 'Logik', quoted in J. A. Coffa, *The Semantic Tradition from Kant to Carnap* (Cambridge: Cambridge University Press, 1991), 64.

²*Word and Object*, 161.

³See e.g. the otherwise excellent recent book by Scott Soames, *Philosophical Analysis in the Twentieth Century*, for an illustration of this point. Russell however, and more generally those with a positivist agenda, are prone to believe that common sense itself is contaminated by language. Speaking perhaps from personal experience, Russell writes that 'common sense is influenced by the existence of the word, and tends to suppose that one word must stand for one object... the influence of vocabulary is towards a kind of platonic pluralism...' (331). Russell's remark may be ambiguous; it might be construed in such a way as to imply that it is our spontaneous *reflective* tendency to use an over-simple model in thinking about the significance of our language; or it might be construed more broadly to apply also to everyday non-reflective thought. The former interpretation is the one I would here recommend.

⁴*Ibid.*, 161.

⁵*Ibid.*, 242, my emphasis.

⁶Russell's 'facts', of course, have *objects* of various sorts as their 'constituents'.

⁷*W&O* 228. The notion of an ideal language typically carries the implication that it is not only *transparent*, in a sense to be explored, but also that it is *complete*, in the sense of being capable of expressing or representing everything which is 'worth expressing'. Quine's remark embodies the notion of an ideal language in this 'full-fledged' sense, as one which is not just transparent but also complete. Here however my focus is chiefly on the first of these two parameters. A sensitive more recent examination of these issues occurs in Paul Grice, *Studies in the way of words*, (Cambridge, Mass: Harvard University Press, 1989), 'Retrospective Epilogue' 372-385.

⁸ 'Almost truistically', since the criteria for identifying CNs, and for distinguishing between CNs and NCNs, are far from clear. And in particular, there is a diverse assortment of syntactically plural nouns, including e.g. 'ashes', 'clouds' and 'groceries', which do not (always or ever) come with determinate criteria for counting that which they are true of. Natural language — perhaps reflecting reality in this regard — can be a pretty messy business. And while my focus here is upon concrete nouns, both CNs and NCNs may be either abstract or concrete (the appellation 'mass noun', as it happens, is typically applied to concrete nouns exclusively). Thus the former group includes such

terms as ‘hill’, ‘house’, ‘word’, ‘number’, ‘atom’, ‘piece of clothing’, ‘planet’, ‘attribute’ and ‘cat’, while the latter includes such terms as ‘wine’, ‘wool’, ‘tension’, ‘furniture’, ‘xenon’, ‘leisure’, ‘refinement’, ‘clothing’, ‘beer’, and ‘food’. I focus upon *concrete* nouns, or uses or occurrences of nouns, in part to mark a contrast with those contexts in which nouns are used *generically*, or as so-called ‘abstract’ nouns. For the fact is that the very words we class as NCNs, in such contexts, may themselves be used for counting — for counting kinds or types — and phrases like ‘a wine’, ‘one wine’ and ‘several wines’ are perfectly in order. And it seems appropriate to speak of *uses* or occurrences of nouns, in part because on one view of word individuation, some words are used concretely both as NCNs and as CNs. Not only do we have ‘less beer’, ‘less cheese’, and so forth, we also have the *non-generic* ‘fewer beers’ and ‘fewer cheeses’. There are numerous expressions which, like ‘cheese’ and ‘hair’, can figure as both CNs and NCNs; e.g. ‘apple’ has a non-count use. (However that of which ‘apple’ as an NCN is true is the result of doing certain things to apples — e.g. chopping or pulping them — whereas nothing need be done to hairs to justify the application of the non-count ‘hair’ to them).

