

Flight from Intension

§ 40. PROPOSITIONS AND ETERNAL SENTENCES

In the preceding chapter a certain air of innovation prevailed, but only the blandest. Ways were shown of paraphrasing sentences to gain clarity of structure and economy of constructions at little or no cost except of brevity and familiarity of expression. The paraphrases were such as to meet most or all the likely purposes for which the originals might be used, except insofar as such needs include brevity or familiarity. There was little or no banning of locutions without benefit of passable paraphrase. The nearest we came to that was perhaps the banning of quantification into opaque constructions, but even there no clear loss was sustained, no loss that would be felt as such from any very plausible point of view; useful cases of apparent quantification into opaque contexts were generally salvaged by paraphrase. There was no banning of abstract objects on scruples of nominalism; no banning of intensional objects on scruples of extensionalism; nor any banning of indicator words on scruples of absolutism. In this chapter such issues will begin to come to the fore.

A sentence is not an event of utterance, but a universal: a repeatable sound pattern, or repeatedly approximable norm. Truth cannot on the whole be viewed as a trait, even a passing trait, of a sentence merely; it is a passing trait of a sentence for a man. 'The door is open' is true for a man when a door is so situated that he would take it as the natural momentary reference of 'the door' and it is (whether he knows it or not) open. The individual event of utterance can still be described as true absolutely, since a time and

a man are specific to it; but talk of sentences as true for men at times covers more ground, for it includes cases where the sentence is not uttered by the man in question at the time in question.

Relativity to times and persons can be awkward on account of the supplementary specifications in which it keeps involving us. This is no doubt one reason why philosophers have liked to posit supplementary abstract entities—*propositions*—as surrogate truth vehicles. This done, they speak of the sentence as expressing now one proposition and now another for this man and that, while allowing each such proposition itself to remain steadfastly true or false without respect to persons.

This posit is not altogether the philosopher's doing. Ordinary language has its 'that' clauses, and such clauses (with 'that' as conjunction, not as relative or demonstrative pronoun) function grammatically as singular terms (except when preceded by 'such'), thus evidently purporting to designate something. Their purported objects are what the philosopher takes up and calls, subject to certain refinements, propositions. It is because of the place in ordinary language of the 'that' clauses in question that it suited the half uncritical mood of the preceding chapter to make a place in canonical notation for what we called propositional abstraction and provisionally to recognize objects, called propositions, for the singular terms thus formed to designate. Since a prominent use of the 'that' clauses is as grammatical objects of the so-called verbs of propositional attitude, we found ourselves taking propositions in particular as the things that people believe, affirm, wish, etc. Russell's term 'propositional attitude' is a reminder that we were not first in so doing.

It is irrelevant that the notation of propositional abstraction, along with singular terms generally other than variables, dropped out in § 38. None of the eliminations of singular terms in §§ 37 and 38 eliminated objects. By the very nature of the elimination technique, propositions stayed on as denizens of the universe alluded to in the 'everything' and 'something' of ' (x) ' and ' $(\exists x)$ '; as values, in short, of the variables.¹ The object x concerned in the notation

¹ Mistaken critical remarks keep one reminded that there are those who fancy the mathematical phrase 'values of the variables' to mean 'singular terms substitutable for the variables'. It is rather the object designated by such a term that counts as a value of the variable; and the objects stay on as values of the variables though the singular terms be swept away.

' xOp ' that supplanted ' $x = [p]$ ' is still the proposition $[p]$, nameless though it be forevermore. Anyway I have no intention of adhering to a canonical notation without singular terms other than variables; it is enough that we have seen how we can switch to it. (Cf. § 39.)

The newly remarked purpose of propositions as surrogate truth vehicles demands that propositions resist variation in truth value, but this demand was already implicit also in their use as objects of propositional attitudes. If the sentence:

(1) Tom believes [the door is open]

as affirmed on some occasion is to be viewed as holding however momentarily of the objects Tom and [the door is open], then certainly the two objects must themselves be quite specific objects once and for all, however inadequately singled out by the words of (1). Tom must be the specific human filler of a couple of serpentine stere-years somewhere-when in past and future space-time, though we must depend heavily on our own knowledge of the circumstances of utterance of (1) in deciding among various possible ones of that name; and [the door is open] must be a proposition specific as to door and time concerned, though again we must depend on our knowledge of the circumstances of utterance of (1) in deciding which. Vagueness, ambiguity, fugacity of reference, are traits of verbal forms and do not extend to the objects referred to.

If we want to identify Tom by explicit elaboration of (1), rather than leaving the matter to circumstances of utterance, we may supply surname and address or other details. If we want to identify [the door is open] by explicit elaboration of (1), rather than leaving the matter to circumstances of utterance, we may specify where the door is and what time is intended. In general, to specify a proposition without dependence on circumstances of utterance, we put for the ' p ' of ' $[p]$ ' an *eternal* sentence: a sentence whose truth value stays fixed through time and from speaker to speaker.

Eternal sentences are standing sentences (§ 9) of an extreme kind; many standing sentences, e.g. 'The *Times* has come', are not eternal. Theoretical sentences in mathematics and other sciences tend to be eternal, but they have no exclusive claim to the distinction. Reports and predictions of specific single events are eternal too, when times, places, or persons concerned are objectively indicated rather than left to vary with the references of first names,

incomplete descriptions, and indicator words. Nor need eternal sentences be empty of stimulus meaning; a speaker may quite well be prompted by one stimulation to assent to an eternal sentence and by another to dissent from it. But when this happens he says he has been wrong and has changed his mind in the light of new evidence, rather than that the sentence has changed in truth value as 'The *Times* has come' is wont to do.

An eternal sentence may be expected to be free of indicator words, but there is no bar to its containing names, however parsed (§ 37), or other ostensibly learned terms. Terms present may well have been learned with help of indicator words.

Already in § 36 we supposed tense banished from the canonical language. But the advantages of that move did not include conversion to eternal sentences. The effect on (1) of banishment of tense is merely to insert 'now' twice and rate the two verbs as tenseless. To finish the job of eternalizing the sentence in the brackets we have to supplant the 'now' by a date and clock reading or the like, and put something more into the description 'the door'. We can go on to eternalize the outer parts too if we like, by supplanting its 'now' similarly and enlarging on Tom. (But see § 45 for an obstacle to thus eternalizing statements of propositional attitude in the general case.)

I find no good reason not to regard every proposition as nameable by applying brackets to one or another eternal sentence. An alternative plan would be to allow for inexpressible propositions, but no evident purpose would be served.² A more humdrum reason for supposing that the propositions outrun the eternal sentences could be that for many propositions the appropriate eternal sentences, though utterable enough, just happen never to get uttered (or written). This point is mistaken but worth examining, for the answer to it is important also apart from the present connection.

Prima facie the answer is that a sentence is not an event of utterance but a linguistic form that may be uttered often, once, or never; and that its existence is not compromised by failure of utterance. But we must not accept this answer without considering more precisely what these linguistic forms are. If a sentence were taken as the class of its utterances, then all unuttered sentences would reduce to one, viz., the null class; they might as well not exist so far as prop-

² For a consideration of this point see Pap, "Belief and propositions," p. 134.

ositions are concerned, for all distinction lapses among them. Nor should I like to take a sentence as an attribute of utterances; for in § 43 I shall argue for dropping attributes. But there is another way of taking sentences and other linguistic forms that leaves their existence and distinctness uncompromised by failure of utterance. We can take each linguistic form as the *sequence*, in a mathematical sense, of its successive characters or phonemes. A sequence $a_1, a_2, \dots, a_n$ can be explained as the class of the n pairs $\langle a_1, 1 \rangle, \langle a_2, 2 \rangle, \dots, \langle a_n, n \rangle$. (On pairs see § 53.) We can still take each component character a_i as a class of utterance events, there being here no risk of non-utterance.

§ 41. MODALITY

There are some obscure idioms that seem much like those of the propositional attitudes except that they lack the personal reference; viz., the so-called logical modalities 'Necessarily...', 'Possibly...'. In ordinary non-philosophical usage 'possibly' usually serves merely as a modestly impersonal rewording of what is really a personal idiom of propositional attitude after all: 'I am not sure but what'. Ordinarily the construction 'necessarily' does not, curiously enough, carry the corresponding sense 'I am sure that'. Often it connotes rather a propositional attitude of purpose or resolve. Sometimes, also, 'necessarily' and 'possibly' provide a condensed way of saying that a sentence follows from or is compatible with some fixed premiss understood as background. And sometimes they provide little more than a variant style for 'all' and 'some'.

But what is called logical modality is none of these things. Used as a logical modality, 'necessarily' imputes necessity unconditionally and impersonally, as an absolute mode of truth; and 'possibly' denies necessity, in that sense, of the negation.

