

The Ontogenesis of Reference

§ 17. WORDS AND QUALITIES

We saw that the specific objective reference of foreign terms is inscrutable by stimulus meanings or other current speech dispositions. When in English we decide whether a term is meant to refer to a single inclusive object or to each of various of its parts, our decision is bound up with a provincial apparatus of articles, copulas, and plurals that is untranslatable into foreign languages save in traditional or arbitrary ways undetermined by speech dispositions. Toward understanding the workings of this apparatus, the most we can do is examine its component devices in relation to one another and in the perspective of the development of the individual or the race. In this chapter we shall ponder the accreting of those devices to the speech habits of the child of our culture. The phylogenetic aspect will be neglected, except in a few speculative remarks toward the end of the chapter; and in what I shall have to say even of the ontogenetic aspect I shall venture no psychological details as to actual order of acquisition. As remarked, the language now concerned is specifically English; this parochialism becomes increasingly marked from § 19 onward.

An oddity of our garrulous species is the babbling period of late infancy. This random vocal behavior affords parents continual opportunities for reinforcing such chance utterances as they see fit; and so the rudiments of speech are handed down. The babbling is a case of what Skinner¹ calls *operant behavior*, "emitted rather

¹ Skinner, *Science and Human Behavior*, pp. 107 f. See also his *Verbal Behavior*, pp. 20 f., 203 ff., and Langer, pp. 124 f.

than elicited.” Operant behavior can be selectively reinforced, in people and other animals, by quick reward. The creature tends to repeat the rewarded act when stimuli recur that chanced to be present at the original performance. What had been stimulation accidentally attending the act becomes transmuted, by the reward, into a stimulus *for* the act.

The operant act may be the random babbling of something like ‘Mama’ at some moment when, by coincidence, the mother’s face is looming. The mother, pleased at being named, rewards this random act, and so in the future the approach of the mother’s face succeeds as a stimulus for further utterances of ‘Mama’. The child has learned an occasion sentence.

That original utterance of ‘Mama’ will have occurred in the midst of sundry stimulations, certainly; the mother’s face will not have been all. There was simultaneously, we may imagine, a sudden breeze. Also there was the sound ‘Mama’ itself, heard by the child from his own lips.² Hence the effect of the reward will be to make him tend to say ‘Mama’ in the future not only on seeing the approaching face, but likewise on feeling a breeze or hearing ‘Mama’. The tendency so to respond to subsequent breezes will die out for lack of further reward on later occasions; the tendency so to respond to the heard word ‘Mama’, however, will continue to be rewarded, for everyone will applaud the child’s seeming mimicry. So really the stimuli to saying ‘Mama’ which continue to be reinforced are of two very different kinds: the seen face and the heard word. The beginnings of mimicry are thus in the very beginnings of word learning; and so is ambiguity, or homonymy, as between use and mention of words.

In learning words we have to learn to send and to receive. We have imagined a child learning to send ‘Mama’, and also learning to parrot the word on hearing it, but we have not considered intelligent hearing. What would count as an intelligent response to the heard word ‘Mama’, and be observable enough for onlookers to appreciate and reinforce? Prompted assent (§ 7) is no game for such small children. Perhaps rather something like this: the child hears ‘Mama’ (say from the father) while sensing the mother in the periphery of his visual field, and then turns visibly on the mother. This

² This circumstance is indeed concurrent with the utterance, rather than prior; but it still admits of reinforcement. Cf. Osgood and Sebeok, p. 21.

turning response to the heard word could be learned before or after the speaking response to the face. It is in the same old pattern of reinforcement, only this time the child's initial act is that of turning rather than babbling. Turning toward the mother while happening to hear 'Mama', the child is applauded and so is confirmed in the routine. But learning thus to face a named object does not have to await the whims of operant behavior; for the child can be directed.

Eventually the child becomes amenable to suggestion also in the initial utterance of new words. Mimicry, which we already saw foreshadowed within the mechanism of reinforced operant behavior, develops to the point where any new utterance from someone else becomes a direct stimulus for a duplicate. Once the child reaches this stage, his further learning of language becomes independent of operant behavior even on the speaking side; and then, with little or no deliberate encouragement on the part of his elders, he proceeds to amass language hand over fist.

Skinner, whose ideas the foregoing sketch is meant to follow in essential respects, is not without his critics.³ But at worst we may suppose that the description, besides being conveniently definite, is substantially true of a good part of what goes into the first learning of words. Room remains for further forces. Thus 'Mama' may issue, as is often said, from anticipatory feeding movements; nor would Skinner object, for operant behavior is not supposed to be uncaused. Again some basic predilection for conformity, rather than merely ulterior values such as communication and praise, may figure in the rewarding of good speech and the discouraging of poor;⁴ but this again is congenial enough to Skinner's scheme, for he does not enumerate the rewards. Such a predilection may be needed to account fully for mimicry, despite the entering wedge observed above.

It remains clear in any event that the child's early learning of a verbal response depends on society's reinforcement of the response in association with the stimulations that merit the response, from society's point of view, and society's discouragement of it otherwise. This is true whatever the cause of the child's first venturing of the response; and it is true even when society's reinforcement

³ E.g., Chomsky.

⁴ I owe this suggestion to G. A. Miller.

consists in no more than corroborative usage, whose resemblance to the child's effort is the sole reward.

There is no reason to suppose that the stimulations for which the child thus eventually learns his uniform verbal response were originally unified for him under any one idea, whatever that might mean. If the child is to be amenable to such training, however, what he must have is a prior tendency to weight qualitative differences unequally. He must, so to speak, sense more resemblance between some stimulations than between others. Otherwise a dozen reinforcements of his response 'Red', on occasions where red things were presented, would no more encourage the same response to a thirteenth red thing than to a blue one; and a dozen reinforcements of his response 'Mama', on occasions dominated by the mother's face at various angles, would be just as inconsequential.

In effect therefore we must credit the child with a sort of pre-linguistic quality space. We may estimate relative distances in his quality space by observing how he learns. If we reinforce his response of 'Red' in the presence of crimson and discourage it in the presence of yellow, and then find that he makes the response to pink and not to orange, we can infer that the shades of crimson and pink used are nearer each other, in his quality space, than the crimson and orange. Supplementary clues to spacing are available in the child's hesitation, or reaction time.

The finest distinctions that the child can be got to make under such reinforcement and extinction tests are called his discrimination thresholds, or just-noticeable differences. But by indirect reasoning from these minimum discriminations we can get smaller intervals still. We find that the child discriminates qualities *A* and *C* from each other but not from *B*; so we count *B* different from *A* and *C* in the child's quality space, even though less than noticeably different.

In thus elaborately exploring and plotting a child's prelinguistic quality space we could, indeed, be systematically deceiving ourselves. For perhaps the space thus reconstructed corresponds only minimally to his initial dispositions, and was molded mainly by the progressive effects on the child of our tests themselves.⁵ This possibility could be dismissed if we found some fair uniformity of quality spaces from child to child, under permutation of the se-

⁵ This caveat is due to Davidson.

quence of tests. Note, however, that such a criterion can never attest to prelinguistic quality spaces except as they are uniform from child to child. Psychology, like other sciences, favors the uniformity of nature in the very criteria of its concepts.

If we suppose it settled that the child has a fairly substantial prelinguistic quality space, then interesting questions arise regarding the structure of the space. Do the just-noticeable differences always add up in such a way as to agree with our other distance comparisons? For example, are there more just-noticeable differences between the crimson and orange of our recent example than between the crimson and pink?

Connexity is bound to fail: no chain of subliminal differences will reach from sounds to colors. We shall need a separate quality space for each of the senses.⁶ Worse, subsidiary spaces may have to be distinguished within a single sense. For example, we may seem to discover, by watching the child learn 'Ball', that a red ball, a yellow ball, and a green ball are less distant from one another in his quality space than from a red kerchief; and yet we may also seem to discover, by watching him learn 'Red', that the red ball, the red kerchief, and a red block are less distant from one another than from the green and yellow balls. A simple distance concept even within the sense of sight may thus break down, giving way to distances in sundry "respects." But enough; there is no cause to speculate further on the quality spaces in these pages.

In § 8 a partial substitute for talk of sense qualities was seen in talk of stimulations. Much the same substitution is in order here—conspicuously so when we are concerned with subliminal differences. For consider again the case where the child discriminates *A* and *C* from each other and not from *B*. It is by our knowledge of the physical arrangements that we know that it was indeed *B* twice over (not *A* and *C*) that was tested respectively against *A* and *C*. Substantial sameness of stimulations is what we work from. The denizens of what we have been calling the child's quality space are, we can as well say, the stimulations; what needs to have been peculiarly "within" the child is just the spacing of them. Yet we need not disclaim, for all that, the insight into the child's immediate experience that our probing of his qualitative spacing of the stimu-

⁶ Cf. Carnap, *Der logische Aufbau der Welt*. For more on the construction of quality spaces see Goodman, *The Structure of Appearance*. For early experiments see Anrep; Bass and Hull; Hovland.

lations affords us. Reference to immediate experience is at its best just here, as an intermediate theoretical chapter within a going theory of physical objects, human and otherwise.

§ 18. PHONETIC NORMS

Vagueness is of the essence of the first phase of word learning. Stimulations eliciting a verbal response, say 'red', are best depicted as forming not a neatly bounded class but a distribution about a central *norm*. The nearer in quality space a stimulation lies to those for which the response 'red' was directly reinforced, the more probably or firmly it will elicit the response. Such a norm will not be a mere point in quality space; it will sprawl freely, rather, in the dimensions that do not matter to redness. Thus, if we think of one's quality space as a qualitative spacing of stimulations, the norm of red will be a class of stimulations that differ from one another in visual shape as well as in brightness. In hue, however, the stimulations belonging to the norm may be thought of as held to red at its reddest. Other stimulations, then, deviating in hue from these, grade off in their tendency to elicit 'red'.

For full justice to the situation, this account needs complicating in several respects. For one thing, volunteered verbal responses to non-verbal stimuli are too scarce to define norms by; thus it was that in § 7 we had to lay on a routine of query and assent. For another thing, norms are warped on occasion by contrasts; thus a stimulation will elicit 'red' the more readily in contrast with a green irradiation. Comparison of more and less red might thus be said to be more basic to learning than the norm of red; however, each determines the other.

Moreover, the pattern of a clustering about a norm is not peculiar to the stimulus side of word learning. There is a similar pattern on the response side; for what the red presentations elicit is not an unvarying response 'red'. The effect of society's rewards and penalties is a phonetic clustering about a phonetic norm 'red' on the part of the subject's responses to stimulations clustering about a chromatic norm of redness. Like the norm of red, that of 'red' extends freely in some dimensions: thus pitch and volume of utterance are indifferent to whether an utterance is an utterance of 'red'. But the norm may be thought of as arbitrarily narrow in respect of certain acoustical qualities, determined by details of oral articulation.