⁹ To echo and expand on the previous note, these remarks are hardly sufficient to precisely demarcate the categories; the categories themselves are far from being neat and tidy. For one thing, it is plainly not the case that all CNs take ‘one’. There are various kinds of irregular nouns — plural invariable nouns, among others, nouns such as ‘riches’, ‘goods’, ‘baked goods’, ‘goods and chattels’, ‘hops’, ‘groceries’, ‘wares’, ‘housewares’, ‘clothes’, ‘cattle’, ‘droppings’ and so on — which have no singular, hence do not fit the paradigm. Indeed though these particular nouns all have a syntactically plural form, it is not even clear that they are all semantically CNs. Somewhat arbitrarily, perhaps — the issue is both theoretical and insufficiently explored — I shall take it to be necessary and sufficient for a noun to be classed as semantically count that it allows talk of *few*, *some* and *many* items of the type, even if the assignment of specific numerical adjectives, e.g. ‘seven clothes’, is not standard English. By the same token, if a term ‘P’ is to be counted as semantically plural, then whatever its syntactic stripe, it seems to be essential that such forms of words as ‘*one of the P*’ and ‘*each of the P*’ should make sense; and this is evidently not the case with *bona fide* NCNs. (Again, where ‘one of the P’ makes sense, there must also be at least the possibility of some singular CN ‘S’ such that ‘one of the P’ counts also as ‘one S’. This does not, naturally, preclude the typographical identity of ‘P’ and ‘S’). On this view of the matter, ‘riches’, for example, would probably not be classed as a count noun. Furthermore, the boundaries between CNs and NCNs are far from clear. For example, the contrast between ‘ash’ and ‘ashes’, in the sense of what, for instance, burning wood results in, *looks* as if it is that between an NCN and a plural invariable CN. But do we or can we speak of few or many ashes? It is possible that the apparent plural captures the quasi-granular or particulate character of certain residues, e.g. of

burnt organic matter — though in contrast with such cases as that of clothing, the idea that there is a plurality of discrete and demarcated objects which *are* individual ashes seems implausible. In other words, it looks as if the fact that clothes *are* discrete and demarcated objects, in spite of the peculiarity of counting procedures in this context, legitimates the thought that ‘clothes’ may be included in the class of nouns which are semantically count whereas ‘ashes’ may not. And finally, some nouns which seem to be semantically non-count can take syntactically plural forms: ‘snows’, ‘sands’, ‘waters’, ‘molasses’ and the like. It may of course turn out that intuitions of what is semantically a *bona fide* plural fail us at the borders, and that for the purposes of a neatly regimented theoretical account, some such condition as the one I have suggested may have to be simply stipulated as criterial.

¹⁰This feature of the entire class of NCNs extends beyond the class of concrete NCNs, but it nonetheless remains of fundamental interest when we focus *only* upon NCNs which are concrete. Work is evidently called for on distinguishing *bona fide* abstract nouns (which correspond to concrete *adjectives*) from the generic uses of what are otherwise concrete *nouns*. The contrast is that of ‘humility’, as in ‘Humility is a virtue’, and ‘water’, as in ‘Water is a liquid’. As against Kripke, Putnam, *et. al.*, it is my working hypothesis that ‘abstract’ or generic uses of nouns in general, and non-count nouns in particular, are best approached by way of their concrete or specific cognates, and not, Platonistically, vice-versa. In this, I note support from the views of Chomsky in ‘Language and Nature’, *Mind* 104 (1995), 1-61., who challenges the essentialist semantics of Putnam and Kripke, and of Barbara Malt, ‘Water is not H₂O’, *Cognitive Psychology* 27 (1994), 41-70. See also Barbara Abbott, ‘A Note on the Nature of “water”’ *Mind* 106 (1997), 311-319.