Modal logic as we now know it was started by Lewis in 1918.¹ His interpretation of necessity, sharpened in formulation by Carnap,² is that a sentence beginning with 'necessarily' is true if and only if the rest of it is analytic. What with our reservations over analyticity (§ 14), this account leaves something to be desired; but let us go along with it for a while. If for the sake of argument we accept the term 'analytic' as predicable of sentences (hence as at-

¹ *Survey of Symbolic Logic*, Ch. 5. See also Lewis and Langford, pp. 78-89, 120-166.

² *Meaning and Necessity*, § 39.

tachable predicatively to quotations or other singular terms designating sentences), then 'necessarily' amounts to 'is analytic' plus an antecedent pair of quotation marks. For example, the sentence:

(1) Necessarily $9 > 4$

is explained thus:

(2) ' $9 > 4$ ' is analytic.

It is doubtful that Lewis would ever have started this if Whitehead and Russell, who followed Frege in defending Philo of Megara's version of 'If p then q ' as 'Not (p and not q)', had not made the mistake of calling the Philonian construction "material implication" instead of the material conditional. Lewis protested that a material implication so defined would have to be not merely true but analytic in order to qualify as implication properly so-called. Such was his account of "strict implication."

'Implies' and 'is analytic' are best viewed as general terms, to be predicated of sentences by predicative attachment to names (e.g. quotations) of sentences. In this they contrast with 'not', 'and', and 'if-then', which are not terms but operators attachable to the sentences themselves. Whitehead and Russell, careless of the distinction between use and mention of expressions, wrote ' p implies q ' (in the material sense) interchangeably with 'If p then q ' (in the material sense). Lewis followed suit, thus writing ' p strictly implies q ' and explaining it as 'Necessarily not (p and not q)'. Hence his development of a modal logic of 'necessarily' as an operator on sentences. The contrast between that operator and the term 'is analytic', drawn by the quotation marks in (2), did not concern Lewis. But it emerges when, as in Carnap's writings, the distinction between use and mention is carefully maintained; indeed it emerges as the very distinction between modal logic and ordinary talk of analyticity.³

Proponents of modal logic need not all be concerned with necessity in this extreme sense. The necessity concerned might be construed rather as some sort of physical necessity, without modifying the form of the system. Or it might be construed as conditional

³ See further my "Three grades of modal involvement."

necessity, relative to some unspecified set of premisses as parameter.⁴ My remarks on modal logic will be predicated on the original or extreme interpretation. How far they apply to other possible uses of the same formal system is a family of separate questions that I shall leave aside.

So suppose (1) explained as in (2). Why, one may ask, should we preserve the operatorial form as of (1), and therewith modal logic, instead of just leaving matters as in (2)? An apparent advantage is the possibility of quantifying into modal positions; for we know we cannot quantify into quotation, and (2) uses quotation. Lewis surely intended modal positions to be quantified into, but he did not develop a quantified modal logic. Miss Barcan has subsequently done so.

But is it more legitimate to quantify into modal positions than into quotation? For consider (1) even without regard to (2); surely, on any plausible interpretation, (1) is true and this is false:

(3) Necessarily the number of major planets > 4 .

Since 9 = the number of major planets, we can conclude that the position of '9' in (1) is not purely referential and hence that the necessity operator is opaque.⁵

Such illustrations of opacity depend on the existence of appropriately stubborn objects. The stubbornness of 9 consists in its being specifiable in ways that fail of necessary equivalence (e.g. as numbering the major planets and as succeeding 8), so that various traits (such as greatness than 4) are entailed with necessity under one specification of 9 and not under another. Now if we narrow the universe of objects available as values of variables of quantification so as to exclude such stubborn objects, there ceases to be any such objection to quantifying into modal position.⁶ Thus we can legitimize quantification into modal position by postulating that whenever each of two open sentences uniquely determines one and the same object x , the sentences are equivalent by necessity. Schematically we can put the postulate as follows, using ' Fx ' and

⁴ On these alternatives see Reichenbach, §§ 65 f. For a reinterpretation in terms of time see Prior, pp. 32 f.

⁵ Hintikka offers a novel account of what makes for the opacity of modal contexts.

⁶ Cf. Church's review of my "Notes on existence and necessity."

(4) If Fx and x only and Gx and x only then (necessarily (w) (Fw if and only if Gw)).

(5) $(p \text{ and } x = y)$ and x only and
 (6) $x = y$ and x only.

(7) Necessarily $(w)(p \text{ and } w = y)$ if and only if $w = y$.

Modal logic as systematized by Miss Barcan and by Fitch allows unrestricted quantification into modal contexts. How to interpret such a theory, without making the disastrous assumption (4), is by no means clear. Church's modal logic is more cautious: it allows quantification into modal contexts with respect only to special variables whose values are restricted to intensional objects.⁸ But this precaution, for all the doubling of the apparatus of variables and quantifiers that it costs, is still no clear solution; for the question of (4) can still be raised within the framework of those special quantifiers and variables.⁹

⁷ Cf. (1) of § 38; also § 20, note 1.

⁸ Church, "A formulation of the logic of sense and denotation."

⁹ Carnap's system of modal logic in *Meaning and Necessity*, §§ 10 and 40, is essentially one in which all objects are intensional. In presenting his system he propounds a curious double interpretation of variables; but, in a criticism which he generously included in that book, § 44, I have argued that this manoeuvre only obscures the intensional character of his objects and makes no difference to the essential theory. This being the case, I should expect his theory to fulfill (4), by interpretation at least, and so to be vitiated by the above deduction.

have handled propositional attitudes. Thus to begin with we might depict (1) as:

(8) $[9 > 4]$ is necessary

and so pin the opacity on intensional abstraction. What are necessary and possible would thus be taken to be propositions. Then, following the model of § 35 further, we might try rendering modality selectively transparent on demand by switching selectively from propositions to attributes. We get:

(9) $x[x > 4]$ is necessary of 9,

which contrasts with (8) in giving '9' purely referential position, susceptible to quantification and to substitution of 'the number of major planets'. Now the manoeuvre seemed rewarding enough in the case of the propositional attitudes, when we wanted to be able to say e.g. that there is someone whom I believe to be a spy (§ 31). But in connection with the modalities it yields something baffling—more so even than the modalities themselves; viz., talk of a difference between necessary and contingent attributes of an object.

Perhaps I can evoke the appropriate sense of bewilderment as follows. Mathematicians may conceivably be said to be necessarily rational and not necessarily two-legged; and cyclists necessarily two-legged and not necessarily rational. But what of an individual who counts among his eccentricities both mathematics and cycling? Is this concrete individual necessarily rational and contingently two-legged or vice versa? Just insofar as we are talking referentially of the object, with no special bias toward a background grouping of mathematicians as against cyclists or vice versa, there is no semblance of sense in rating some of his attributes as necessary and others as contingent. Some of his attributes count as important and others as unimportant, yes; some as enduring and others as fleeting; but none as necessary or contingent.

Curiously, a philosophical tradition does exist for just such a distinction between necessary and contingent attributes. It lives on in the terms 'essence' and 'accident', 'internal relation' and 'external relation'. It is a distinction that one attributes to Aristotle (subject to contradiction by scholars, such being the penalty for attributions to Aristotle). But, however venerable the distinction,

it is surely indefensible; and surely then the construction (9) which so smoothly implements it must go by the board.

We cannot in conscience blame these varied sorrows of modality on the notion of analyticity. The latter can be had without the former. Necessity as quantified into, and necessity as just now predicated of intensional objects, are burdens that are not forced upon one by merely explaining (1) and the like as (2) and the like; such a definition would not of itself yield all that. However, as long as propositional abstraction is admitted, there is a definition alternative to the plan of (1) and (2) that also commits us to at least a bit of something like modal logic: we can define '*P* is necessary' as ' $P = [(x)(x = x)]$ '. Whether this makes (8) true, whether it conforms to the equating of (1) with (2) at all, will depend on how narrowly we construe propositions in point of their identity. Actually the answer is negative if propositions are construed narrowly enough to suit the propositional attitudes (cf. § 42). But the fact remains that this definition of necessity, however Pickwickian, yields something isomorphic to unquantified modal logic. We may then well ask whether a parallel definition of '*A* is necessary of *a*', say as ' $A = x[x \text{ has } A \text{ or } x = a]$ ', has power to renew the horrors of (9). I shall leave the reader to ponder that one, meanwhile contenting myself with the prospect, in § 43, of renouncing intensional objects altogether.

§ 42. PROPOSITIONS AS MEANINGS

A large part of learning 'apple' or 'river' was learning what counts as the same apple or river re-exposed and what counts as another. Similarly for 'proposition': little sense has been made of the term until we have before us some standard of when to speak of propositions as identical and when as distinct. Not being physical, a proposition cannot, like an apple or river, be exposed and re-exposed; but it admits of something analogous. The question of identity of propositions is the question how two eternal sentences should be related in order that, where '*p*' and '*q*' stand for them, we be entitled to say that [*q*] is the same proposition as [*p*] rather than another.