Other utterances, deviating in point of these latter qualities, will grade off in their capacity to pass for utterances of 'red'. Factors of environmental contrast enter here too to complicate the picture, as green did in the case of red.

The phonetic norms have a curiously nagging quality that the chromatic ones have not. A color that is markedly off center relative to every color word can still be a color to prize and to try to match; but ab-norm-al speech is simply poor performance, like singing off key. Such is the importance of phonetic norms that we may do well to dwell on the topic for a few pages, though no use will be made of these reflections in subsequent sections.

Norms are a means of reconciling continuity and discreteness. When we listen to bad singing we grasp the intended melody by assigning each sour note to one of the twelve norms of the diatonic scale. All gradations of pitch are thus acceptable in a sense, but also in a sense not: for the performance is taken only as a sour rendering of a diatonic tune, and not as a faithful rendering of something else. Similarly there are continuous phonetic gradations from 'red' to 'raid', and from 'raid' to 'rate'; and all these gradations belong to English in a way, and in a way not. They belong in that they may occur in English speech, and they fail to belong in that they are proxies for the three norms 'red', 'raid', and 'rate'. Utterances falling between norms are treated as utterances of the nearest norm, or allocated by guess and by context.

The contrary attitude, of counting each slight imprecision as a full miss, would impose inconveniently high standards on singers and speakers. Indeed it would be inapplicable in principle, since a miss can be ever so slight; we could never recognize a hit. The policy of allocating misses to the nearest norms is, in contrast, easy and practical. Trouble arises only in those cases where, because of bad performance or noisy background, the reception falls just about midway between two norms, and there happen furthermore to be no clues in the context. Such cases are minimized in speech in three ways: systematically by a generous spacing of norms; unsystematically by moderately careful enunciation, well away from the midpoints; and unsystematically by wilful pleonasm, calculated to create contextual aids. When contextual aids are at hand, enunciation gratefully sags.

Our linguistic norms probably engender no outright breaks in the continuum of linguistically admissible sounds; for even a sound just

midway between two norms can occur unambiguously in some contexts, viz., in those where only one of the two norms would make sense. But the norms do engender near-breaks: the sounds nearly midway between norms will tend to occur less frequently than others, because it is there in general that the safeguards against ambiguity are least.

We have seen why it is far better to accept continuous gradations, and interpret them in terms of discrete norms, than to accept just those discrete values and scorn all approximations. But what now of a continuous symbolic medium in its own right, without norms? For instance we might work out a continuous hummed vocabulary for the reporting of color, as follows. The continuum of pitches, over some arbitrary octave, might be used to represent the continuum of hues over the spectrum. Loudness might be used to represent brightness. Time order in the vocalization might be used to represent spatial order within the object talked about, say a variegated ribbon. Here, then, is a symbolism that knows no norms; none in the sounds that are its vehicle, and none in the colors that are its subject matter. A second example can be got by reversing this one, thus using the ribbon as a notation for a tune. A third example is cartoon in pantomime, as a medium for rudimentary narration. But all three lack the versatility of genuine languages. (Cartooning differs in this from conventional picture-writing, which has norms.) Their subject matter is limited to selected traits—color, tone, position—which mirror the continuity of the symbols.

Suppose there were a discontinuity of subject matter; suppose e.g. that the pitches up only to middle C were to represent hues, and higher pitches something else. At middle C, then, there would be a drastic ambiguity. Indiscriminable pitches in that neighborhood would differ sharply in reference, rather than just indiscernibly as elsewhere. Consequently communicators would tend to shun middle C, as if it were a midpoint between norms. Allow many discontinuities of subject matter and you create many of these points of scarcity in the continuum of pitches, until what remains is a range flecked with norms as points of condensation.

In the access of power which norms make possible there is an air of paradox, since we impoverish our continuum of symbols when we condense it about a finite array of norms. But the explana-

tion lies in the resources of combination. Thus, consider again the tones. We may do away with not only the systematic reference of pitch to hue, but also the systematic reference of temporal succession to spatial contiguity. Thenceforward we are free to make such symbolic use as we please not only of the relatively few selected norms of pitch, but of the infinite fund of distinguishable finite sequences that can be formed from them. Such also is the efficacy of the alphabet.

An incidental boon of norms is the possibility of indefinitely prolonged relay. A message can be transmitted verbatim from mouth to mouth across a linguistic community and down the generations, provided merely that at each transmission the sounds heard be recognizably near the then-intended norms. Each man rectifies his predecessor's inaccuracies before substituting inaccuracies of his own, and error is thus not accumulated.¹

Here then we have another paradox: painstaking mimicry at each stage of transmission would have hastened the loss of the message by causing small distortions to accumulate. When there are no norms, e.g. in a man's effort to imitate bird calls, prolonged relay is bound to eventuate in something unrecognizable.

Oral relay, if unaided by notes, must depend also on memory between transmissions. Here again the norms operate: a message, if remembered verbatim at all, will be remembered with reference somehow to the phonetic norms; other details, if remembered, are extra. Memory indeed is relay of a sort from self to self.² Written records diminish our dependence on relay, but admit in turn of relaying: a text can be recopied indefinitely and rejuvenated each time, because there are notational norms to which to rectify.

The task of learning what will pass for an utterance of one word or another would be forbidding indeed were it not for pervasive part-identities among the norms of different words. Once the child has been inducted by reinforcement and extinction into the right phonetic habits for 'mama', so that his utterances of this word come to cluster about the orthodox norm, he has a head start on 'marble' and to a less degree on 'milk'. By the time he has learned to say a few dozen words, there will be no further word in the language that

¹ A further aid to such rectification is redundancy, and not only in the form of wilful pleonasm. See Shannon and Weaver; also Mandelbrot.

² We noticed in § 1 another aspect of this relay mechanism, in the dependence of memory on conceptualization.

has not already been anticipated in its entirety, albeit piecemeal. Thus it is that the child reaches the point of being able to divine the norm of any new word or phrase from hearing just one passable utterance of it. This vast saving of labor hinges on the following law of phonetic norms: *The norms of segments of an utterance are segments of the norm of the utterance.* The law is inaccurate, for the sounds in a stream of speech are normally tempered rather to the sounds before and after them;³ still the departures from the law are not so considerable as to deprive the child of his labor-saving shortcut.

Linguists handle the phonetic norms with help of their concept of *phoneme*. The phonemes of a language are to speech in that language what letters are to writing. Indeed the invention of the alphabet was a first primitive step toward phonematic analysis, though conventional spelling usually falls short of mirroring the phonemes. The phonemes of a language can be viewed as short segments of the norms of utterances in that language. Linguists choose them short enough so that they can keep their number down and still represent every longer norm as a string of them. Talking of phonemes enables linguists to abstract from all phonetic minutiae not germane to the grammar and lexicography of the language; for each phoneme is just the norm, as against the innumerable more or less passable deviations from that norm.

The law of phonetic norms gives substance to the phonematic approach, assuring us that any utterance has as its norm the sequence of those phonemes approximated in the utterance. But note that that law affords no basis for any particular snipping of phonemes to length. Whether to treat 'cheer' as segmented merely into two syllables 'chee' and 'er', or into a consonant 'ch', a vowel 'ee', and a vowel 'er', or into a consonant 't', a consonant 'sh', a vowel 'ee', a glide 'y', and a vowel 'er', is indifferent to our law of phonetic norms and to the child's learning of language as well. The language has its utterances and its norms, and then the linguist imposes a technical segmentation upon the norms to implement his business of specifying the lot.

Phonemes are sometimes construed as the classes of their approximations. In representing them rather as segments of norms I stress the qualitative clustering about statistical norms, and minimize

³ Cf. Joos; also Zipf, pp. 85-121.

the suggestion of an enclosing boundary. But we can still think of each norm as the class of the events that are occurrences of it.⁴

§ 19. DIVIDED REFERENCE¹

If a term admits the definite and indefinite article and the plural ending, then normally under our perfected adult usage it is a general term. Its singular and plural forms are most conveniently looked on not as two kindred terms, but as ways in which one and the same term turns up in varying contexts. The '-s' of 'apples' is to be reckoned thus merely as an outlying particle comparable to the 'an' of 'an apple'. We shall see later (§§ 24, 36) that by certain standardizations of phrasing the contexts that call for plurals can in principle be paraphrased away altogether. But the dichotomy between *singular terms* and *general terms*, inconveniently similar in nomenclature to the grammatical one between singular and plural, is less superficial.² A singular term, e.g. 'mama', admits only the singular grammatical form and no article. Semantically the distinction between singular and general terms is vaguely that a singular term names or purports to name just one object, though as complex or diffuse an object as you please, while a general term is true of

⁴ For more on the nature of phonemes see Bloomfield, Ch. V, and Jakobson and Halle, pp. 7-37. On anticipations in ancient India see Brough, "Theories of general linguistics."

¹ Half of this section is taken from pp. 9-11 of "Speaking of objects," with permission of the American Philosophical Association. In that address I called terms with divided reference individuating, and in my Harvard and Oxford lectures of previous years I vacillated between 'individuating' and 'articulating', both of which suffer from unintended associations. Both of these designations are preserved in Strawson's "Particular and general," pp. 238, 254 n., but his regular designation in that work is 'substance-name', which gives way in his new book to 'sortal universal' (*Individuals*, pp. 168 ff., 205 ff.). Woodger's term, p. 17, is 'shared name'. Martin, in *Truth and Denotation*, Ch. IV, speaks of divided reference as multiple denotation. I applaud that use of 'denote', having so used the word myself until deflected to 'true of' by readers' misunderstanding; and Martin's 'multiple' obviates the misunderstanding. I hope my 'divided reference' may be felt as casual enough not to count as further proliferation of terminology. Its stress on division, as against multiplication, seems best suited to what I here want to bring out.

² "The distinction . . . between *general* . . . and . . . *singular* . . . is fundamental," Mill wrote, "and may be considered as the first grand division of names" (Bk. I, Ch. II, § 3).

each, severally, of any number of objects. The distinction will become sharper in § 20.

It is in full-fledged general terms like 'apple', or 'rabbit', that peculiarities of reference emerge which call for distinctions not implicit in the mere stimulatory occasions of occasion sentences. To learn 'apple' it is not sufficient to learn how much of what goes on counts as apple; we must learn how much counts as *an* apple, and how much as another. Such terms possess built-in modes, however arbitrary, of dividing their reference.

The contrast lies in the terms and not in the stuff they name. It is not a question of scatter. Water is scattered in discrete pools and glassfuls, and red in discrete objects; still it is just 'pool', 'glassful', and 'object', not 'water' or 'red', that divide their reference. Or, consider 'shoe', 'pair of shoes', and 'footwear': all three range over exactly the same scattered stuff, and differ from one another solely in that two of them divide their reference differently and the third not at all.