¹¹It is then hardly surprising that there are no standard recipes for the formal representation of such sentences as ‘All water contains impurities’ and ‘Some snow is black.’ There are, to be sure, various proposals and suggestions in the literature; but these are largely matters of dispute. Regarding the sentence ‘All water is wet’ (numbered as 7.5.4a) James D. McCawley considers a possible formalisation as ‘(x)(W_ax ⇒ W_ex)’. McCawley then suggestively observes that

The problem with this formalisation is that it is far from clear what must be allowed as values of the bound variables for it to make sense. The values must include things of which ‘is water’ can be predicated, and while there are many entities of which ‘is water’ can innocuously be predicated (puddles, pools, drops), it is not clear that any such set of entities would provide enough values for the bound variable.... Example 7.5.4a is valid not only for a believer in the modern atomic and molecular composition of matter but also for someone of 1700 AD who believed that matter is continuous and infinitely divisible, and an adequate account of mass terms must be as consistent with the latter view as with

the former, since the logic of quantifiers cannot by itself establish or refute any theory of matter... this makes for a whopping big universe of discourse, especially for states of affairs in which a pre-atomic conception of matter holds and all physical objects will have uncountably many parts... *Everything that linguists have always wanted to know about logic*, 235.

¹² This table first appears, albeit in a slightly different form, in my ‘Words without objects’, *Principia*, vol. 2 no. 2 (1998), 147-182. The general claim, to be precise, is that the category-contrasts here at issue — those of singular and non-singular, plural and non-plural, are *all* essentially semantic and not ontological.

¹³ *Word and Object*, (Cambridge, Mass.: MIT, 1960). 91.

¹⁴ Since bales may be of indefinitely many different sizes, counting the bales is strictly a measure of the *bales* alone, and only indirectly a measure of the *clothing*; hence this is a case in which counting ‘goes proxy’ for measuring, rather than one of measurement *per se*.

¹⁵ There are indeterminate forms for the specification of continuous quantity — ‘so much stuff’, ‘too much cotton’, ‘so little water’, etc. — which are parallel with forms for the specification of discrete quantity — ‘so many things’, ‘so few birds’, ‘too many cars’.

¹⁶ To emphasize, the point is *not* a point about the semantic status of the denotation of ‘the wine in this bottle’ as against, e.g., ‘the snow in our garden’ — these, I maintain, are equally non-singular. It concerns rather the contrast between the semantically non-particulate nature of ‘wine’ as opposed to ‘snow’.

¹⁷ The argument ‘All cars pollute; Guzzler is a car; therefore, Guzzler pollutes’ involves just such an obvious shift from plural into singular.

¹⁸ ‘Any’ however is an all-purpose quantifier which combines with singular, plural and non-count nouns alike.

¹⁹ While ‘all’ may be conjoined with proper names (in constructions which are perhaps elliptical — ‘all Rome’, ‘all Gaul’, etc.), and ‘all *of the...*’ (along with ‘some *of the...*’) may be conjoined with both plural and singular occurrences of nouns, the meaning of ‘all’ is such as to preclude its combination with unvarnished singular occurrences of common nouns.

²⁰ The categorical universal plural of [1b], ‘All cars...’, becomes the hypothetical universal singular ‘If something *is a car*, then *it ...*’. Likewise the plural ‘Some cars...’ of [2b] becomes the existential singular ‘There *is an x* — or, *at least one x* — such that

x is ...’; and so on. Non-singular quantifiers and their corresponding verbs and plural CNs, in natural-language sentences, are invariably replaced by singular quantifiers and CNs or predicates in the artificial-language sentences. Natural-language plural grammatical subjects, such as ‘All cars’, are deconstructed into quantifiers, predicates and variables — quantifiers and predicates which are singular in form, and variables which range over individual objects taken individually, or take semantically singular terms exclusively as their substituends. Because of this, the calculus may be said to provide an *analysis* of sentences like [1b] - [4b] — an analysis which complements the introduction of a category of atomic sentences, referring to specific individuals by name, and which accords with that basic theoretical role commonly assigned to the notion of singular reference. All this is obvious enough, and is more or less explicitly recognized in standard expositions of the calculus. We are told for example in the *Encyclopedia of Philosophy* that ‘Predicate logic begins its analysis with the very simplest type of sentence, the singular sentence’ — which itself, we are told, asserts ‘that a certain property is possessed by an individual object’. Beyond this, the next step ‘is to extend the analysis to certain classes of *nonsingular* simple sentences’, such as, for instance,

Everything is material.