A usual answer is that the sentences are to be synonymous. One who gives this answer can as well go on to say that the proposition is the meaning of the sentence; and this again is a well-known line.

Not that meanings of declarative sentences are all to count as propositions; a likelier position is that 'The door is open' stays unchanged in meaning while the associated proposition differs from occasion to occasion of utterance. But propositions would be said to be the meanings of eternal sentences.

One must remember that an expression's meaning (if we are to admit such things as meanings) is not to be confused with the object, if any, that the expression designates. Sentences do not designate at all (variant conventions such as Frege's apart), though words in them may; sentences are simply not singular terms. But sentences still have meanings (if we admit such things as meanings); and the meaning of an eternal sentence is the object designated by the singular term formed by bracketing the sentence. That singular term will have a meaning in turn (if we are prodigal enough with meanings), but it will presumably be something further.¹ Under this approach the meaning (if such there be) of the non-eternal sentence 'The door is open' is not a proposition, and so is not named by '[the door is open]'; what '[the door is open]' names on the occasion concerned is a proposition which is the meaning not of 'The door is open' but of some other sentence, some eternal one that is an appropriate elaboration of 'The door is open' for the occasion concerned.

If we are content to define identity of propositions by synonymy of sentences, there is no evident objection to calling propositions meanings of eternal sentences. Misgivings as to what sort of object such a meaning might be could be allayed, if one pleases, by identifying it with the very class of all those mutually synonymous sentences that are said to have it.² The worry that remains is the worry over a suitable notion of synonymy of eternal sentences.

If propositions are to serve as objects of the propositional attitudes, then the broad sort of sentence synonymy talked of in § 14 would be unsatisfactory as a standard of identity of propositions even if adequately formulated. It would be too broad. For it would reckon all analytic sentences as meaning an identical proposition; yet surely one would not want to regard all analytic sentences as

¹ Cf. Frege, "On sense and reference," and my *From a Logical Point of View*, pp. 9, 21 f., 47, 62, 163.

² Thus Ayer, p. 88. Bergmann, if I rightly interpret his "Intentionality," p. 179, takes propositions rather as certain attributes of events of awareness and the like.

interchangeable in contexts of belief or indirect quotation, especially if all mathematical truths are regarded as analytic. Hence Lewis and Carnap have resorted to narrowed derivative relations of synonymy, or *intensional isomorphism* in Carnap's phrase, as better suited to interchange in contexts of propositional attitude.³ The manner of derivation was sketched early in § 14.

The broader synonymy remains the basic one for both authors. It is to it that they fit modal logic, and by it that they gauge the identity of propositions. In their terminology, therefore, the objects of the propositional attitudes are not propositions; they are more finely individuated objects, called by Lewis *analytic meanings*. On the other hand Church reserves the word 'proposition' for the latter purpose. I prefer to follow Church in this; for it is the propositional attitudes above all, it seems to me, and not modal logic, that clamor for positing propositions or the like. As for the purpose of truth vehicles, it is served by propositions in either sense.

Gauging the identity of propositions to suit the propositional attitudes does not disallow the modal use made of propositional abstraction in § 41. The effect of the tightened identity is merely that if the meaning of every analytic sentence continues to be rated as necessary, there will be many necessary propositions. The minimum interchangeability relation for modal logic—strict equivalence, Lewis calls it—merely ceases to imply identity, and 'P is necessary' ceases to be definable as ' $P = [(x)(x = x)]$ '. A re-interpretation of modal logic remains thus definable, but its necessity is narrower than analyticity (cf. § 41). In any event I feel that the best claim of modal logic upon our attention is rather as a by-product of positing propositions than as a purpose of positing them.

Mates, Church, and Scheffler have argued that Carnap's intensional isomorphism (and Lewis's earlier construction of similar character) is still too broad for interchange in contexts of propositional attitude. Putnam and Church have responded with proposals for further tightening the relation. Scheffler still finds loopholes,⁴ but part of his criticism can be annulled by limiting the question

³ Lewis, "Modes of meaning"; Carnap, *Meaning and Necessity*, §§ 14–16.

⁴ Mates, "Synonymy," p. 215; Church, "Intensional isomorphism and identity of belief"; Scheffler, "On synonymy and indirect discourse"; Putnam, "Synonymy and the analysis of belief sentences." See also Pap, "Belief, synonymy, and analysis" and "Belief and propositions."

of interchange, in contexts of propositional attitude, to the interchange of eternal sentences. Each non-eternal sentence should be filled out into an eternal one suitable to the circumstances of the supposed affirmation of propositional attitude, before we put a standard of propositional identity to the test. This plan is mandatory if we take the objects of the propositional attitudes as propositions and propositions as meanings of eternal sentences; and anyway it is a natural separation of problems, since eternalization is often in order also apart from propositional attitudes.

Little would be gained here by examining the historical details of intensional isomorphism and its variants, for the constructions have depended on the notion of sentence synonymy in the broad sense, or, what is an equivalent assumption, the notion of analyticity. Section 14 left us little expectation of making approximately suitable sense of a general boundary between analytic sentences and others, on the basis even of the totality of dispositions to speech behavior.

We do have our analyticity intuition, but it grades off. It is a question of how heavily communication is felt to depend on acceptance of the sentences concerned (§ 14). It is question of how much facility would be gained by departing from homophonic translation in dealing with a compatriot who denies such a sentence. Now there is no objection to a graded notion of synonymy or of analyticity, supposing it made reasonably clear; but it is unlikely to contribute directly or indirectly to a standard of identity of propositions. For propositions have to be the same or distinct absolutely; identity, properly so-called, knows no gradations.

These reflections count only against hoping to base identity of propositions on some sort of intensional isomorphism derived from the broad sort of sentence synonymy which is interdefinable with analyticity. We might still hope to construct some approximation to intensional isomorphism suitable for identity of propositions, in some other way than from the elusive broad notion of sentence synonymy. For we saw in § 12 how to define stimulus synonymy of general terms using stimulus analyticity, and in Chapter V how to regiment the structure of sentences in terms of a few fixed constructions. At the height of the regimentation, sentences were constructible only by adjoining general terms (including '=' and 'ε') predicatively to variables and applying quantification, truth functions, and other operations on sentences (thus the 'O', 'O_x',

etc. of § 38). Here, then, is a definition of structural synonymy to consider: sentences in this canonical form of notation are synonymous if one can be transformed into the other by transformations of the logic of quantification and truth functions together with substitution of general terms for stimulus-synonymous general terms. May we not take eternal sentences in canonical notation to mean the same proposition when and only when they are synonymous in this sense? Let us survey the objections.

(1) The transformability of one sentence into another by the logic of quantification and truth functions can elude even the specialist in logic for indefinite periods; there is no general limit to the length of inquiry that may be required.⁵ Evidently then to identify propositions on this basis would disqualify them as objects of belief.⁶ We might meet this objection by counting only certain less far-reaching logical transformations into our synonymy definition, or even none.⁷

(2) Perhaps the stimulus synonymy of general terms, on which our definition depends, is too loose a synonymy to give the desired effect—particularly when the terms do not denote fairly observable objects. (Cf. § 12.)

(3) Whether a general term in a sentence of ordinary language survives in a canonical paraphrase of the sentence, or disappears in favor of a more minute analysis, depends only on one's momentary purposes in paraphrasing; and so does the nature of the more minute analysis, if any. (Cf. § 33.) Therefore our suggested notion of structural synonymy, with its emphasis on general terms, is mainly relevant to a wholly casual feature of our use of canonical notation. Nor should we care to meet this objection by specifying

⁵ This is a way of stating an important discovery of Church. See my *Methods of Logic*, revised edition, § 32.

⁶ This objection is similar in principle to objections leveled against Carnap's intensional isomorphism in the papers of Scheffler and Church last cited.

⁷ Counting none of them in is Putnam's course and Church's in their last-cited papers. Note that making the synonymy relation thus excessively narrow is more defensible than leaving it excessively wide; for when we count two sentences not synonymous and hence not interchangeable in belief contexts we still leave people free to believe both. Because of this, the first of the two problematic cases that Scheffler notes, *op. cit.*, top of p. 42, may be taken lightly. All that is wanted to clear up his other case, by the way, is the technique of selective transparency in § 31.

or imagining some absolute vocabulary of simple general terms, as canonical all-purpose elements of paraphrase.⁸ If the positing of propositions as objects is serious, any such arbitrarily assembled groundwork for propositional identity must be seen as gratuitous.