So-called *mass* terms like 'water', 'footwear', and 'red' have the semantical property of referring cumulatively: any sum of parts which are water is water.³ Grammatically they are like singular terms in resisting pluralization and articles. Semantically they are like singular terms in not dividing their reference (or not much; cf. § 20). But semantically they do not go along with singular terms (or not obviously; cf. § 20) in purporting to name a unique object each. More will be said of their status in § 20, as the reader will have divined. Meanwhile note that full-fledged general terms like 'apple' are also commonly made to double as mass terms. We may say 'Put some apple in the salad', not meaning 'some apple or other'. Likewise we may say 'Mary had a little lamb' in either of two senses. Conversely, as readers more contentious than yourself

³ A term with this semantic trait is what Goodman (*Structure of Appearance*, p. 49) calls *collective*. I should indeed prefer 'collective term' to 'mass term' for words like 'water' and the like, were it not too apt to suggest such unintended cases as 'flock', 'army', etc. 'Partitive' is inviting, but it connotes a wrong principle, since some parts of furniture and even of water are not furniture or water. Strawson's term in "Particular and general" (p. 238) is 'material-name'. In 'mass term' I follow Jespersen, whose 'mass word' seems fairly entrenched in linguistics in the sense required. In "Speaking of objects" I used 'bulk term', which is more nearly the *mot juste*; but I shall not persist in thus multiplying alternatives.

have been clamoring to say for ten lines running, 'water' has a special use that admits the plural.

From the point of view of infantile learning, as from the point of view of the first steps of radical translation (Ch. II), we do best to look upon 'Mama', 'Red', 'Water', and the rest simply as occasion sentences. All the linguist can claim for his first radical translations is agreement in stimulus meanings, and all the baby learns is to say his word when appropriately irritated and not otherwise. It is in relation rather to the going concern of general terms with divided reference that it first becomes pertinent to ask with regard to an occasion sentence ('Mama', 'Red', 'Water', 'Apple', 'Apples') whether it is a singular term sententially used or a general term sententially used. If infantile occasion sentences are to be seen as incipient terms, the category of mass terms is perhaps the most inviting one to identify them with, just because of its indecisiveness in relation to the sophisticated dichotomy between singular and general.⁴

We in our maturity have come to look upon the child's mother as an integral body who, in an irregular closed orbit, revisits the child from time to time; and to look upon red in a radically different way, viz., as scattered about. Water, for us, is rather like red, but not quite; things are red, stuff alone is water. But the mother, red, and water are for the infant all of a type; each is just a history of sporadic encounter, a scattered portion of what goes on. His first learning of the three words is uniformly a matter of learning how much of what goes on about him counts as the mother, or as red, or as water. It is not for the child to say in the first case 'Hello! mama again', in the second case 'Hello! another red thing', and in the third case 'Hello! more water'. They are all on a par: Hello! more mama, more red, more water.

The child can learn 'mama', 'red', and 'water' quite well before he ever has mastered the ins and outs of our adult conceptual scheme of mobile enduring physical objects, identical from time to time and place to place. In principle he might do the same for 'apple', as a mass term for sporadic uncut apple stuff. But he can never fully master 'apple' in its divisive use, except as he gets on with the scheme of enduring and recurrent physical objects. He may come somewhat to grips with the divisive use of 'apple' before quite mastering the comprehensive physical outlook, but his usage will be

⁴ See § 12, particularly note 1.

marred by misidentifications of distinct apples over time, or misdiscriminations of identical ones.

He has really got on to divided reference, one is tempted to suppose, once he responds with the plural 'apples' to a heap of apples. But not so. He may at that point have learned 'apples' as another mass term, applicable to just so much apple as is taken up in apple heaps. 'Apples', for him, would be subordinated to 'apple' as is 'warm water' to 'water', and 'bright red' to 'red'.

The child might proceed to acquire 'block' and 'blocks', 'ball' and 'balls', as mass terms in the same fashion. By the force of analogy among such pairs he might even come to apply the plural '-s' with seeming appropriateness to new words, and to drop it with seeming appropriateness from words first learned only with it. We might well not detect, for a while, his misconception: that '-s' just turns mass terms into more specialized mass terms connoting clumpiness.

A plausible variant misconception is this: 'apple' masswise might cover not apples generally, but just the lone ones, while 'apples' still figures as last suggested. Then apples and apple would be mutually exclusive rather than subordinate the one to the other. This variant misconception could likewise be projected systematically to 'block' and 'blocks', 'ball' and 'balls', and long escape exposure.

How can we ever tell, then, whether the child has really got the trick of general terms? Only by engaging him in sophisticated discourse of 'that apple', 'not that apple', 'an apple', 'same apple', 'another apple', 'these apples'. It is only at this level that a palpable difference emerges between the genuinely divided reference of general terms and the counterfeits lately imagined. (Cf. § 12.)

Doubtless the child gets the swing of these peculiar adjectives 'same', 'another', 'an', 'that', 'not that', contextually: first he becomes attuned to various longer phrases or sentences that contain them, and then gradually he develops appropriate habits in relation to the component words as common parts and residues of those longer forms (cf. § 4). His tentative acquisition of the plural '-s', lately speculated on, is itself a first primitive step of the kind. The contextual learning of these various particles goes on simultaneously, we may suppose, so that they are gradually adjusted to one another and a coherent pattern of usage is evolved matching that of society. The child scrambles up an intellectual chimney, supporting himself against each side by pressure against the others.

That these matters are not reflected in stimulus meaning is why the child has to scramble for them by a method of simultaneous learning, and why the linguist has to resort to analytical hypotheses to translate them. Let us pursue the parallel. The notable point about the analytical hypotheses was that two independent Martians could acquire perfect and indistinguishable English through unlike and even incompatible systems of English-to-Martian analytical hypotheses. The corresponding point about English children is that two of them may attain to an identical command of English through very dissimilar processes of tentative association and adjustment of the various interdependent adjectives and particles on which the trick of divided reference depends. Or, to revert to the hypothesis of neural hookups (§ 16, "fourth cause"), the children's identical command of English may be the outward manifestation of very dissimilar patterns of neural interconnection. The identical elephantine form may, in the figure of § 2, overlie very unlike configurations of twigs and branches.

My remarks on how the child gradually acquires and coordinates the various locutions needed to implement divided reference have been both slight and metaphorical. I might do well now to illustrate one conceivable phase of the process, however unrealistically, just by way of suggesting the type of accomplishment wanted. The child has learned 'Mama' and 'Daddy', let us suppose, in the essentially ostensive way of § 17. Then suppose, and here is the unrealistic part, that by a similar but binary process of ostension he learns 'Same-person'. This term goes with simultaneous or closely consecutive presentations in pairs. It proves to apply whenever both presentations are appropriate to 'Mama' and whenever both are appropriate to 'Daddy', but never when one is appropriate to 'Mama' and the other to 'Daddy'. Once the child has ascended in a behavioral way to this higher-level generalization, he may perhaps be said to be in a fair way to appreciating what it is for Mama and Daddy to be persons and not the same one—though it will take a third-level abstraction from this generalization and others like it to bring off any such separation of 'same' from 'person'. On the side of radical translation, a similar series of generalizations could underlie a Martian's eventual analytical hypotheses regarding our apparatus of divided reference.

Once the child has mastered the divided reference of general terms, he has mastered the scheme of enduring and recurring

physical objects. For our commonest general terms are overwhelmingly terms which, like 'apple' and 'river', divide their reference according to conservation or continuity of change of substance, and conservation or continuity of change of position in objective space. To what extent the child may be said to have grasped identity of physical objects (and not just similarity of stimulation) ahead of divided reference, one can scarcely say without becoming clearer on criteria.

Be that as it may, the child who has general terms and identity of physical objects in hand is then prepared to reassess prior terms. 'Mama', in particular, gets set up retroactively as the name of a broad and recurrent but withal individual object, and thus as a singular term *par excellence*. Occasions eliciting 'mama' being just as discontinuous as those eliciting 'water', the two terms had been on a par; but now the mother becomes integrated into a cohesive spatiotemporal convexity, while water remains scattered even in space-time. The two terms thus part company.

The mastery of divided reference seems scarcely to affect people's attitude toward 'water'. For 'water', 'sugar', and the like the category of mass terms remains, a survival perhaps of the undifferentiated occasion sentence, ill fitting the dichotomy into general and singular. Further terms even are added to this archaic category, after divided reference is at hand; witness 'furniture', 'footwear'. Also genuine general terms may retain a mass use, as lately observed of 'lamb' and 'apple'.

§ 20. PREDICATION

The distinction between general and singular terms may seem overrated. After all, it may be objected, the singular term differs from general terms only in that the number of objects of which it is true is one rather than some other number. Why pick the number one for separate attention? But actually the difference between being true of many objects and being true of just one is not what matters to the distinction between general and singular. This point is evident once we get to derived terms such as 'Pegasus', which are learned by description (§ 23), or such as 'natural satellite of the earth', which are compounded of learned parts. For 'Pegasus' counts as a singular term though true of nothing, and 'natural satellite of the earth' counts as a general term though true of just one object. As one vaguely says, 'Pegasus' is singular in that

it *purports* to refer to just one object, and 'natural satellite of the earth' is general in that its singularity of reference is not something *purported* in the term. Such talk of purport is only a picturesque way of alluding to distinctive grammatical roles that singular and general terms play in sentences. It is by grammatical role that general and singular terms are properly to be distinguished.

The basic combination in which general and singular terms find their contrasting roles is that of *predication*: 'Mama is a woman', or schematically '*a* is an *F*' where '*a*' represents a singular term and '*F*' a general term. Predication joins a general term and a singular term to form a sentence that is true or false according as the general term is true or false of the object, if any, to which the singular term refers.

Because of our concern in this book with the mechanisms of reference, it is natural that predication and the associated grammatical contrast between general and singular terms should loom large for us. The case is otherwise with the grammatical contrasts among substantive, adjective, and verb. These again are contrasts in grammatical role, with associated distinctions in word form; but it happens that the separation of roles into those that call for the substantival form, those that call for the adjectival, and those that call for the verbal has little bearing on questions of reference. Our study can consequently be simplified by viewing substantive, adjective, and verb merely as variant forms given to a general term.

Thus we may best picture predication in the neutral logical schematism '*Fa*', understood as representing not only '*a* is an *F*' (where '*F*' represents a substantive) but also '*a* is *F*' (where '*F*' represents an adjective) and '*a* *F*s' (where '*F*' represents an intransitive verb).¹ Predication is illustrated indifferently by 'Mama is a woman', 'Mama is big', and 'Mama sings'. The general term is what is predicated, or occupies what grammarians call predicative position; and it can as well have the form of an adjective or verb as that of a substantive. For predication the verb may even be looked on as the fundamental form, in that it enters the predication without the auxiliary apparatus 'is' or 'is an'.