And the analysis of such sentences ‘requires the introduction of a second sort of term, *individual variables*’ — items which ‘do not name or refer to a particular object but, like pronouns, serve as placeholders for terms that do’. P. Edwards, (ed.), *The Encyclopedia of Philosophy* (New York: Macmillan and The Free Press, 1967), entry under *Logic, Modern*, italics in original. It will I think be evident that ‘singular’ in this passage does double duty both for the quantitatively specific concept of *being numerically one* and for the quantitatively or numerically neutral concept of *being non-general*; and that it is the latter concept, but not the former, which is carried over into the meaning of ‘nonsingular’ as used above. (It is a nice question why the most typical natural-language examples of universal sentences with which we are confronted for analysis are ones beginning with ‘all’, when the irony is that it is *precisely* in the divergence between ‘all’, and ‘any’, ‘each’ and ‘every’, that some of the more serious limitations of this calculus come clearly into view). The passage illustrates the fact that there is a certain equivocation surrounding the use of the expression ‘singular term’ in much theoretical discourse, reflecting the conflicting pressures of both formal canon and natural language. There is a tendency, consonant with formalism, to take the expression as co-extensive with, and even perhaps as virtually synonymous with, ‘referring expression’. Yet referring expressions may of course be plural; and the natural bizarreness of such constructions as ‘plural singular terms’, or — even more strikingly, ‘non-singular singular terms’ (which must plainly, if it is to be coherent, involve equivocation) — is self-evident. It will already be very plain however that by ‘singular’ in this work I always and only mean *numerically* singular — singular, that is, as it is contrasted with plural. In this manner it’s clear that even among CN sentences

themselves, the predicate calculus accords a massive privilege to those which are singular. And this too is unfortunate, since to understand quantification on NCNs, it is essential to understand its *overall* relationship to quantification on CNs — its relationship not only to quantification on CNs which are singular, but to quantification on CNs which are plural too. In turn, this requires that we identify the limitations imposed by the predicate calculus on accounts of quantification of this latter kind: we need to understand what it is about CN quantification which is excluded from the calculus account.

²¹There are a number of possible senses of ‘irreducible’; one might for instance distinguish a ‘merely’ *syntactic* irreducibility such as that of [1c] from a *semantic* irreducibility such as that of Boolos’ sentence ‘The rocks rained down’ where the irreducibility is enforced by the meaning of the (collective) predicate ‘rained down’, or again that of an *ontic* irreducibility, such as that of *certain* NCNs, e.g. ‘water’, to plural CNs, a point I will return to in due course.

²² The same point applies, in a rather weaker sense, to such ‘irregular’ plural CNs as ‘people’, ‘geese’ and so forth.

²³To say that because an essentially non-singular universally quantified sentence is plural or collective, it is not *also* distributive, would then be misleading. Intuitively, such a sentence seems best characterised as *non-individually* distributive — distributing *en masse*, or several at a time, over all and any *things* which are so-and-so, and not over every and any *thing* which is so-and-so (there being no *such* things).

²⁴‘Stuff’ here is a dummy term standing in for any concrete NCN.

²⁵ Helen Cartwright is acutely aware of this difficulty and it motivates her theory of ‘quantities’, to be examined in the sequel. Cartwright considers the identity-statement

[1] The water Heraclitus bathed in yesterday = the water Heraclitus bathed in today,

and remarks that [1] might *seem* to entail

[2] There is exactly one x such that x is some water, and Heraclitus bathed in x yesterday.

But, as she goes on to note, [1] might be true even though [2] is bound to be false. ‘Even if he took just one bath yesterday, Heraclitus bathed in most of what he bathed in; he bathed in all but a quart and all but a pint; and these things are surely distinct’ [481].

What [1] therefore requires, it is suggested, is not [2] but rather

[3] There is exactly one x such that x is *all* of the water Heraclitus bathed in yesterday, and exactly one y such that y is *all* of the water Heraclitus bathed in today, and x = y.