(4) The proposed concept of structural synonymy, limited as it is to canonical notation, covers too special a subclass of the eternal sentences. Now insofar as this objection is aimed e.g. at the absence of singular terms, it is minor. Mechanical transformations are at hand in § 39 for eliminating and restoring singular terms, and we can read these operations into our definition of structural synonymy, if we like, on a par with the logical transformations and the substitutions under stimulus synonymy. But as an objection to limiting oneself to the canonical notation in other respects, it is serious; for the conversions to canonical notation are in general no more mechanical than foreign translation. The objection can be put simply as the objection that we are explaining propositional identity relative only to one language. The objection applies in particular also to the dependence of our concept upon that of the stimulus synonymy of terms; for this latter, unlike stimulus synonymy of sentences, was tied to English from the start (§ 12). Now to say that we can always adhere to our own language, and to the canonical part of it, is no adequate defense. For if the posit of propositions is to be taken seriously, eternal sentences of other languages must be supposed to mean propositions too; and each of these must be identical with or distinct from each proposition meant by an eternal sentence of our own, even if we never care which. Surely it is philosophically unsatisfactory for such questions of identity to arise as recognized questions, however academic, without there being in principle some suggestion of how to construe them in terms of domestic and foreign dispositions to verbal behavior.

This last point has the germs of an argument not only against our specific plan of a structural-synonymy concept as a standard of propositional identity, but against the whole idea of positing propositions. For, insofar as we take such a posit seriously, we thereby concede meaning, however inscrutable, to a synonymy relation that can be defined in general for eternal sentences of distinct languages

⁸ Cf. § 47. It is on this point that Carnap's use of his intensional isomorphism differs most radically. He imagines a fixed, closed vocabulary of simple terms.

as follows: sentences are synonymous that mean the same proposition. We would then have to suppose that among all the alternative systems of analytical hypotheses of translation (§§ 15, 16) which are compatible with the totality of dispositions to verbal behavior on the part of the speakers of two languages, some are "really" right and others wrong on behaviorally inscrutable grounds of propositional identity. Thus the conclusions reached in § 16 may of themselves be said implicitly to scout the whole notion of proposition, granted a generally scientific outlook. The difficulties cited earlier in the present section are merely by the way. The very question of conditions for identity of propositions presents not so much an unsolved problem as a mistaken ideal.

§ 43. TOWARD DISPENSING WITH INTENSIONAL OBJECTS

A need to posit propositions—or perhaps "statements," as Strawson uses this word—has been felt or imagined in a number of connections. Propositions or other sentence meanings have been wanted as translational constants: as things shared somehow by foreign sentences and their translations. They have been wanted likewise as constants of so-called philosophical analysis, or paraphrase: as things shared by analysanda and their analysantia. They have been wanted as truth vehicles and as objects of propositional attitudes. The want has been felt so strongly as to encourage philosophers to defend a notion of sentence synonymy such as the identity of propositions demands, and to defend it by flimsier arguments than they might have permitted themselves if no preconceptions had been at stake. One of those arguments involves the fallacy of subtraction: it is argued that if we can speak of a sentence as meaningful, or as having meaning, then there must be a meaning that it has, and this meaning will be identical with or distinct from the meaning that another sentence has.¹ This is

¹ Thus Grice and Strawson, p. 146: "We want only to point out that if we are to give up the notion of sentence-synonymy as senseless, we must give up the notion of sentence-significance (of a sentence having meaning) as senseless too." The same subtractive fallacy can perhaps be imputed to Rynin, p. 381, where he seems to regard his defense of the notion of "knowing the meaning" as a defense of the notion of "meaning"; and again to Gewirth, note 48. And see Xenakis, p. 20, where from my remark that we give the mean-

urged without any evident attempt to define synonymy in terms of meaningfulness, nor any notice of the fact that we could as well justify the hypostasis of sakes and unicorns on the basis of the idioms 'for the sake of' and 'is hunting unicorns'.² Also we find it argued that the standard of clarity that I demand for synonymy and analyticity is unreasonably high;³ yet I ask no more, after all, than a rough characterization in terms of dispositions to verbal behavior.

Another defense cites our undeniable intuitions of synonymy and analyticity. These I recognize, but I have urged (§§ 14, 42) that they do not sustain a synonymy concept suited to identity of propositions, or meanings. It should be said also that the arguments deplored in the preceding paragraph were doubtless meant in part as defenses merely of the intuitions and not of a synonymy adequate to propositional identity, though the distinction never gets drawn. As defenses of the intuitions those arguments may be acknowledged as fair enough, always excepting the one involving the fallacy of subtraction. But so construed the arguments are no defense of propositions, however strongly motivated by a wish to defend them.

Whistling in the dark is not the method of true philosophy. Let us review the situations that prompted the positing of propositions, and consider what can be done without that expedient. Now to begin with it is a mistake to suppose that the notion of propositions as shared meanings clarifies the enterprise of translation. The totality of dispositions to speech behavior is compatible with alternative systems of sentence-to-sentence translation so unlike one another that translations of a standing sentence under two such systems can even differ in truth value (§ 16). Were it not for this situation, we could hope to define in behavioral terms a general relation of sentence synonymy suited to translational needs, and our objection to propositions themselves would thereby be dissipated. Conversely, since the situation does obtain, the positing of propo-

ing of x by giving a synonym of x he deduces that "the meaning of x is a synonym of x ." (But he is encouraged here by the familiar use of 'means' as short for 'means the same as'.)

² Nor any notice of my own caveats over this point, in the very book that the argument is directed against: *From a Logical Point of View*, pp. 11 f., 22 n., 48 f.

³ Grice and Strawson, pp. 145 f.; Kemeny, review; Martin, "On 'analytic'"; Mates, "Analytic sentences," pp. 528 ff.; Richman, "Neo-pragmatism," p. 36. See also Gewirth, p. 400.

sitions only obscures it. The notion of proposition seems to facilitate talk of translation precisely because it falsifies the nature of the enterprise. It fosters the pernicious illusion of there being a uniquely correct standard of translation of eternal sentences (cf. § 42).

It is no less a mistake to suppose that the notion of propositions as shared meanings clarifies the paraphrastic enterprises of philosophical analysis. On the contrary, as stressed in Chapter V, synonymy claims would generally be out of place in such connections even if the notion of synonymy as such were in the best of shape.

We come next to the appeal to propositions as truth vehicles. But instead of appealing here to propositions, or meanings of eternal sentences, there is no evident reason not to appeal simply to the eternal sentences themselves as truth vehicles. If we undertake to specify the proposition "expressed" by the utterance of some non-eternal sentence, e.g. 'The door is open', on some particular occasion, we do so by bracketing some eternal sentence that means the proposition; thus we have had to compose an appropriate eternal sentence anyway, and we could as well stop there.

To stop there opens the question how this eternal sentence is related to the given utterance of the non-eternal one. If the question how the proposition was related to the utterance seemed less urgent, it was because of a false sense of security induced by the facile word 'expressed' and the unexamined ontology of propositional "thought" that it connotes. If talking of eternal sentences instead of propositions brings the question to consciousness, so much the better. In vague terms the answer to it is much the same as in the case of paraphrasing sentences into canonical notation (§ 33): the eternal sentence will be one that the original speaker could have uttered in place of his original utterance in those original circumstances without detriment, so far as he could foresee, to the project he was bent on. I need hardly say that there is scope here for refinement, but let it not be supposed that acquiescence in talk of expressed propositions provides it.

It may seem that in talking of eternal sentences instead of propositions, whether as truth vehicles or in other connections, we cut ourselves off from cases where the proposition is referred to as a function of some variable: [x is mortal], where ' x ' is bound only by some quantifier farther forward in the context. The argument would be that reference to the sentence ' x is mortal' itself, in place

of the propositional reference, would violate the restriction against quantifying into quotation. Actually there is no loss on this score; for quantification into the brackets of propositional abstraction is ruled out to begin with. Cf. § 35.

So much for propositions as truth vehicles. We have still to consider the problem of dispensing with propositions as objects of the propositional attitudes; but meanwhile let us pause for a word on the intensional objects other than propositions.

The strictures against propositions apply with equal force to attributes and relations. Just as propositions purport to be meanings of eternal closed sentences, so attributes and relations might be looked upon as meanings of eternal open sentences: open sentences which, for each choice of values of their free variables, take on truth values independent of speaker and occasion. The objection to propositions on the score of identity applies unchanged to attributes and relations. We shall want to dispense with attributes and relations as objects of the propositional attitudes, if we can, along with propositions.

Attributes and relations, or something rather like them, are needed also for various purposes apart from the propositional attitudes. Some of those purposes can be met by talking simply of the corresponding eternal open sentences or general terms—just as the purpose of propositions as truth vehicles seems to be met by eternal closed sentences. Others of those purposes, and very important ones they are, have no analogues among the purposes for which propositions might seem to be wanted; nor can they be met by talking of open sentences or general terms. We shall see later (§§ 48, 53 ff.) what some of those purposes are. But we shall find that those further purposes of attributes are well served by classes, which, after all, are like attributes except for their identity condition. Classes raise no perplexities over identity, being identical if and only if their members are identical.