¹ In many writings on logic, my own included, '*Fa*' is used rather to represent any sort of sentence involving '*a*', regardless of whether the portions other than '*a*' are drawn together into a general term. But such will not be my usage in this book, except where I say so.

The copula 'is' or 'is an' can accordingly be explained simply as a prefix serving to convert a general term from adjectival or substantival form to verbal form for predicative position. 'Sings', 'is singing', and 'is a singer' thus all emerge as verbs, and interchangeable ones apart from some subtleties (§ 36) of English idiom. Conversely '-ing' and '-er' are suffixes serving to convert a general term from verbal form to adjectival or substantival form, to suit various positions other than predicative (§§ 21-23); and 'thing' and '-ish' are suffixes for converting adjectives into substantives and vice versa.²

Adjectives in English bear a formal resemblance to mass substantives in that we cannot apply 'an' to them, nor the plural ending. Adjectives that are cumulative in reference (§ 19) even double as mass substantives—as when we say 'Red is a color' or 'Add a little more red'. In such cases English agrees with us in making light of the distinction between substantive and adjective. But in general we must note which substantive it is that an adjective does not need to be distinguished from. The substantives to be thus equated to 'red', 'wooden', and 'spherical' are 'red', 'wood', and 'sphere', not 'redness', 'woodenness', and 'sphericity'. These latter are quite another matter: abstract singular terms (§ 25). In general a faithful substantival rendering of a term, if not the briefest, can be got from the adjective by appending 'thing' or 'stuff'.

Now let us get back to the dichotomy between general and singular terms, as clarified by the roles in predication. The ambivalence of mass terms with respect to that dichotomy is strikingly seen in predication. For the mass term is found to enter predication sometimes after 'is', like a general term in adjectival form, and sometimes before 'is', like a singular term. The simplest plan seems to be to treat it accordingly: as a general term in its occurrences after 'is', and as a singular term in its occurrences before 'is'.

Examples showing mass terms after 'is' are 'That puddle is water', 'The white part is sugar', 'The rest of the cargo is furniture'. Let us not pause over the compound singular terms 'that puddle', 'the white part', 'the rest of the cargo'; they are business for the next section. The present point is rather the predicative use of the mass terms. We can view the mass terms in these contexts as general terms, reading 'is water', 'is sugar', 'is furniture' in effect as

² This theme has been developed by Peano in papers of 1912 and 1930. See his *Opere Scelte*, vol. 2, pp. 458 ff., 503 ff.

'is a bit of water', 'is a bit of sugar', 'is a batch of furniture'. In general a mass term in predicative position may be viewed as a general term which is true of each portion of the stuff in question, excluding only the parts too small to count. Thus 'water' and 'sugar', in the role of general terms, are true of each part of the world's water or sugar, down to single molecules but not to atoms; and 'furniture', in the role of general term, is true of each part of the world's furniture down to single chairs but not to legs and spindles.

In 'Water is a fluid', on the other hand, and 'Water is fluid', and 'Water flows', the mass term is much on a par with the singular term of 'Mama is big' or 'Agnes is a lamb'. A mass term used thus in subject position differs none from such singular terms as 'mama' and 'Agnes', unless the scattered stuff that it names be denied the status of a single sprawling object. Doubtless a child's first glimmering of the mechanism of general and singular terms does depend on the conspicuous unity of something seen against a contrasting background, but in time he masters less visibly bounded entities; certainly for us adults, retrospectively describing the behavior of terms, there is no reason to boggle at water as a single though scattered object, the aqueous part of the world. Even the tightest object, short of an elementary particle, has a scattered substructure when the physical facts are in. We can treat 'water' in this sophisticated way without imputing any reflective semantics to the user; it suffices that his use of 'water' in subject position be enough like his use of 'mama' and 'Agnes' to make our thoughtful semantics come out right.

Similarly the mass substantive 'red' in subject position may be conceived as a singular term naming the scattered totality of red substance. 'Color' becomes a general term true of each of various such scattered totalities.

Let it not be imagined that in sanctioning scattered concrete objects we facilely reduce all multiplicities to unities, all generalities to particulars. This is not the point.³ There remain, besides the world's water as a total scattered object, sundry parts which are lakes, pools, drops, and molecules; and in singling out such sorts of parts for express mention we still need general terms as usual—

³ On the efficacy and limitations of the device as a means of reducing universals to particulars see Goodman, *Structure of Appearance*, pp. 155 f., 203 ff., and my *From a Logical Point of View*, pp. 68–77.

'lake', 'pool', 'drop', 'water molecule'. Treating 'water' as a name of a single scattered object is not intended to enable us to dispense with general terms and plurality of reference. Scatter is in fact an inconsequential detail. General terms are needed as much for distinguishing parts (arms, legs, fingers, cells) of an unscattered object (mama) as for distinguishing parts of the scattered object water. Scatter is one thing, multiplicity of reference another. Recognition of a scattered object as a single object reduces the category of mass terms to that of singular terms, but leaves the cleavage between singular terms and general terms intact.

Mass terms before the copula having been assimilated to singular terms thus by appeal to scattered objects, the idea suggests itself of carrying the artificiality a step farther and treating mass terms thus as singular terms equally after the copula. It may seem that this can be done by reconstruing 'is' in such contexts as 'is a part of'. But this version fails, because there are parts of water, sugar, and furniture too small to count as water, sugar, furniture.⁴ Moreover, what is too small to count as furniture is not too small to count as water or sugar; so the limitation needed cannot be worked into any general adaptation of 'is' or 'is a part of', but must be left rather as the separate reference-dividing business of the several mass terms, conceived as general terms. We shall do best to acquiesce in a certain protean character on the part of mass terms, treating them as singular in the subject and general in the predicate.⁵

The protean character indeed goes farther. We already noted in § 19 that even an ordinary general term such as 'apple' or 'lamb' could double as a mass term. In all, thus, 'lamb' figures not in two ways but three. In 'Lamb is scarce' it figures as a mass term used as a singular term to name that scattered object which is the world's lamb meat. In 'Agnes is a lamb' it figures as a general term true of each young specimen of *Ovis aries*. In 'The brown part is lamb', finally, it figures as a mass term used as a general term true of each portion or scattered quantity of lamb meat. The constancy in form of the word 'lamb', amid these three functions, is a reminder

⁴ Cf. Goodman, *Structure of Appearance*, p. 48. The terms are not, in his terminology, *dissective*.

⁵ Here I follow Lewis, "Modes of meaning," p. 239, only in part.

of the state of the child before he learns to deal with the divided reference of general terms. Revolutionary though his learning about divided reference is, language before and language after are continuous; and thus it is that prior words survive with branching uses. Moreover, such being the pattern, even a word subsequently acquired will by analogy bear a constant form in three functions. But the distinction of functions in question matters much to us, however poorly reflected in word forms. We need not hesitate to draw distinctions, where they clarify our concerns, though they have no vivid reflections in English idiom; nor to waive distinctions indifferent to our concerns, though English idiom exalt them.

§ 21. DEMONSTRATIVES. ATTRIBUTIVES

Much of the utility of general terms lies in their yield of demonstrative singular terms. These are got from general terms by prefixing demonstrative particles, 'this' and 'that'. The economy of effort afforded is enormous. For one thing, we are saved the burden of knowing names. We can get by with 'this river', 'this woman', without knowing what names the things actually bear. Second, we are enabled to refer singly to objects that simply have no proper names: this apple. Third, we are aided in the teaching of proper names. Say we want to teach the name 'Nile'. The hard way would consist in protracted training similar to what went into 'mama' and 'water'. We might expose our pupil to bits and stretches of the Nile from Kenya to the sea, schooling him in the proper applications of the word and discouraging its abuse, until satisfied that he was prepared to apply the term throughout the intended portion of the world and not beyond. Given his mastery of the general term 'river', on the other hand, and of the device of deriving singular terms, we have only to stand with him on the quay at Cairo and say once, pointing, 'This river is the Nile'.

A general term imposes a division of reference which, once mastered, can be thus exploited in no end of particular cases to fix the intended ranges of application of singular terms. 'This is the Nile', with accompanying gesture but without the general term 'river', might be misconstrued as identifying a bend in the river; 'This is Nadejda' might be misconstrued as identifying the material of the

faithful creature's rude garment; but 'This river is the Nile', 'This woman is Nadejda', settle matters.

Often 'this' serves as a singular term by itself. If the object indicated contrasts with its surroundings, the intended limits of reference within present space will be evident without help of a general term; and even the intended limits of reference backward and forward in time can commonly be inferred well enough. And an isolated 'this' would usually suffice for the Nile or Nadejda because of what one knows of human interest: rivers and women are likelier objects of identification than bends and fabrics.

Also we can use 'this' with a mass term: 'this water', 'this sugar'. After 'this', as after 'is', we do best to view a bulk term as a general term. 'Water' so used amounts to the general term 'body of water', conceived as applying equally to a river, a puddle, and the contents of a glass.

A notable trait of 'this', 'this river', 'this water', and similar terms is their transiency of reference, in contrast to tenacious singular terms like 'mama', 'water', 'Nile', 'Nadejda'. Such is the effect not only of the two demonstrative particles, but of the *indicator words* generally: 'this', 'that', 'I', 'you', 'he', 'now', 'here', 'then', 'there', 'today', 'tomorrow'. The child's learning of 'mama' and 'water' depended on fixity of reference; he was trained, by reinforcement and extinction on multiple occasions of utterance, to adjust to norms or boundaries of reference which were held fast for him. In learning the indicator words he learns a higher-level technique: how to switch the reference of a term according to systematic cues of context or environment. Demonstrative singular terms thus gained have the convenience of flexibility and the drawback of instability; and it is just when this drawback begins to count that we introduce a proper name to carry the reference for good: 'This river is the Nile', 'This woman is Nadejda'.¹

The demonstrative singular terms preserve the mechanism of *ostension*—direct experiential association with the object of refer-

¹ For more concerning indicator words see Goodman, *Structure of Appearance*, pp. 290 ff., or his dissertation, Harvard, 1940, pp. 594 ff.; Russell, *Inquiry into Meaning and Truth*, Ch. VII; Reichenbach, § 50. The term is Goodman's; Jespersen (*Language*) called them shifters, Russell called them egocentric particulars, and Reichenbach called them token-reflexive. Peirce called them indices, but he applied this term also more broadly; see vol. 2, paragraphs 248, 265, 283 ff., 305.

ence—at the same time that they by-pass the training process which attended the ostensive teaching of ‘mama’ and ‘water’. General terms are what make that shortcut possible. The general terms thus exploited do have first to be learned, and the learning of them is, as observed (§ 19), a more elaborate affair than the learning of words like ‘mama’ and ‘water’. But, once got, they make for high-speed ostensive introduction of singulars, both temporary (‘this river’, ‘this woman’) and permanent (‘the Nile’, ‘Nadejda’). Such derived singulars, moreover, facilitate ostensive introduction in turn of further general terms. Thus, having the general term ‘round (thing)’, and thence the singular term ‘that round thing’, we may proceed to explain ‘pomegranate’ in the fashion ‘That round thing is a pomegranate’. Our pupil may need several such lessons in order to learn the allowable range of variation from pomegranate to pomegranate. But the other factor in learning a general term, viz. the dividing of reference, is in this case taken care of in advance; for we give him each example as ‘that round thing’, exploiting thus a prior general term whose dividing of reference he has already mastered.