Clearly, both [2] and its ‘revision’ or ‘improvement’ [3] give direct expression to the

belief that [1] is semantically singular — that the denoting phrases here purport the designation of a single object each. It is precisely because she makes this assumption, that Cartwright naturally also supposes that the denoting phrases must somehow, à la Russell, involve uniqueness. But since this creates an obvious *prima facie* difficulty — the problem with [2] — she is faced with the task of circumventing it; hence [3]. In fact, however, it is not difficult to see that as it stands, the proposed analysis of [1] as [3] is wholly spurious. For the definite descriptions in [1] are not, as in ‘On Denoting’, *unpacked* in [3], but are baldly *reproduced* behind the quantifier. Cartwright might just as well have said ‘There is exactly one x such that x is *the water...*’ — were it not for the fact that it would then be patently obvious that no analysis of [1] had so far been produced. In an article in which she attempts to address these and related criticisms — criticisms which first appeared in my ‘Theories of Matter’, *Synthese* 31 (1975) — Cartwright has nevertheless acknowledged that her thesis here is mistaken. See her ‘Parts and Partitives: Notes on What Things are Made of’, in *Synthese* 58 (1984), 251-277, and especially pp.265-272.

²⁶‘It has been said that a mass noun... does not ‘wholly determine criteria of distinctness and identity for individual instances’ or ‘provide a principle for distinguishing enumerating and re-identifying particulars of a sort’ (Strawson); and that, whereas a cat ‘is a particular thing, the concept “gold” does not determine an individual thing in this way’ (Anscombe). Such statements are true enough so long as they are taken to mean just that there is not such a thing as “one gold” or that, as Geach puts it, ‘the question “how many golds?” does not make sense’; for this much is guaranteed by the grammar of ‘gold’ as a mass noun. But it does not follow that what ‘gold’ is used for or applied to... as a general term, is not *one single thing*, as individual and capable of being counted as any cat... Suppose it is true that this lump is gold... This lump may be made into a ring, and the ring then cut up into a number of bits. *There is something that survives these changes, some one thing that we can pick out and follow through them; and though this is always gold... for it is this gold that survives, and the same gold that is first a lump, then a ring, and then a collection of bits — it is not always a lump. We need a count noun, therefore, that will be true of this thing and remain true of it so long as it keeps its identity as this same gold*’. V. C. Chappell, ‘Stuff and things’, 63-4, my italics.

²⁷‘Quantities’. The need for the comparison between the non-count and plural sentences for Cartwright is grounded in the fact already noted that, as Cartwright clearly recognises in ‘Heraclitus and the bath water’, a straightforwardly singular construal of the definite non-count description violates the semantic conditions for such a description as identified by Russell.

²⁸ *Introduction to Mathematical Philosophy*, ch. 17. In a similar vein, Max Black proposes to build

the idealised set talk of mathematicians upon the rough but serviceable uses in ordinary language of plural referring expressions... to get the abstract notion of a set as... *several things referred to at once*. ('The Elusiveness of Sets', *The Review of Metaphysics* 24 (1971), 614-636.)

²⁹ 'The Metaphysics of Abstract Objects', *Journal of Philosophy* 1995, Vol XCII, no. 10, 522-23.

³⁰ In the case of *quantified* sentences, the venerable tendency to paraphrase the plural in terms of sentences ostensibly referring to *classes* — e.g. the paraphrase of a sentence with the form of 'All cars pollute' as 'The class of cars is included in the class of polluters' — is radically undercut by the Fregean-style formalisation. Such spurious talk of classes is a feature of the (*so-called*) Boolean algebra of classes — which need involve commitment to no objects beyond the individuals of the first-order predicate calculus. See, e.g., Quine's *Methods of Logic* on Boolean algebra. The inclination to suppose that a *grammatical* subject like that of [1b], 'all cars', is also a *logical* subject or *semantic* unit, supposedly denoting some one 'collective' entity, is dispelled in the singular recasting as [1d]. Such an inclination is also starkly manifest by Russell himself in the *Principles*, when he writes 'With regard to infinite classes, say, the class of numbers, it is to be observed that the concept *all numbers*, though not itself infinitely complex, yet denotes an infinitely complex object' (72). A more perspicuous relationship is arguably then established between syntactic form and semantic content — the paraphrase in predicate calculus may plausibly be said to render explicit the logical form of [1b]. Equally, this representation may be said to constitute a transparent rendition of the truth-conditional content of the sentence: [1b] is seen to count as true, just in case any value of x which satisfies the open sentence 'x is a car' also satisfies the open sentence 'x pollutes'.