Not only is the use of classes instead of attributes, where possible, to be desired on account of the identity question. It is also important in that intensional abstraction is opaque whereas class abstraction is transparent. Much of the power of class abstraction is due to our freedom to quantify into it, as in Cantor's theorem:

$(x)(\hat{y}(y \text{ is a subclass of } x) \text{ has more members than } x)$

or again in the law of counting:

(x)(if x is a positive integer then $\hat{y}$ (y is a positive integer $\leq x$) has x members).

Such quantification into intensional abstraction, on the other hand, is obstructed by opacity.

What classes are to attributes (thus dogkind to caninity), classes of ordered pairs are to relations. Insofar as purposes of attributes are met by classes, the analogous purposes of relations are met by classes of ordered pairs. But here there is a terminological quirk to look out for: classes of ordered pairs are in modern logic and mathematics customarily called relations too. To avoid confusion one often speaks of relations in the former or intensional sense as relations-in-intension.

The words 'attribute' and 'relation' turn up so often in the best discourse on the best of subjects that one may be taken aback by talk of renouncing attributes and relations. We now perceive that the renunciation, whatever its difficulties, is not as drastic as it sounds, since so much of what is said by ostensible reference to attributes or relations can be construed to refer at worst to open sentences, general terms, classes, or relations in the sense of classes of ordered pairs. Often even, as in the case of colors and substances, scattered concrete objects will fill the bill (§ 20).

Not that I would undertake to limit my use of the words 'attribute' and 'relation' to contexts that are excused by the possibility of such paraphrase. For consider how I have persisted in my vernacular use of 'meaning', 'idea', and the like, long after casting doubt on their supposed objects. True, the use of a term can sometimes be reconciled with rejection of its objects (cf. §§ 48 ff.); but I go on using the terms without even sketching any such reconciliation. What is involved here is simply a grading of austerity. I can object to using a certain dubious term at crucial points in a theory, on the ground that to use it would deprive the theory of its desired explanatory force; but I can still use and condone the term in more casual or heuristic connections, where less profundity of theoretical explanation is professed. Such grading of austerity is a natural adjunct of the scientific enterprise, if we see that enterprise in Neurath's way. There will be more to say of it in §§ 45 ff.

But let us get back, meanwhile, to the question how to accomplish specific purposes of intensional objects by means of substitute devices; for our troubles in that quarter are not over. For one

thing, we have still to see what can be done about attributes and relations-in-intension, as well as propositions, in their capacity of objects of propositional attitudes.

§ 44. OTHER OBJECTS FOR THE ATTITUDES

When we handle propositional attitudes with intensional abstraction as in § 35, their opacity becomes localized in that of intensional abstraction. It follows that the work of attributes as objects of propositional attitudes cannot be done by the corresponding classes; for class abstraction is transparent. Or, to argue from example, let $x[Fx]$ be an attribute for which it is false that

- (1) Tom believes $x[Fx]$ of a .

Still, endowed as he is with some trace of logical sense,

- (2) Tom believes $x[Fx \text{ or } x = a]$ of a .

Suppose further that, unbeknownst to Tom, Fa . Then $\hat{x}(Fx) = \hat{x}(Fx \text{ or } x = a)$; so the required independence between (1) and (2) would be lost under class abstraction.

What thus disqualifies classes as objects of propositional attitudes is laxity of the condition of class identity: for two open sentences to determine the same class they need only be coextensive, i.e., fulfilled by the same values of the variable. Disqualification even of intensional objects as objects of propositional attitudes was to be feared on the same count, under certain contemplated conditions of identity of such objects; cf. objection (1) of § 42. Anyway we saw strong reasons not to welcome the intensional objects. The idea next suggests itself of taking as objects of the propositional attitudes things whose identity conditions are even stronger than the propositional attitudes require.

Such a course disturbs only some rather special sentences. Examples are 'Paul and Elmer agree on just three things', 'Paul believes only one thing that Elmer does not'; the effect of excess strength in the identity conditions could be upward revision of the numbers three and one in those examples, even to infinity. But these examples seem queer to begin with. That they do is indeed indicative of how uncertain one feels about sufficient conditions for identity of objects of the propositional attitudes.

Besides these trivial examples, there is indirect quotation to con-

sider; it is one idiom of propositional attitude that might seem vulnerable to excessively strong identity conditions. Thus imagine hereafter in place of ' p ' and ' q ' two eternal sentences that are more or less equivalent intuitively speaking, and suppose the former uttered by w at t . One is tempted to think that an identity condition so strong as to distinguish between the objects of ' w says at t that p ' and ' w says at t that q ' would make ' w says at t that q ' false. One is tempted to think thus about indirect quotation and not about belief, since w can believe all manner of distinct things at t but can utter only one sentence. However, this reasoning is wrong. In uttering his one sentence, w can be regarded as "saying" (in the sense of indirect quotation) as many distinct "things" (in the sense of objects of the propositional attitude of indirect quotation) as we like. Strong identity conditions are compatible with any amount of liberality over indirect quotation; they constrain us only in the more negligible connections noted in the preceding paragraph.

Such being the case, we might try repeating for propositional attitudes the line already urged in § 43 for truth vehicles: we might try using, instead of the intensional objects, the sentences themselves.¹ Here the identity condition is extreme: notational identity. The rough idea would be to rephrase (7)–(9) of § 35 thus:

- (3) Tom believes-true 'Cicero denounced Catiline',
- (4) Tom believes-true ' y denounced Catiline' of Cicero,
- (5) Tom believes-true ' y denounced z ' of Cicero and Catiline.

I modify 'believes' as 'believes-true' to alleviate the sense of oddity.

The plan has its recommendations. Quotation will not fail us in the way that class abstraction did. Moreover, conspicuously opaque as it is, quotation is a vivid form to which to reduce other opaque constructions. And we can even dissolve it altogether, into spelling, when we please (§ 30).

Intensional abstraction is in a very different position from class abstraction. We could scarcely afford to switch from class abstraction to quotation and so dispense with classes. The difference is our freedom to quantify into class abstraction (cf. § 43). To drop class theory in favor of quotation, into which there is no quantifying, would mean giving up most of the power that a class theory confers (whereof more anon: § 55). Intensional abstraction, on the

¹ Thus Carnap, *Logical Syntax*, p. 248.

other hand, was pressed into duty in § 35 with full acceptance of opacity; so its absorption into quotation means no such loss.

The proposal of (3)–(5) applies equally to other propositional attitudes. ‘Tom says that Cicero denounced Catiline’, or ‘Tom says [Cicero denounced Catiline]’, would become:

(6) Tom says-true ‘Cicero denounced Catiline’.

This new verb is not to be confused with the ‘says’ of direct quotation; (6) is meant to retain the freedom of indirect quotation.

In general, thus, the objects of propositional attitudes would be taken simply to be eternal sentences, open and closed. In limiting them to eternal sentences we do not prohibit other sentences in contexts of propositional attitude; the point is merely that it is not these, but only eternal paraphrases of them, that count as the objects of the attitudes. In this respect the situation remains somewhat as it was when we were still using intensional abstraction; cf. § 40. Part of what is bewildering in analyses of the propositional attitudes is cleared up by keeping in mind that only the switch to eternal sentences makes the objects of the attitudes explicit, whether in propositional abstraction or in quotation.

Taking the objects of propositional attitudes as sentences does not require the subject to speak the language of the object sentence, or any. A mouse’s fear of a cat is counted as his fearing true a certain English sentence. Yet there remains, as Church has remarked,² a certain relativity to language that needs still to be made explicit. Quotations are names merely of the forms therein exhibited, regardless of what language they belong to. What then if by coincidence those same forms quoted in (3)–(6) make sense in another language, and sense other than we intend? The coincidence is not excluded; indeed for Church it is even inevitable, for he counts as languages all possible languages and not just those actually used. Evidently therefore we should amend (3) to read:

(7) Tom believes-true in English ‘Cicero denounced Catiline’;

and correspondingly for (4)–(6) and other cases.

But there is still, according to Church,³ a fundamental difficulty in treating the objects of propositional attitudes thus as linguistic

² “On Carnap’s analysis of statements of assertion and belief.”

³ *Op. cit.* He credits Langford with the point.

forms. A German translation of (7) might run, inelegance for inelegance, thus:

(8) Tom glaubt wahr auf Englisch „Cicero denounced Catiline.“

Yet a German ignorant of English will not get from (8) the information about Tom that he would get from a full German translation of:

(9) Tom believes that Cicero denounced Catiline.

Since (8) reproduces the meaning of (7), then, (7) must miss that of (9).