We have seen that not only are general terms useful for their yield of demonstrative singular terms, but also demonstrative singular terms are useful in getting further general terms. Now this last is an understatement. Demonstrative singular terms figure even in the child’s first acquisition of general terms: he has to learn of *this* apple and *that* apple, when to identify and when to distinguish. (Cf. § 19.) Demonstrative singular terms, though formed of general terms, are thus needed in getting on to the trick of general terms. The general term and the demonstrative singular are, along with identity (§ 24), interdependent devices that the child of our culture must master all in one mad scramble.

Often the general term that follows ‘this’ or ‘that’ suffices, along with the circumstances of the utterance, to direct attention to the intended object without a gesture. In such cases ‘this’ and ‘that’ tend to be weakened to ‘the’: thus ‘the river’. Such degenerate demonstrative singular terms are called *singular descriptions*, though the phrase becomes more apt when we come to where the general terms available as components can themselves be composite.

Often the object is so patently intended that even the general term can be omitted. Then, since ‘the’ (unlike ‘this’ and ‘that’) is never substantival, a *pro forma* substantive is supplied: thus ‘the

man', 'the woman', 'the thing'. These minimum descriptions are abbreviated as 'he', 'she', 'it'. Such a pronoun may be seen thus as a short singular description, while its grammatical antecedent is another singular term referring to the same object (if any) at a time when more particulars are needed for its identification.

We turn now to a further method of forming composite terms. This one is not, like the method of demonstrative singular terms, presupposed in what it presupposes; the child can learn it serenely after his scrambling is done. It is the joining of adjective to substantive in what grammarians call *attributive position*. 'Red' has attributive position in 'red house', as against its predicative position in 'Eliot House is red'. A composite general term thus formed is true of just the things of which the components are both true.

Substantives also commonly occur in what seems like attributive position, but for the most part the compounds thus formed are best seen rather as irrelevantly similar condensations of multifarious phrases. For whereas red houses and red wine are red, water wings are not water; nor are water meters, water rights, water rats. There is even a kind of solecism (viz., zeugma) in saying 'water wings, meters, rights, and rats'; 'water' needs repeating because its bearing on each of the adjoined terms is different. It is only in occasional cases such as 'student prince', 'lady cop', and 'iron bar' that we find substantives in truly attributive use, functionally speaking; whereas such use of adjectives is usual.

In the case of adjectives also there are exceptions. A mere child is not something that is mere and a child. Similarly for dubious honors, feigned affection, real money, and expectant mothers. Such an adjective invites the old philosophical word *syncategorematic*. For such an adjective is not a term (in my sense) marking out a category of objects in its own right; it makes sense only with (*syn*) such a term, e.g. 'mother', as part of a further such term, e.g. 'expectant mother'. Even when a syncategorematic adjective appears alone in the predicate, as in 'The honor is dubious', 'The money is real', its dependence on its host term remains; an appropriate genuine predication (§ 20) would be rather 'The thing is a dubious honor', 'The stuff is real money'. The syncategorematic imitations of the attributive and predicative use of adjectives belong to a more sophisticated phase in the learning of language than now concerns us; let us now further examine the truly attributive use of adjectives that are genuinely terms.

In predicative use the adjective is to be taken, we know, as a general term: the '*F*' of '*Fa*'. Likewise in attributive use, next to a general term, the adjective is to be taken as a general term; for it is only thus that we can reckon the compound a general term true of the things of which the two components are jointly true. But in attributive position next to a mass term the adjective must be treated as a mass term: thus 'red' in 'red wine'. The two mass terms unite to form a compound mass term. When we think of the two component mass terms as singular terms naming two scattered portions of the world, the compound becomes a singular term naming that smaller scattered portion of the world which is just the common part of the two. Red wine is that part of the world's wine which is also part of the world's red stuff. When the compound mass term occurs rather as a general term, as in 'That puddle is red wine' (cf. § 20), its parts likewise figure as general terms; they amount in such contexts to 'red thing' and 'bit (or batch) of wine', and then the compound is true of each of the things of which the two components are jointly true.

The formal resemblance noted in § 20 between adjectives and mass substantives must not be allowed to obscure the fact that many adjectives, such as 'spherical', divide their reference as insistently as any substantive. Such adjectives are not cumulative in reference, not mass terms; the reason they can manage without articles and plural endings is only that we attach those accessories rather to the substantive which, predicatively or attributively, the adjective accompanies. But now what is to be said of such adjectives, under our precept that an adjective in attributive position next to a mass term be treated as a mass term? It is reassuring to note that adjectives not cumulative in reference simply tend not to occur next to mass terms ('spherical wine', 'square water'). Such adjectives serve as general terms only. On the other hand adjectives which can function as mass terms will, as seen, normally function both as singular terms ('red' in 'red wine') and, in three situations, as general terms ('red' in 'Eliot House is red', in 'red house', and sometimes in 'red wine').

But 'red' as general term so far diverges from 'red' as singular term as to be true of things that are not even parts of the total red substance of the world. Red houses and red apples overlap the red substance of the world in only the most superficial sort of way, being red only outside. It is thus borne in on us that the distinction

between a word as singular term and the same word as general term is no mere pedantic distinction in modes of reference; even the concerned regions of the world can diverge. Yet both uses of 'red' are natural descendants of that single primeval one which alone is accessible to the child before he gets on to divided reference and the notion of physical object. For at that early phase no distinction can be drawn between 'red' said of an apple and 'red' said only of its skin. The child can see the uncut apple as red, and can see a subsequently exposed cross-section of it as white, but the white is no newly exposed cross-section of a formerly uncut red apple save in terms of a sophisticated physical identification across time.

Closely related to the attributive joining of terms is the joining of terms by 'and' or 'or'. When these conjunctive particles are used, both component terms are substantival in form or both adjectival. Used as in '*a* is *F* and *G*', the 'and' compound has the force of the compound formed in the attributive way; viz., it is true of just the objects that both components are true of. When pluralized, however, as in '*F*s and *G*s are *H*', the 'and' compound commonly functions rather as a term true of all objects that one or both components are true of. This force is reserved rather to the 'or' compound when the plural is not used.

§ 22. RELATIVE TERMS. FOUR PHASES OF REFERENCE

What I have thus far been calling general terms are, more expressly, *absolute* general terms. For there are in addition the *relative* ones,¹ such as 'part of', 'bigger than', 'brother of', and 'exceeds'. Whereas an absolute general term is simply true of an object *x*, and of an object *y*, and so on, a relative term is true rather of *x* with respect to some object *z* (same or different), and of *y* with respect to *w*, and so on. Thus 'part of' is true of Roxbury with respect to Boston. 'Bigger than' and 'exceeds' are true of Boston with respect to Roxbury. 'Brother of' is true of Cain with respect to Abel and vice versa; true also of Sir Osbert Sitwell with respect to Dame Edith, but not vice versa.

Just as an absolute general term may take the form indifferently of substantive, adjective, or intransitive verb, so a relative term may

¹ This terminology comes to us through Mill, Bk. I, Ch. II, along with 'general' and 'singular', 'concrete' and 'abstract' (§ 25 below).

take the form indifferently of substantive plus preposition ('brother of'), adjective plus preposition or conjunction ('part of', 'bigger than', 'same as'), or transitive verb. Also a relative term may take the form of a lone preposition: 'in', 'under', 'like'.

Parallel to the form of predication ' Fa ' for absolute terms there is, for relative terms, the form of predication ' Fab ': ' a is F to b ', or ' a F s b '.

Relative terms are, as we might say, true of objects pairwise. But we must also recognize relative terms in an extended sense—triadic ones—that are true of objects in sequences of three; also tetradic ones and higher. 'Gives to', as in ' a gives b to c ', is a triadic relative term; 'pays to for' is tetradic. Predication of such terms may be represented as ' $Fabc$ ', ' $Fabcd$ ', etc. Mostly, though, in talking of relative terms I shall intend the dyadic case just as in talking of general terms I shall usually continue to intend the absolute case.

Often we can pair relative terms off as mutual *converses*: the one is true of anything x with respect to anything y if and only if the other is true of y with respect to x . Thus 'bigger than' and 'less than'; also 'parent of' and 'offspring of'. Often, as in the case of 'brother of', 'father of', and 'part of', there happens to be no pat English word for the converse. But when in particular the relative term has the form of a transitive verb, we have in English a general formula for forming the converse: switch to passive voice and add 'by'.

Commonly the key word of a relative term is used also *derelativized*, as an absolute term to this effect: it is true of anything x if and only if the relative term is true of x with respect to at least one thing. Thus anyone is a brother if and only if there is someone of whom he is a brother. Where the relative term is a transitive verb, the corresponding absolute term is the same verb used intransitively.

Relative terms also combine with singular terms by *application*, to give absolute general terms of a composite kind. Thus the relative term 'brother of' gives not only the absolute general term 'brother' but also the absolute general term 'brother of Abel'. Similarly the relative term 'loves' gives not only the absolute general term 'loves' (intransitive) but also the absolute general term 'loves Mabel'. Again the relative term 'at' gives the absolute general term 'at Macy's'.²

² The temporal 'at' is treated along different lines in § 36.

We have seen two basic methods of getting composite general terms. One is the adjoining of one general term attributively to another (§ 21); thus 'red house', 'iron bar'. The other, just illustrated by 'brother of Abel', 'loves Mabel', and 'at Macy's', is application of a relative general term to a singular term. These two operations can be combined to get more complex general terms; thus 'wicked brother of Abel', formed by joining 'wicked' attributively to 'brother of Abel', or again 'man at Macy's', formed by joining the composite adjectival general term 'at Macy's' attributively to 'man'. Compound general terms obtained by either or both devices can be useful in turn under 'this', 'that', and 'the' in the forming of further singular terms. To composite singular terms, conversely, we can apply relative terms to get further general terms; and so round and round. So succinct a term as 'his brother' may be seen as encapsulating a three-layer compound of the kind, for we can view it as short for 'the brother of him' where 'him' is short for 'the man' (cf. § 21). Singular description makes a notable stride as a result of this access to composite general terms, for a composite general term will frequently suffice to fix the object of reference uniquely without the aid of any supplementary determinants in the context or in other circumstances of the utterance. The traditional example from Russell is the composite general term 'author of *Waverley*'; add 'the' and you have a singular term whose reference is stable and independent of context and occasion. Most singular descriptions, of course, e.g. 'the man at Macy's' or 'the president of the United States', continue to depend for their uniqueness of reference upon context or occasion.