³¹ At the same time, it should be said that the apparent tendency to identify the objects of a plural reference with a single collective unit need not be seen as the doctrine I here call into question; it might also be viewed, in a particular context, as either [i] a mere *façon de parler* with no ontological significance or [ii] an ill-formulated assertion of a relationship not of identity but of constitution, or [iii] a reduction or replacement of multiplicity by talk of sets.

³² Furthermore, such reference renders possible collective *predication*, as exemplified by Russell's 'Brown and Jones are two of Miss Smith's suitors', where the predicate is not applicable individually to each of the objects thus collectively referred to. I address this and related issues at considerable length in *Words without Objects*.

³³It is difficult in this connection to improve on Alex Oliver's luminous remarks (directed, as it happens, against the 'mereological' view of classes advanced by David Lewis). To say that the many just *are* the one, as he observes, seems necessarily false given our ordinary understanding of identity and counting. Everything is identical to itself and to nothing else, in particular, nothing is identical to many things, each of which is different from it. If we measure commitment by the number of objects in our ontology, then a commitment to a cat-fusion is a further commitment, over and above the commitment to the cats which are its parts. If we have ten cats, then the cat-fusion which has all the cats as its parts is an eleventh object. How else could we measure commitment? 'Are Subclasses Parts of Classes?', *Analysis* 54.4 (1994), 215-223.

³⁴ Of course, the inhabitants of London, whilst actually *in* the city, *constitute* a kind of *physical* mass or group; but *those individuals* may be so dispersed as to cease to constitute any such physical collection.

³⁵There are obviously such things as units *of* units — groups of units, packs of units, bunches of units, and so forth; but for these, some further *principle* of unity is called for, beyond the *mere* phenomenon of multiplicity. The status of non-singular reference in general and of plural reference in particular is examined at considerable length in my *Words without objects* (Oxford University Press, forthcoming 2005).

³⁶It would be possible to think of the objects of a plural reference, *as such*, as constituting a collection, only if the plural referring expression itself were thought of as the linguistic equivalent of a bag, box or other collecting device or container — in effect, as the *form* of the collection, serving as an 'external' unifying agent for its 'contents'. Yet here too, the 'bag' would have to be *distinguished* from its contents: what could be said to be *in* such a linguistic 'container' — the objective contents of the term — would be *simply* a number of individual objects (several objects, some objects, etc.); and what they would count as the 'contents' *of* would be a linguistic object of a certain kind. It is a matter of common sense that the plural 'principle of collectivity' does not exist *in rebus*, but is rather to be found in the semantics of the symbolism itself.

³⁷ In this respect Boolos differs from e.g. Barry Schein, who rejects plural objects, but insists also upon singular reduction.

³⁸ 'To be is to be the value of a variable (or to be some values of some variables) *Journal of Philosophy* (1984), 448. It is indeed 'haywire' to think that when you have some Cheerios, you are eating a set, but this fact is entirely compatible with the supervenience of sets on the semantics of plurals. All that is required is that plural expressions *as such* should not denote such things.

³⁹Of such a sentence, Boolos plausibly remarks that ‘it would appear hopeless to try to say anything more about the meaning of a sentence of the form “The Ks M” other than that it means that there are some things such that they are the Ks and they M.’ ‘Reading the Begriffsschrift’, repr. in *Logic, Logic and Logic*, 168.