This argument I find inconclusive because it turns on a notion of likeness of meaning. After all, it was misgivings over that notion that impelled us to drop propositions in the first place.⁴ True, I cannot reject the argument on that score and then hold that (7) is like (9) in meaning. But likeness of meaning is not my aim; cf. § 33. One could still hold that (7) well enough serves any purposes of (9) that seem worth serving.

But I find (7) and its train unsatisfactory on another count: the dependence on the notion of *a* language. The underlying form of (7) is '*w* believes-true *s* in *l*', relating a man, a linguistic form, and a language. What are languages, and when do they count as identical or distinct? Clearly such questions should be unconnected with the propositional attitudes. It would be better to refer here not to a language *l* but to a speaker *z*, thus: '*w* believes-true *s* in *z*'s sense'. We have then an irreducibly triadic relative term '*... believes-true ... in ...'s sense*', relating a man, a linguistic form, and a man. The corresponding adjustment applies to the higher cases (4) and (5) and to the other propositional attitudes, including indirect quotation. In practice of course the appropriate substitute for '*z*' will regularly be the indicator word '*me*', since '*that*' clauses are always given in our own language.

Scheffler has an alternative suggestion.⁵ Consider all those events of utterance (or inscription), in all languages, that may fairly be counted as cases of saying that Cicero denounced Catiline. Let us call each such event an utterance that Cicero denounced Catiline. In effect Scheffler's plan is to adopt as basic this operator 'utterance

⁴ This point was made by Pap in "Belief, synonymity, and analysis."

⁵ "An inscriptional approach to indirect quotation."

that', which applies to a sentence to form a composite general term true of utterance events. Then he explains '*w* says that *p*' as '*w* makes an utterance that *p*'. Since an actual utterance event normally belongs to a unique language even if the form uttered does not, no auxiliary specification is required of Scheffler on that score.

Let it not be objected just here that there is no evident way of telling how far an utterance may be allowed to differ from the sentence appearing in the position of '*p*' and still be counted as an utterance that *p*. The objection is correct, and doubly so when we think of what is involved in translation from foreign languages (Ch. II); and Scheffler appreciates it. But it is out of order just now, for it concerns indirect quotation however analyzed, and has no special relevance to Scheffler's contribution.

When Scheffler extends his method to idioms of propositional attitude other than indirect quotation,⁶ however, a peculiar difficulty does arise: how are we to say e.g. that Paul believes something that Elmer does not? It will not do to say that Paul believes-true some utterance that Elmer does not believe-true, for it may happen that no such utterance exists or ever will; believing does not, like saying, produce utterances. This defect may be counted as favoring sentences over utterance events as objects of propositional attitudes; for, under the construction at the end of § 40, sentences are undisturbed by failure of utterance.

Still, the defect is limited to quantifications. It does not touch the explicit idiom '*w* believes that *p*', construed as '*w* believes-true an utterance that *p*'; for, once '*w* believes that *p*' is itself uttered, there has been created a sample utterance that *p*.⁷ Perhaps, after all, the quantifications affected—'Paul believes something that Elmer does not', 'Eisenhower and Stevenson agree on something', and the like—are expendable; for such quantifications tend anyway to be pretty trivial in what they affirm, and useful only in heralding more tangible information. Already earlier we were prepared not to care how the truth values of such sentences as 'Paul and Elmer agree on just three things' might turn out; perhaps now we can find it in us to be indifferent toward these others too.

But if so, there is no need to recognize 'believes' and similar verbs as relative terms at all; no need to countenance their predicative use

⁶ He does so in "Thoughts on teleology," pp. 280 f.

⁷ Scheffler notes this, p. 280 n.

as in ' w believes x ' (as against ' w believes that p '); no need, therefore, to see 'that p ' as a term. Hence a final alternative that I find as appealing as any is simply to dispense with the objects of the propositional attitudes. We can continue to formulate the propositional attitudes with help of the notations of intensional abstraction as in § 35 but just cease to view these notations as singular terms referring to objects. This means viewing 'Tom believes [Cicero denounced Catiline]' no longer as of the form ' Fab ' with a = Tom and b = [Cicero denounced Catiline], but rather as of the form ' Fa ' with a = Tom and complex ' F '. The verb 'believes' here ceases to be a term and becomes part of an operator 'believes that', or 'believes []', which, applied to a sentence, produces a composite absolute general term whereof the sentence is counted an immediate constituent. Similarly the 'believes' in 'Tom believes y [y denounced Catiline] of Cicero' becomes part of a variable-binding operator which, applied directly to an open sentence ' y denounced Catiline' and a variable ' y ', produces a relative general term 'believes y [y denounced Catiline] of'. Correspondingly for two and more variables; and correspondingly for other verbs of propositional attitude. In a word, we take the notation of § 35 simply as a stylization of the verbal treatment of § 31 rather than as a deeper analysis of it that makes reference to intensional objects.

This course supersedes the 'O', 'O_x', etc. of § 38. They belonged to the program of eliminating singular terms, as it applied to intensional abstracts when intensional abstracts were singular terms. In their new status of non-terms, the intensional abstracts stay on irreducibly as portions of composite general terms. General terms, for their part, cease to count always as simple from the point of view of canonical notation, and come to admit closed sentences or open sentences and variables as immediate constituents.

§ 45. THE DOUBLE STANDARD

Even this course, for all its sacrifices, leaves us with a very wayward set of idioms. To have cleared away the ontology of the propositional attitudes is not to have made scientific sense of them. Thus, take indirect quotation again: the question how far it may allowably deviate from direct quotation remains alive as ever, repudiate the supposed objects of indirect quotation though we may.

The problem here has evident affinities with that of translation.

It even includes the latter, when the indirect quotation occurs between languages. And indeed that most primitive phase of translation, the translation of observation sentences by stimulus synonymy, serves indirect quotation well enough within the limits of observation sentences; thus 'He says there is a rabbit there' is plausibly interpreted as 'He says something that has for him the stimulus meaning that 'There is a rabbit there' has for us'.

We can do as much for belief, if we abstract for the moment from liars and dumb animals. 'He believes there is a rabbit there' is plausibly interpreted as 'He would, if asked, assent to some sentence that has for him the stimulus meaning that 'There's a rabbit' has for us'.¹ This in turn, by our definition of stimulus meaning, amounts to saying two things: that he has just had a stimulation belonging to the stimulus meaning of 'There's a rabbit' for us, and that he knows the use of a sentence whose stimulus meaning for him is the same. If in place of this latter requirement we will settle for some non-linguistic discriminatory disposition toward rabbits, we may even make sense of 'The dog believes there is a rabbit there'.²

Observation sentences are not eternal. In examining them thus directly under propositional attitudes, instead of first paraphrasing them into eternal sentences, we therefore abandon the precept of § 42; but so we must if we are to make much use here of their stimulus meanings. Anyway the reason for the precept, insofar as it turned on propositions, has now lapsed.

We know from § 11 that stimulus synonymy can be used as a standard of translation not only for observation sentences but for occasion sentences generally, thanks to the devices of socialized intrasubjective synonymy and bilinguals. One may reasonably expect comparable success in construing indirect quotations and belief sentences whose contained sentences are occasion sentences, though some tinkering with times and indicator words can be called for. The efficacy of the approach even extends to cases where the contained sentences are standing sentences, but it grades off with the richness of their stimulus meanings. It is perhaps partly because so substantial a portion of propositional-attitude discourse is thus straightforwardly empirical that people proceed so confidently with the rest of it.

¹ Cf. Carnap, *Meaning and Necessity*, p. 55.

² In this paragraph and the preceding one I am indebted to Davidson.

For the case of sentences generally, however, or even the case of eternal sentences generally, surely there is nothing approaching a fixed standard of how far indirect quotation may deviate from the direct.³ Commonly the degree of allowable deviation depends on why we are quoting. It is a question of what traits of the quoted speaker's remarks we want to make something of; those are the traits that must be kept straight if our indirect quotation is to count as true. Similar remarks apply to sentences of belief and other propositional attitudes. Thus even if we eternalize the contained sentence and also rid the containing sentence of such sources of truth-value variation as inadequate descriptions, indicator words, and the like, still the whole may in some cases remain capable of varying in truth value from occasion to occasion, counting as true on occasions where no capital is to be made of the contained sentence's divergences from direct quotation, and false otherwise. Evidently we must recognize in indirect quotation and other idioms of propositional attitude a source of truth-value variation comparable to the indicator words, though more restrained in its effects. It will often happen also that there is just no saying whether to count an affirmation of propositional attitude as true or false, even given full knowledge of its circumstances and purposes.

A reason for gravitating to indirect quotation as prime example of the propositional attitudes is that the quoted speaker's actual utterance exists as a standard with which to compare the variants, whereas in the case of believing, wishing, and the rest there is usually no such fixed point to work from. Not, of course, that this trait makes indirect quotation humanly dispensable. We tend, even if we hear a remark directly and not by hearsay, to forget its exact words and remember only enough to report by indirect quotation.⁴ Hence the main utility of indirect quotation. And there is its utility also as a medium of translation. Indirect quotation is here to stay, and so, for similar and further reasons, are the other idioms of propositional attitude.