'Wicked brother of Abel', parsed above, invites a further reflection. 'Natural satellite of the earth' might be parsed similarly; or one might prefer to view 'natural satellite of' as the relative term, and to view 'natural' as syncategorematic (§ 21) therein. Certainly this is the necessary line on 'natural son of Charles the Bald'. If syncategorematic adjectives have not figured much in our survey of the compounding of terms, it is simply because they are not terms. There is this to say of them, and equally of adverbs: they are words for attaching to terms, whether relative ('son of', 'loves') or absolute ('mother', 'red', 'talks'), to form further such terms ('natural son of', 'loves dearly', 'expectant mother', 'deep red', 'talks fast').

Akin to the application of relative terms to singular terms, as in

'brother of Abel' and 'loves Mabel', there is also the application of relative terms to general terms. In this combination the subsidiary general term is given the plural form, thus 'benefactor of refugees', and the result is again a general term.

The forming of composite general terms by applying relative terms thus to further terms, singular or general, brings a new kind of referential power. Let us look back over the phases that we have already distinguished in the referential function of language, so as to see the significance of this new one in the proper setting.

In the first phase, terms like 'mama' and 'water' were learned which may be viewed retrospectively as names each of an observed spatiotemporal object. Each such term was learned by a process of reinforcement and extinction, whereby the spatiotemporal range of application of the term was gradually perfected. The object named is assuredly an observed one, in the sense that the reinforced stimuli proceeded pretty directly from it. Granted, this talk of name and object belongs to a later phase of language learning, even as does the talk of stimulation.

The second phase is marked by the advent of general terms and demonstrative singular terms; also, as degenerate cases of the latter, singular descriptions. The general terms are learned still by ostension, but they differ from their precursors in their divided reference. The division of reference is such as to give prominence to temporal continuities of substance and of objective position (§ 19). Already it may be possible to learn a general term such as 'unicorn' by ostension of pictures and be quite prepared to find that it refers to nothing; for one soon appreciates that terms are intended less commonly for pictures than for things they depict.⁸ And in any event failures of reference of a sort become possible on the part of demonstrative singular terms and singular descriptions, as when 'this apple' or 'the apple' is used in connection with something that proves to lack its back half or to be a tomato. But despite the scope for failure of reference, the objects amenable to reference are still substantially the same old ones. They are the objects from which the reinforced stimuli proceeded in our ostensive learning of the general terms concerned, or objects enough like them to invite application of the same terms.

The third phase brings compound general terms, through the

⁸ Here I am indebted to Davidson.

attributive joining of general terms. Here we are more clearly assured than before of cases of failure of reference on the part of general terms; we get compounds like 'square apple' and 'flying horse' that are not true of anything, because of non-duplication among the objects of which the component terms are true. The attributive joining of terms can also issue directly in singular terms that name nothing; viz., such compound mass terms as 'dry water'. Moreover, from attributively compounded general terms we can get demonstrative singular terms and singular descriptions whose failure of reference is categorically assured: 'this square apple', 'the flying horse'.

This third phase, for all the possibilities of failure of reference that it opens up, still provides no reference to new sorts of objects on the part of general terms. When there are things at all for the newly compounded general terms to be true of, they are just some among the same old things to which the component terms apply. The third phase brings mass production of general terms, far out-running the objects of reference; but those objects are the same old ones.

One may still ask whether the third phase does not open the way to new objects for singular terms. For the attributive compounding of mass terms yields a singular term that refers to just the common part of the two masses or scattered totalities named by the components. May it not happen that that common part is something that no previous singular term refers to and that none of the general terms at hand is true of either? Not so. Each of the components, being a mass term, has its predicative use as a general term (cf. § 20), and, so used, will already have been true of that common part among other things.

It is reserved rather to the fourth phase to give access to new objects. This is the phase ushered in just now by applying relative terms to singular or general terms to form general terms. This phase brings a new mode of understanding, by generating such compounds as 'smaller than that speck'. Such a compound is unlike 'square apple' in that it does not even purport to denote things to which we could point and give individual names if they came our way. The relative term 'smaller than' has enabled us to transcend the old domain, without a sense of having fallen into gibberish. The mechanism is of course analogy, and more specifically extrapolation (cf. § 4).

The positing of new objects is not the work only of this grammatical construction. Relative clauses (§ 23) afford admirably flexible means of formulating conditions for objects to fulfill, and indefinite singular terms (§ 23) enable us to be quite articulate about the existence of any objects we care to assume. Abstract objects insinuate themselves in other ways soon to be speculated upon (§ 25). But the special interest of the applying of relative terms to terms is that in the series of simple constructions thus far taken up, it is the first to widen our referential horizons.

§ 23. RELATIVE CLAUSES. INDEFINITE SINGULAR TERMS

The use of the word 'relative' in 'relative clause' has little to do with its use in 'relative term'. A relative clause is usually an absolute term. It has the form of a sentence except that a relative pronoun stands in it where a singular term would be needed to make a sentence, and often the word order is switched; thus 'which I bought'. A general term of this sort is true of just those things which, if named in the place of the relative pronoun, would yield a true sentence; thus 'which I bought' is true of just those things x such that x I bought, or, better, such that I bought x .

From this last broad rule we see in particular that a relative pronoun is in a way redundant when it occurs as subject. For example, 'who loves Mabel' is true of just the persons of whom 'loves Mabel' is true, and 'which is bigger than Roxbury' is true of just the things of which 'bigger than Roxbury' is true. But the redundant pronoun can serve a grammatical purpose: we switch from 'loves Mabel' to 'who loves Mabel' for attributive use as in 'brother who loves Mabel', just because relative clauses are adjectival and hence suited, unlike the verbal form 'loves Mabel', to attributive position. There is less purpose in 'which is bigger than Roxbury', since 'bigger than Roxbury' is adjectival already. The main use of a form like 'which is bigger than Roxbury' is after a comma as an unrestrictive clause; and we may pass over unrestrictive clauses, for they are only stylistic variants of coordinate sentences.

At any rate the peculiar genius of the relative clause is that it creates from a sentence ' $\dots x \dots$ ' a complex adjective summing up what that sentence says about x . Sometimes the same effect could

be got by dropping 'x is', as in the last example, or by other expedients; thus, in the case of 'I bought x', 'bought by me' (formed by conversion and application) would serve as well as the relative clause 'which I bought'. But often, as in the case of 'the bell tolls for x', the relative clause is the most concise adjective available for the purpose.

We reflected in § 21 that some adjectives, such as 'spherical', cannot function as singular terms, while others, such as 'red', are free to behave both as general terms alongside general terms and as singular terms alongside singular terms. These remarks apply in particular to relative clauses. In 'Coffee from which extract is made is grown in the lowlands', the substantive 'coffee' and the adjective 'from which extract is made' are mass terms which stand as singular terms, each the name of a scattered portion of the world; and the compound formed of them, 'coffee from which extract is made', is a singular term naming that smaller scattered portion of the world which is the common part of the two.

'Which', 'who', and 'whom' are not the only relative pronouns to which all these reflections apply. 'That' is another, but I have avoided it because of its uses as demonstrative and conjunction. And there is the variant style of simply leaving the relative pronoun tacit, as in 'car I bought from you'.

A fruitful basis for singular descriptions is the general term of the form of a relative clause; thence 'the car [which] I bought from you'. Let us build this example from its elements. We have a triadic relative term 'bought from', which, applied predicatively to the singular terms 'I', 'x' (say), and 'you', gives a sentence form 'I bought x from you'. Putting a relative pronoun for the 'x' here and permuting, we get the relative clause 'which I bought from you'. This clause is a general term, adjectival in status. Combining it attributively with the general term 'car', we get the general term 'car which I bought from you'; and then 'the' yields the singular term.

The relative clause must be combined attributively with a substantive before 'the' is applied, since 'the' applies to substantives whereas relative clauses are adjectives. If there is no interest in the attached substantive beyond this grammatical requirement, a colorless 'thing' or 'object' or 'person' is used for the purpose; and then 'the object which' is shortened in turn to 'that which', or even 'what'. We thus come out with such singular descriptions as 'what

the cat dragged in'. Note that this is a singular term, and a substantive, while 'which the cat dragged in' is a general term and an adjective.

The reason for permuting word order in forming relative clauses is to bring the relative pronoun out to the beginning or near it. The task can be exacting in complex cases, and is sometimes avoided by recourse to an alternative construction, the unlyrical 'such that'. This construction demands none of the tricks of word order demanded by 'which', because it divides the two responsibilities of 'which': the responsibility of standing in a singular-term position within the clause is delegated to 'it', and the responsibility of signaling the beginning of the clause is discharged by 'such that'. Thus 'which I bought' becomes 'such that I bought it'; 'for whom the bell tolls' becomes 'such that the bell tolls for him'.

The 'such that' construction is thus more flexible than the 'which' construction. But what is more striking is the power and flexibility of either of these constructions as contrasted with the earlier or "algebraic" ways of deriving general terms: such operations as attributive juxtaposition, application of relative terms, conversion to passive voice, derelativization ('brother' from 'brother of'), and the joining of terms by 'and' and 'or'. It is not obvious that any preassigned finite set of algebraic operations could suffice for the work of all relative clauses; though actually Schönfinkel's work, which marked the inception of combinatory logic, may be said to establish an affirmative answer to that question.

Much discourse depends on the *indefinite* singular terms, formed typically with help of 'an' in place of 'this' or 'that' or 'the'. In 'I saw the lion', the singular term 'the lion' is presumed to refer to some one lion, distinguished from its fellows for speaker and hearer by previous sentences or attendant circumstances. In 'I saw a lion', the singular term 'a lion' carries no such presumption; it is just a dummy singular term. 'I saw a lion' counts as true if at least one lion, no matter which, was seen by me on the occasion in question.

It is with the advent of indefinite singular terms that we find pure affirmations of existence. 'I saw a lion' is true if there is at least one object satisfying the conditions of being a lion and being seen by one on the occasion in question; otherwise false. Sentences like 'Mama sings' and 'I saw the lion', which contain definite singular terms, may indeed be said to depend for their truth on the existence of objects named by those terms, but the difference is that they do

not clearly become false (and their negations true) failing such objects. Failing objects of reference for their definite singular terms, such sentences are likely to be looked upon as neither true nor false but simply as uncalled for.¹

The difference between such indefinite singular terms and the ordinary or definite ones is accentuated when repetitions occur. In 'I saw the lion and you saw the lion', we are said to have seen the same lion; indeed 'it' or 'him' could just as well have been used in place of the second occurrence of 'the lion'. But in 'I saw a lion and you saw a lion' there is no such suggestion of identity. In this sentence we could put 'so did you' for the last four words, but we cannot put 'it' or 'him' for the last two without imputing an identity not originally intended. There is no one thing named by the indefinite singular term 'a lion'; no one thing even temporarily for the space of the single sentence. In this respect the indefinite singular term is somewhat like the relative pronoun 'which', which, though it occupies positions in relative clauses corresponding to positions of singular terms in sentences, can scarcely be said even temporarily to name anything.