⁴⁰ At any rate, it is not as if there is an ontic difference between singular and plural with regards to *substance*; at most, it is a difference over the importance of relations, over for instance, *pace* Boolos, what it is for rocks to be able to *rain down*, where this represents a ‘collective action’ of the rocks, or requires certain spatio-temporal relationships between a number of rocks.

⁴¹ A Quinean manoeuvre in such contexts might well be to invoke ‘novel units’ in the form of sets to play the role of values; but of course to exercise such an option is to embrace an anti-realist or pragmatic reductionism (which, indeed, was always part of Quine’s well-tended ‘desert landscape’); and this, for the realist, is to simply abandon the metaphysical quest.

⁴²At the same time, there is in my view no guarantee that all natural-language sentences are *capable* of being represented in concept-script; a sentence might be intrinsically and irredeemably ‘unclear’.

⁴³Quoted in Coffa, *op. cit.*, p. 12.

⁴⁴ Coffa, *Op. Cit.*, 66, my italics. Fregean content is of course *thought*-content, a matter of sense and not of reference. But the point is much the same: a clear connection between word and thought is one in which, for instance, a single referring expression is correlated with the *thought* of a single object.

⁴⁵*The Philosophy of Logical Atomism*, 198, my italics.

⁴⁶See especially her ‘On Plural Reference and Elementary Set Theory’, *Synthese* 96 (1993). 201-254, .

⁴⁷‘Systematically Misleading Expressions’, *Proceedings of the Aristotelian Society* 32 (1932). Ryle writes that ‘People... use expressions which disguise instead of exhibiting the forms of the facts recorded’. And in overlooking or failing to recognise this gap, serious philosophical confusions, mistakes, etc., can occur. Quine subsequently speaks of the (reflective) tendency to be ‘carried away by the object-directed pattern of our thinking to the point of seeking the gist of every sentence in things it is about’ (*Word and Object*, 239). Meinong is commonly cited as perhaps the most dramatic example of such a tendency; but less extravagant or more modest cases are not hard to find. Again, Wittgenstein observes that most philosophical ‘questions and propositions’ result from

the fact that ‘we’ (that is, of course, *philosophers*, semanticists, etc.)

do not understand the logic of our language... It is a merit of Russell’s work to have shown that the apparent logical form of the proposition need not be its real form (*Tractatus*, 4.002-4.0031).

Following in Russell’s footsteps, Quine speaks of logical theory as advancing our understanding of ‘the referential work of language and clarifying our conceptual scheme’ (158), a project that sometimes involves what, following Carnap, he calls ‘explication’. ‘We have’, he writes,

an expression or form of expression that is somehow troublesome. It behaves partly like a term but not enough so.... or encourages one or another confusion.... In the case of singular descriptions.... Russell dissolves [the problems] by showing how we can dispense with singular descriptions.... (*Word and Object*, 260-1).

A vital dimension of ‘casting a statement into logical form’, then, consists not *simply* in suiting it to formal manipulation, but also and precisely in undermining the all too frequent philosophical tendency towards what may be called the ‘hypostatisation of non-existent entities’, by way of rewriting its syntax so as to transparently reflect its true significance. The ‘failure to give clear expression to the logical’ may be thought of as one side of a coin — the underside, as it were — the upper side of which is precisely our proneness to misconceptions as to the significance of what we say; and it may seem tempting to think of this ‘failure’ as corresponding precisely to a gap between grammatical and logical forms.

There is not typically any suggestion, in this sort of outlook, that natural language are in *any* way misleading or defective for purposes which are *other than* philosophical. As Ryle himself stresses, this susceptibility to being misled is a purely reflective or philosophical hazard. The natural-language user, he writes, ‘does not pretend to himself or anyone else that when he makes statements containing such expressions as “the meaning of x” he is referring to a queer new object; it does not cross his mind that his phrase might be misconstrued as a referentially used descriptive phrase’. Natural language, in short, creates no problems for its immediate user, and the grammar / logic gap is there for a variety of reasons.

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