In general the underlying methodology of the idioms of propositional attitude contrasts strikingly with the spirit of objective science at its most representative. For consider again quotation,

³ Thus I agree on the general point with Scheffler, "On synonymy and indirect discourse," despite the reservations in § 42.

⁴ See Chisholm, *Perceiving*, p. 160.

direct and indirect. When we quote a man's utterance directly we report it almost ⁵ as we might a bird call. However significant the utterance, direct quotation merely reports the physical incident and leaves any implications to us. On the other hand in indirect quotation we project ourselves into what, from his remarks and other indications, we imagine the speaker's state of mind to have been, and then we say what, in our language, is natural and relevant for us in the state thus feigned. An indirect quotation we can usually expect to rate only as better or worse, more or less faithful, and we cannot even hope for a strict standard of more and less; what is involved is evaluation, relative to special purposes, of an essentially dramatic act. Correspondingly for the other propositional attitudes, for all of them can be thought of as involving something like quotation of one's own imagined verbal response to an imagined situation.

Casting our real selves thus in unreal roles, we do not generally know how much reality to hold constant. Quandaries arise. But despite them we find ourselves attributing beliefs, wishes, and strivings even to creatures lacking the power of speech, such is our dramatic virtuosity. We project ourselves even into what from his behavior we imagine a mouse's state of mind to have been, and dramatize it as a belief, wish, or striving, verbalized as seems relevant and natural to us in the state thus feigned.

In the strictest scientific spirit we can report all the behavior, verbal and otherwise, that may underlie our imputations of propositional attitudes, and we may go on to speculate as we please upon the causes and effects of this behavior; but, so long as we do not switch muses, the essentially dramatic idiom of propositional attitudes will find no place.

The Scholastic word 'intentional' was revived by Brentano in connection with the verbs of propositional attitude and related verbs of the sort studied in § 32—'hunt', 'want', etc. The division between such idioms and the normally tractable ones is notable. We saw how it divides referential from non-referential occurrences of terms. Moreover it is intimately related to the division between behaviorism and mentalism,⁶ between efficient cause and final cause, and between literal theory and dramatic portrayal.

⁵ This adverb allows for § 18.

⁶ See Chisholm, "Sentences about believing"; Bergmann, "Intentionality," p. 211.

The analysis in § 32 was such as to spare us any temptation to posit peculiar "intentional objects" of hunting, wanting, and the like. But there remains a thesis of Brentano's, illuminatingly developed of late by Chisholm,⁷ that is directly relevant to our emerging doubts over the propositional attitudes and other intentional locutions. It is roughly that there is no breaking out of the intentional vocabulary by explaining its members in other terms. Our present reflections are favorable to this thesis. Even indirect quotation, for all its tameness in comparison with other idioms of propositional attitude, and for all its concern with overt speech behavior, seems insusceptible to general reduction to behavioral terms; the best we can do with it is switch to direct quotation, and this adds information. And when we turn to belief sentences the difficulty is doubled. For, first there is trouble, e.g. over dumbness or mendacity, in explaining belief as disposition to assent to sentences at all; and second there remains, much as in the case of indirect quotation, the question what deviations to allow between the sentences actually assented to and the second-hand reports.

Chisholm counts the semantical terms 'meaning', 'denote', 'synonymous', and the like into the intentional vocabulary, and questions the extent to which such terms can be explained without the help of other semantical or intentional ones. Adapted to the example 'Gavagai' (Ch. II), the sort of difficulty he has in mind is this: we cannot equate 'Gavagai' and 'Rabbit' as outright responses to rabbits, for assent to these sentences is prompted not by the presence of rabbits but by their believed presence; and belief is intentional. Now we cleared this obstacle in § 8 by equating 'Gavagai' and 'Rabbit' on the basis of stimulations rather than rabbits. Stimulations, however deceptive, go by face value, and match up well enough from speaker to speaker to sustain the equation. There is the possibility that informants may lie to us, but one assumes that such deviations, where undetected as lies, are rare enough not to spoil a significant approximation of stimulus meanings.

But the predicament that Chisholm anticipates is still encountered when we turn from the stimulus synonymy of occasion sentences to the construing of terms. This is a step that requires analytical hypotheses, undetermined by verbal dispositions (§§ 12, 16); yet it is a step that the intentional vocabulary would represent as determinate. For, using the intentional words 'believe' and 'ascribe',

⁷ See Chisholm, *Perceiving*, Ch. 11, and his references to Brentano.

one could say that a speaker's term is to be construed as 'rabbit' if and only if the speaker is disposed to ascribe it to all and only the objects that he believes to be rabbits. Evidently, then, the relativity to non-unique systems of analytical hypotheses invests not only translational synonymy but intentional notions generally. Brentano's thesis of the irreducibility of intentional idioms is of a piece with the thesis of indeterminacy of translation.

One may accept the Brentano thesis either as showing the indispensability of intentional idioms and the importance of an autonomous science of intention, or as showing the baselessness of intentional idioms and the emptiness of a science of intention. My attitude, unlike Brentano's, is the second. To accept intentional usage at face value is, we saw, to postulate translation relations as somehow objectively valid though indeterminate in principle relative to the totality of speech dispositions. Such postulation promises little gain in scientific insight if there is no better ground for it than that the supposed translation relations are presupposed by the vernacular of semantics and intention.

Not that I would fore swear daily use of intentional idioms, or maintain that they are practically dispensable. But they call, I think, for bifurcation in canonical notation. Which turning to take depends on which of the various purposes of a canonical notation happens to be motivating us at the time. If we are limning the true and ultimate structure of reality, the canonical scheme for us is the austere scheme that knows no quotation but direct quotation and no propositional attitudes but only the physical constitution and behavior of organisms. (It would be pointless to exempt from this ban even those favored sentences of propositional attitude that can be explained in terms of stimulus synonymy; for when they can be thus paraphrased they are certainly dispensable.) If we are venturing to formulate the fundamental laws of a branch of science, however tentatively, this austere idiom is again likely to be the one that suits. But if our use of canonical notation is meant only to dissolve verbal perplexities or facilitate logical deductions, we are often well advised to tolerate the idioms of propositional attitude. Our purposes may then be well served by admitting the apparatus of propositional attitudes as of the end of § 44—hence minus the right to quantify over the attitudinal objects.⁸

⁸ On the austere scheme, which Bergmann ("Intentionality") calls L_{α} , see further § 47. Its more liberal variant, accommodating intentional idioms,

§ 46. DISPOSITIONS AND CONDITIONALS

Let us turn now to a further idiom that is similar in a way to those of propositional attitude: the strong or subjunctive conditional. What sets this apart from the ordinary conditional is not falsity of its antecedent or 'if'-clause, but the fact that the conditional can be seriously entertained and affirmed or denied in full cognizance of the falsity of the antecedent. An ordinary conditional forfeits our interest and ceases to be affirmed or denied once we are satisfied of the truth value of its antecedent.¹

The subjunctive conditional depends, like indirect quotation and more so, on a dramatic projection: we feign belief in the antecedent and see how convincing we then find the consequent. What traits of the real world to suppose preserved in the feigned world of the contrary-to-fact antecedent can be guessed only from a sympathetic sense of the fabulist's likely purpose in spinning his fable. Thus consider the pair (Goodman's, nearly enough):

If Caesar were in command, he would use the atom bomb;

If Caesar were in command, he would use catapults.

We are likelier to hear the former, but only because that one is likelier to fit a lesson that a speaker would try to dramatize.

We recall of indirect quotation that it has no general translation into quoted speech, though each specific true case has a quotable actual utterance behind it. Similarly the subjunctive conditional is an idiom for which we cannot hope to find a satisfactory general substitute in realistic terms, though ordinarily in a particular case we can see how to restate the relevant point straightforwardly enough.

The subjunctive conditional is seen at its most respectable in the disposition terms. To say that an object *a* is (water-) *soluble* at time *t* is to say that if *a* were in water at *t*, *a* would dissolve at *t*. To say that *a* is *fragile* at *t* is to say that if *a* were struck smartly at

answers in spirit though not in detail to Bergmann's *L*. In his kindness toward the intentional, Bergmann is nearer Brentano than I; but it is a difference not easily assessed, for we are agreed both that the intentional does not reduce and that it is at least in a practical way indispensable.

¹ For a closer analysis of the distinction see Stanley.

t, *a* would break at *t*. The ordinary conditional would not suffice here, for it loses its point when the truth value of its antecedent is known. We want to speak of *a* as soluble or fragile at *t* though knowing that it is not immersed or struck at *t*. Clearly the subjunctive conditional is the one involved. Yet it retains here little of the erratic quality seen in the Caesar examples.