On this score the ordinary pronouns 'he', 'she', and 'it' are altogether different. They are, as lately remarked, definite singular terms. How much better it is to view them thus, than as somehow "standing for" their grammatical antecedents, is incidentally pointed up by the failure of substitution noted in the preceding paragraph: 'it' cannot be supplanted by its grammatical antecedent when that is an indefinite singular term, simply because 'it' remains a definite singular term whether its antecedent is or not.

'He', 'she', and 'it' are definite singular terms on a par with 'that lion' and 'the lion'. Any of these may depend for its reference upon determinants in antecedent verbiage, and any of them may be used subject to no better than the false or dummy determinants provided by an indefinite singular term. The three compound sentences 'I saw a lion and you saw that lion', 'I saw a lion and you saw the lion', and 'I saw a lion and you saw it' are interchangeable. Such use of a definite singular term dependently upon an indefinite antecedent is a departure from the uses of definite singular terms considered in preceding pages, but it makes no distinction between a pronoun such as 'it' and a singular description such as 'the lion'.

¹ Cf. Frege, "On sense and reference."

The use of 'it', 'he', etc. in connection with 'such that' may seem more of a departure from the pattern of singular description. Yet even there 'the thing', 'the man', etc. can be substituted without violence. The fact is that 'such that' clauses usually drop into context in such a way that the pronoun associated with 'such that' is felt to have a definite or indefinite singular term as antecedent. In 'the car such that I bought it from you' or 'a car such that I bought it from you' we sense a routine use of 'it' with 'the car' or 'a car' as antecedent. Granted, this feeling cuts across our analysis, which counts the article 'the' or 'a' rather as governing a composite general term formed by adjoining the 'such that' clause attributively to 'car'. And our analysis is desirable on various counts; for instance, it makes 'the' cover as much as possible of what might contribute to the uniqueness of reference which that word imputes. This analysis does require viewing the function of pronouns in connection with 'such that' as a special one.

'An' is not the only particle used in forming indefinite singular terms. Another is 'every'. This differs from 'an' in the truth condition for sentences that contain it, but it is like 'an' in that it produces only a dummy singular term. There is no one thing, neither a lion nor a class nor anything else, that is named by 'every lion', any more than by 'a lion'. Moreover the example 'I saw a lion and you saw a lion', which helped bring out the oddity of indefinite singular terms, can be matched for 'every'. For, consider first 'This lion is African or this lion is Asiatic'. 'This lion' here is a definite singular term, and can as well be supplanted by 'he' or even deleted in its second occurrence. But 'every lion', in the false statement 'Every lion is African or every lion is Asiatic', cannot be so treated. To delete the second occurrence of 'every lion', or supplant it by 'he', would radically change our false sentence, turning it into a true one.

The particles 'an' and 'every' have variants, notably 'some', 'each', and 'any'. The interchangeabilities here are curiously erratic, as one sees by putting 'every', 'some', and 'any' for 'a' in the sentences 'John can outrun a member of the team' and 'John cannot outrun a member of the team' and comparing. (Cf. § 29.)

§ 24. IDENTITY

Identity is expressed in English by those uses of 'is' that one is prepared to expand into 'is the same object as'. The sign '=' may

conveniently be thought of as annexed to English in this sense, enabling us as it does to be brief about the matter without ambiguity. But the notion of identity, however written, is fundamental indeed to our language and conceptual scheme.

The sign '=' of identity is a relative term; thus a transitive verb, we might say, not boggling at the spectacle of a direct object in the nominative. Like any such term it joins singular terms to make a sentence. The sentence thus formed is true if and only if those component terms refer to the same object.

Identity is intimately bound up with the dividing of reference. For the dividing of reference consists in settling conditions of identity: how far you have the same apple and when you are getting onto another. It was only when the child had mastered this talk of same and other to some degree that he could be said to know about general terms. Conversely, also, identity is pointless otherwise. We can perhaps imagine saying 'This is mama' or 'This is water' before general terms are in, and the 'is' here is '=', but only in retrospect. Except with a view to the eventual divided reference of general terms, 'This is mama' and 'This is water' are better thought of as 'Mama here', 'Water here'.

At that earliest phase of reference the one other conceivable case of identity is the case where instead of a demonstrative 'this' on one side and a stable term such as 'mama' on the other, we have terms of the latter sort on both sides. But such an identity would be true only if both terms were conditioned to the same range of stimulations for the same person; and if they were, which is unlikely, the identity would for that very reason convey no new information.

'Gaurisanker = Everest' is indeed informative, even though both of its singular terms are ostensibly learned (in the case imagined in § 11). For they are learned not in the primeval manner of 'mama', but only after mastering general terms and the adult scheme of enduring physical objects. Even if our explorer learns each of the names by ostension on the part of natives incapable of supplying the auxiliary English demonstrative term 'that mountain', it will be much the same to the explorer as if they had supplied it: he is confident that both natives are naming from their respective points of view the enduring solid and not just a current phase or exposed side of it.

More typical still of the useful and informative identities are the cases where one or both terms are complex; thus 'Mama is the

new treasurer', also 'The barn behind 21 Elm Street is the same barn as the one behind 16 High Street'.¹

Though the notion of identity is so simple, confusion over it is not uncommon. One instance is suggested in the fragment from Heraclitus, according to which you cannot step into the same river twice, because of the flowing of the water. This difficulty is resolved by looking to the principle of division of reference belonging to the general term 'river'. One's being counted as stepping into the same river both times is typical of precisely what distinguishes rivers both from river stages and from water divided in substance-conserving ways.²

Other difficulties over identity form the background of this statement of Hume's: "We cannot, in any propriety of speech, say, that an object is the same with itself, unless we mean, that the object existent at one time is the same with itself existent at another."³ It seems likely that his statement is prompted in part by what we noted three paragraphs back: that identity sentences joining simple terms are idle before the scheme of physical objects is grasped. But there is also another cause, clearly traceable in Hume's pages: if identity is taken strictly as the relation that every entity bears to itself only, he is at a loss to see what is relational about it, and how it differs from the mere attribute of existing.⁴ Now the root of this trouble is confusion of sign and object. What makes identity a relation, and '=' a relative term, is that '=' goes between distinct occurrences of singular terms, same or distinct, and not that it relates distinct objects.

Similar confusion of sign and object is evident in Leibniz where he explains identity as a relation between the signs, rather than between the named object and itself: "*Eadem sunt quorum unum potest substitui alteri, salva veritate.*"⁵ Frege at one time took a

¹ After Lewis.

² For more on this theme see § 36 below; also *From a Logical Point of View*, pp. 65-70.

³ Hume, p. 201.

⁴ See Hume, p. 200.

⁵ Leibniz, *Opera Philosophica* (ed. Erdmann), 1840, p. 94. On the other hand Aristotle had the matter straight: things are identical (ταὐτὰ) when "whatever is predicated of the one should be predicated of the other" (*Topics*, Bk. 7, Ch. I, 15). Aquinas says the same, *Summa Theologica*, Part I, question 40, art. I, 3. Cf. Peano, *Opere Scelte*, vol. 2, pp. 258, 417, whence these references.

similar line.⁶ This confusion is curiously doubled in Korzybski, when he argues that ' $1 = 1$ ' must be false because the two sides of the equation are spatially distinct.⁷

Identity evidently invites confusion between sign and object in men who would not make the confusion in other contexts. Those involved include most of the mathematicians who have liked to look upon equations as relating numbers that are somehow equal but distinct. Whitehead once defended the view, writing e.g. that " $2 + 3$ and $3 + 2$ are not identical; the order of the symbols is different in the two combinations, and this difference of order directs different processes of thought."⁸ It is debatable how much this defense depends on confusion of sign and object, and how much on a special doctrine that numbers are thought processes. Wittgenstein's mistake is more clearly recognizable, when he objects to the notion of identity that "to say of *two* things that they are identical is nonsense, and to say of *one* thing that it is identical with itself is to say nothing."⁹ Actually of course the statements of identity that are true and not idle consist of unlike singular terms that refer to the same thing.

The device of identity combines with that of indefinite singular terms to produce the equivalents of a wealth of familiar and useful idioms. Thus take 'Mabel loves none but George'. This amounts to an identity having the definite singular term 'George' as one side and the indefinite singular term 'everyone whom Mabel loves' as its other side. This indefinite singular term is in turn formed by applying the indefinite particle 'every' to the general term 'one whom Mabel loves'. This general term is essentially just the relative clause 'whom Mabel loves'; the 'one' is a substantivizing particle, present for no other reason than that 'every' applies to general terms only in substantival and not in adjectival form.

Or take 'Mabel loves George and someone else'. This amounts to 'Mabel loves George and someone other than George'. The indefinite singular term 'someone other than George' is formed by applying the indefinite particle 'some' (or 'an') to the (substantivized form of the) general term 'other than George', which in its

⁶ See "On sense and reference," opening remarks. Geach has more recently taken this line; see his pp. 540 f.

⁷ Korzybski, p. 194.

⁸ *Universal Algebra*, p. 6.

⁹ *Tractatus*, 5.5303.

turn amounts to a relative clause 'who $\neq$ George', the negation of 'who = George'.

General terms of the form just remarked on, 'other than y ', are of particular interest in that they enable us to analyze away the most distinctive use of the grammatical plural. Thus take 'I hear lions', meaning at least two. This amounts to 'I hear a lion other than a lion which I hear'—a paraphrase which, however unnatural, is both straightforward and devoid of plural endings. (The 'other than' in it may, as before, be rewritten 'which $\neq$ '.) Extensions of the same method enable us to say specifically for each n that there are n objects of a given sort, that there are more than n , and that there are fewer, still without recourse to plural forms.¹⁰

The combination 'is an', which we have been treating as a single copula, can be reanalyzed as a composite of 'is' and 'an' now that 'an' is seen as a particle for the formation of indefinite singular terms. 'Agnes is a lamb' then ceases to be seen as ' Fa ', and comes to be seen as ' $a = b$ ' where ' b ' represents an indefinite singular term of the form 'an F '. 'Agnes bleats' and 'Agnes is docile' retain the form ' Fa ', and the 'is' of 'is docile' retains the status of a copula, or of a particle for converting adjectives to verbs; but the 'is' of 'is a lamb' becomes '='. In a way this treatment is juster to English, but it stresses an excessively local trait. In German and the Romance languages the pattern is simply ' a is F ', as often as not, even when the general term is a substantive; thus '*Il est médecin*'. In Polish and Russian, articles do not exist at all. What is more to the point, our original treatment of ' a is an F ' as ' Fa ' meshes better with the logical developments of a later chapter. Not but that plenty of uses of 'is' still have to be construed as '='.

§ 25. ABSTRACT TERMS

At length there comes a phase at which a drastically new kind of posit sets in. This phase is marked by the advent of terms like 'roundness': abstract singular terms, purported names of qualities or attributes. Before speculating on the mechanism of this new move, let us see what it consists in. Let us see wherein such terms differ in function from 'round'.

¹⁰ The required manners of extension, due to Frege, are easily devised in the light of pp. 211 and 231 f. of my *Methods of Logic*. On uses of the plural not concerned in the present remarks see below, §§ 25, 28.

We attached only superficial significance to the distinction between substantive, adjective, and verb; hence between 'round thing', 'round', and 'is round'. But we took the distinction between general and singular terms seriously; and such is the important distinction between 'round' and 'roundness'. The basic construction in which the distinction between general and singular figured was that of predication. Whereas 'round' and the like play the role of '*F*' in '*Fa*', 'roundness' and the like are suited rather to the role of '*a*' or '*b*' in '*Fa*', '*Fab*', etc. Now in order for this latter role to exist for abstract singular terms, there have to be some abstract general terms for the supporting role of '*F*': some general terms predicable of abstract objects. Two such abstract general terms are 'virtue' and 'rare'; thus '*Fa*' can be 'Humility is a virtue', or 'Humility is rare'. Again a relative term that is abstract at one end is 'has', as in '*a* has humility', or '*a* has roundness', which have the form '*Fab*'. The move that ushers in abstract singular terms has to be one that simultaneously ushers in abstract general ones.

If the parsing of certain words as abstract terms, general and singular, were to depend simply on parsing their combinations as predications in certain ways, and vice versa, then decisions on either point would be pretty empty.¹ But the fact is that general and singular terms, abstract or concrete, are not to be known only by their role in predication. There is also the use of singular terms as antecedents of 'it', and the use of general terms after articles and under pluralization. Predication is but part of a pattern of interlocking uses wherein the status of a word as general or singular term consists. By the time we encounter abstract general terms in such contexts as 'He has a rare virtue', for instance, we are left with no very evident alternative to recognizing them as abstract general terms and recognizing the sentence even as affirming, outright, the existence of an abstract object.

For I deplore that facile line of thought according to which we may freely use abstract terms, in all the ways terms are used, without thereby acknowledging the existence of any abstract objects. According to this counsel, abstract turns of phrases are mere linguistic usage innocent of metaphysical commitment to a peculiar realm of entities. For anyone with scruples about what objects

¹ It was in part perhaps this sort of reflection that occasioned Lazerowitz's second chapter.

he assumes, such counsel should be no less unsettling than reassuring; for it drops the distinction between irresponsible reification and its opposite. And indeed anyone, interested in the question of abstract objects or not, is bound to be interested in some of the existential implications of some bodies of discourse; some at least of the ostensibly referential turns of phrase have therefore to be taken tentatively at face value, if only as a step toward drawing eventual boundaries between what to count at face value and what not. If idioms ostensibly about abstract objects are to be defended as linguistic conveniences, why not see this defense as a defense of the reifications in the only possible sense? One's privilege not to be interested in some of the ontic² implications of one's discourse is better exercised by ignoring them than by denying them. The matter is indeed not wholly simple; there is more to be said as to what uses of a term to regard as unequivocally affirming existence of its ostensible objects. But this is a topic that we can pursue more minutely when we get to Chapter VII.

We saw that the emergence of abstract singular terms is not to be separated from that of abstract general terms, and that neither is to be separated from the emergence of a systematic pattern of uses of such words in connection with pronouns, plural endings, articles, and the like. Still it may not be amiss to speculate on this development with special reference to the abstract singular. Now what can the mechanism have been?

One wedge is the mass term. Such terms can be learned at the very first phase, we saw, on a par with 'mama'. We saw them diverge from 'mama' at the second phase, simply on the score that the woman comes then to be appreciated as an integrated spatiotemporal thing while the world's water or red stuff ordinarily does not. For the child, thus, who is not on to the sophisticated idea of the scattered single object, the mass term already has an air of generality about it, comparable to the general term 'apple'; and still it is much like the singular term 'mama' in form and function, having even been learned or learnable at the first phase on a par with 'mama'. So the mass term already has rather the hybrid air of the abstract singular term. 'Water' might even be said to name (1) a

² Of the three evident advantages of 'ontic' over 'ontological', in the special sense of 'as to what there is', brevity is the least. In thus reforming my usage I follow Williams.

shared *attribute* of the sundry puddles and glassfuls rather than (2) a scattered portion of the world *composed* of those puddles and glassfuls; for the child of course adopts neither position. The virtues of (2) as a retrospective assessment of mass terms are that it preserves the kinship of terms learned or learnable at the first phase, and it postpones the eventuality of abstract objects; but surely the child, as unversed in the idea of a scattered concrete object as in that of an abstract one, is done quite as much justice by (1) as by (2). The distinction is as irrelevant to infant speech as it is to stimulus meaning (cf. § 12).

In the category of mass terms, then, that archaic survival of the first phase of language learning, the child already has forerunners of his eventual abstract singulars. Now further transition is facilitated by such an example as 'red'. This word is learnable at the first phase, where, as noted (§ 21), the difference between 'red' said of apples and 'red' said of their outsides is not yet significant. Thus the child ends up with 'red' both as a mass term and as an adjective true of things not even composed primarily of red stuff. Of course he does not consciously distinguish the words as functionally two. Result: 'red' comes in effect to name a shared attribute not only of the puddles and blobs of homogeneous red stuff, but also of apples. Now this abstract object cannot be put aside quite so easily as the water attribute was put aside, viz. by letting (2) prevail over (1). Even we, who in our sophistication recognize water as a concrete scattered object and red (the red stuff of the world) as another, are apt to admit in addition this abstract object—redness (as we may call it to stress the distinction). The analogy then spreads beyond mass terms altogether, to terms with the most strictly divided reference; thus roundness, sphericity. Each general term delivers an abstract singular.

Much of the utility of abstract terms lies in abbreviated cross-reference. For example, after an elaborate remark regarding President Eisenhower, someone says 'The same holds for Churchill'. Or, by way of supporting some botanical identification, one says 'Both plants have the following attribute in common' and proceeds with a double-purpose description. In such cases a laborious repetition is conveniently circumvented. Now the cross-reference in such cases is just to a form of words. But we have a stubborn tendency to reify the unrepeated matter by positing an attribute,

instead of just talking of words. Certainly there is an archaic precedent for such confusions of sign and object; cf., in the case of 'mama', the simultaneous reinforcement of the looming face and the heard word (§ 17). So ingrained is this kind of confusion that many unreflective persons will insist on the reality of attributes for no other reason than that the two plants (or Eisenhower and Churchill) "admittedly have something in common."

Insofar as the talk of attributes issues from such abbreviated cross-reference, the supposed attributes are likely to correspond not to simple abstract terms but to elaborate phrases; for, the more elaborate the phrase, the greater the saving achieved by the cross-reference. The ontology of attributes that thus develops allows an attribute corresponding to any sentence, however elaborate, that we can formulate about a thing. Complex singular terms for attributes commonly take the form of gerundive clauses (e.g., 'bearing spines in clusters of five'), preceded or not by 'the attribute (or quality or property) of'.

We have seen how the child might slip into the community's ontology of attributes by easy stages, from mass terms onward. We have also seen how talk of attributes will continue to be encouraged, in the child and the community, by a certain convenience of cross-reference coupled with a confusion of sign and object. We have in these reflections some materials for speculation regarding the early beginnings of an ontology of attributes in the childhood of the race. There is room, as well, for alternative or supplementary conjectures; e.g., that the attributes are vestiges of the minor deities of some creed outworn.⁸

One might, with laudably scientific motives, resolve to sweep these abstract objects aside. One might begin by explaining 'Humility is a virtue' and 'Redness is a sign of ripeness' away as perverse ways of saying of humble concrete persons and red concrete fruits that they are virtuous and ripe. But such a program cannot without difficulty be carried far. What of 'Humility is rare'? We may for the sake of argument construe 'Humility is a virtue' and 'Humility is rare' as 'Humble persons are virtuous' and 'Humble persons are rare'; but the similarity is misleading. For whereas 'Humble persons are virtuous' means in turn that each humble person is virtuous, 'Humble persons are rare' does not mean that each humble person

⁸ Thus Cassirer, pp. 95 ff.

is rare; it means something rather about the class of humble persons, viz., how small a part it is of the class of persons. But these classes are abstract objects in turn—not to be distinguished from attributes, save on a certain technical point (§ 43). So 'Humble persons are rare', unlike 'Humble persons are virtuous', has only the appearance of concreteness; 'Humility is rare' is the more forthright rendering. Maybe this abstract reference can still be eliminated, but only in some pretty devious way.

Once we start admitting abstract objects, there is no end. Not all of them are attributes, at least not *prima facie*; there are or purport to be classes, numbers, functions, geometrical figures, units of measure, ideas, possibilities. Some of these categories are satisfactorily reducible to others, and some are best repudiated. Each such reform is an adjustment of the scientific scheme, comparable to the introduction or repudiation of some category of elementary physical particles. We shall come to grips with such issues to some extent in Chapter VII.

We speculated briefly on the disreputable origins of abstract discourse: how the individual and the race are abetted in this development by confusions over mass terms, confusions of sign and object, perhaps even a savage theology. In a general way such speculation is epistemologically relevant, as suggesting how organisms maturing and evolving in the physical environment we know might conceivably end up discoursing of abstract objects as we do. But the disreputability of origins is of itself no argument against preserving and prizing the abstract ontology. This conceptual scheme may well be, however accidental, a happy accident, just as the theory of electrons would be none the worse for having first occurred to its originator in the course of some absurd dream.

Devices conceived in error have had survival value, and are to be assessed on present utility. But we stand to increase our gains by clearing away confusions that continue to surround them; for clarity is more fruitful on the average than confusion, even though the fruits of neither are to be despised. Hence we do well to distinguish abstract singular terms from concrete general ones by faithful use of '-ness', '-hood', and '-ity', at least in contexts of philosophical analysis, despite the fact that the inception of abstract singular terms probably depended on the absence of a distinctive mark.

The interlocked conceptual scheme of physical objects, identity,

and divided reference is part of the ship which, in Neurath's figure, we cannot remodel save as we stay afloat in it. The ontology of abstract objects is part of the ship too, if only a less fundamental part. The ship may owe its structure partly to blundering predecessors who missed scuttling it only by fool's luck. But we are not in a position to jettison any part of it, except as we have substitute devices ready to hand that will serve the same essential purposes.