The difference is that here a stabilizing factor is intruded: a theory of subvisible structure. What we have seen dissolve in water had, according to the theory, a structure suited to dissolving; and when now we speak of some new dry sugar lump as soluble, we may be considered merely to be saying that it, whether destined for water or not, is similarly structured. Fragility is parallel.

True, men talked equally easily of solubility before those explanations were at hand; but only because they already believed there was a hidden trait of some sort, structural or otherwise, that inhered in the substance and accounted for its dissolving on immersion. It was enough to suppose that if an erstwhile object *a* had the hypothetical characteristic (as seen by its having dissolved), and if the stuff of *b* seemed just like that of *a*, then probably *b* had it too. Something of the kind is still afoot whenever we infer one trait from another on the ground of widespread observation of association of the traits but in ignorance of the connecting mechanism, as for instance in psychiatric prognoses based on syndromes: an appropriate mechanism is believed present in the structure of the behaving organism, though all unknown.

Dispositions are, we see, a better-behaved lot than the general run of subjunctive conditionals; and the reason is that they are conceived as built-in, enduring structural traits. Their saving grace extends, moreover, to many subjunctive conditionals that do not happen to have acquired one-word tags like 'soluble' and 'fragile'. An example was the 'would prompt assent' of § 8. For there again a disposition was concerned, albeit unnamed: some subtle neural condition, induced by language-learning, that disposes the subject to assent to or dissent from a certain sentence in response to certain supporting stimulations.

Disposition terms such as 'soluble' and 'fragile' show their dispositionality in their suffixes, and the nature of the disposition in their verb stems. It is only on this etymological count, if at all, that such a term as 'red' might not be said to be dispositional as well. An object is red if it is disposed, given a chance, to reflect a certain

range of low frequencies selectively. Redness of things is like solubility in that the pattern of subvisible structure concerned now happens to be fairly well understood and was once, without hindrance to the use of the term, known only by its fruits. Apart from etymology, therefore, the notion of disposition term proves to be a pretty idle one unless taken in a relativized sense: 'soluble' is dispositional relative to 'dissolve', 'red' relative to 'reflect low visible frequencies selectively'. Doubts connected with the subjunctive conditional concern not the several terms but rather the disposition operator '-ble', conceived as generally applicable to terms in order to generate new terms that are dispositional relative to them. Any specific terms got by that operator may still be accepted on their merits as simple terms. There is no reason to hesitate over admitting the general terms 'soluble' and 'fragile' to one's theoretical vocabulary, any more than 'red'. Each is a term that we attribute to physical objects on the strength often of direct observation, by way of simply conditioned response, and often of theory.

The special problem of disposition terms is therefore this: must we treat the etymologically dispositional words 'soluble', 'fragile', etc. as simple and irreducible general terms on a par with 'red', or can the sentences that contain them be systematically paraphrased so as to drop those disposition terms in favor of their root verbs? Of course they can if we allow subjunctive conditionals; but the problem is to manage also without that aid—or, what is equivalent, to paraphrase subjunctive conditionals themselves insofar as they can be fairly viewed as expressing dispositions.

The objective would not be synonymy, but just approximate fulfillment of likely purposes of the original sentences; cf. § 33. The objective is wholly vague failing some indication of admissible vocabulary, but still there is the hint of a procedure in the point about subvisible structure. If we allow our theory to include a relative term '*M*' corresponding to the words 'alike in molecular structure' in some appropriate sense, then we can paraphrase '*x* is soluble' and '*x* is fragile' in rough outline thus:

$$(\exists y)(Mxy \text{ and } y \text{ dissolves}), \quad (\exists y)(Mxy \text{ and } y \text{ breaks})$$

with the verbs understood as tenseless. Correspondingly also perhaps, with change of '*M*', for some other sets of disposition terms. Such paraphrases would be strictly for regimentation of theory, of course, not epistemological reduction.

Between subjunctive conditionals in a reasonably dispositional spirit and subjunctive conditionals at their wildest there is no boundary, but only a gradation of better and worse. There is such a gradation also among the etymologically explicit disposition terms. Which of these to accommodate in a canonical notation by systematic considerations of the above sort, which to admit separately as irreducible general terms, and which to ban—these are matters to decide with an eye to projects in hand and not once and for all.

The farther a disposition is from those that can confidently be pinned on molecular structure or something comparably firm, the more our talk of it tends to depend on a vague factor of "*caeteris paribus*." This factor was what was elusive likewise in indirect quotation; and it was what obstructed general analysis of the implicitly dispositional constructions represented by 'Tabby eats mice' (§ 36). That the idioms involving it remain useful is due to those clues to the scope of "*caeteris paribus*" that are afforded by the context or other special circumstances of the particular utterance. This is why the paraphrasing of such idioms into a satisfactorily explicit canonical notation is often practicable occasion by occasion and altogether hopeless idiom by idiom.

From recent paragraphs it becomes evident not only that the subjunctive conditional has no place in an austere canonical notation for science, but also that the ban on it is less restrictive than would at first appear. We remain free to allow ourselves one by one any general terms we like, however subjunctive or dispositional their explanations. (Doubtless 'stimulus-synonymous' would be one.) What we exclude is the subjunctive conditional or the dispositional operator '-ble' as a freely applicable ingredient of canonical notation. Much of the general force even of these constructions is still available in other forms, moreover, thanks to the universally quantified indicative conditional and thanks also to such relative terms as 'M', which we remain free to adopt. For the rest, our renunciation seems only in keeping with the trend of science itself: the favoring of definite mechanisms, assumed or discovered, over unqualified causality.²

² A view of the residual subjunctive conditionals as unscientific language has been suggested also by Hampshire, who speaks of subjunctive conditionals that "are not intended to be replaceable by falsifiable general statements plus statements of initial conditions; when so used, they can be described as ex-

As for the indicative conditional, it presents no problem. In its unquantified form 'If p then q ' it is perhaps best represented as suffering a truth-value gap (§ 37) whenever its antecedent is false. The gap is awkward for the same reason noted in connection with singular terms: it cannot be spotted by notational form. If in the spirit of good canonical notation we proceed to close it, what we come out with (like Philo of Megara and Frege before us) is simply the material conditional (§ 41), a truth function.³

Undue denunciation of the material conditional was provoked by Russell's word 'implication' (cf. § 41), but there would have been some protesting anyway. I should not want to rest the case for the material conditional on the claim that it differs none from the indicative conditional of ordinary usage except over the truth-value gap; for, here as at other points touching canonical notation, usage is not the issue. Let us not ask whether the material conditional constitutes a genuine semantical analysis, somehow, of the ordinary indicative conditional; let us merely notice that it, reinforced sometimes by universal quantification, proves on the whole to help us over humps of communication where we might otherwise have brought in an ordinary indicative conditional. In particular this is borne out wherever an indicative 'if-then' has found its way into the formulas of foregoing pages; it can satisfactorily be construed as the material conditional at each such point.

§ 47. A FRAMEWORK FOR THEORY

Our canonical notation in Chapter V continued to admit indicator words after tense and singular terms were eliminated. There was no limitation of its sentences to eternal ones. There is a certain premium on eternal sentences, though, and has been since writing began. Insofar as some utterances of a sentence can be true

pressing judgments, or interpretations of the facts, to distinguish them from their use in strictly scientific discourse." And see Russell, *Our Knowledge of the External World*, p. 220. On subjunctive conditionals and disposition terms see further Carnap, "Methodological character of theoretical concepts," pp. 62-69, and "Testability and meaning"; Goodman, *Fact, Fiction, and Forecast*; Pap, "Disposition concepts and extensional logic"; Reichenbach, §§ 60-63, and my review; and Sellars.

³ See my *Elementary Logic*, § 7. But the claim applies to the indicative conditional only in its "semi-adjunctive" use, according to Reichenbach (pp. 389 f.), and not in what he calls its "connective" use.

and other utterances of it false, demands are placed on our knowledge of the circumstances of utterance; and such knowledge is scarcer for script than for speech.

Writing is essential to serious science, as rendering it cumulative; and the longer the preservation, the dimmer the circumstances of utterance. Furthermore, the spirit of theoretical science encourages fixity of truth values also apart from the demands of writing. What is true here-now tends the more to be true also there-then, the more it is of the sort that scientists aspire to discover. Though scientific data go back to observation sentences, which are true only utterance by utterance, the sentences of the theory that is projected from those data tend to be eternal.

A consequence of this tendency, and one which encourages it, is simplification of logical theory. Laws of logical inference refer to recurrences of sentences, on the assumption that a sentence true in one occurrence will be true in the next. Even inference of '*p*' from '*p* and *q*' (where '*p*' and '*q*' represent sentences) is a case in point. Any plan not predicated thus on fixity of truth values would be unrewardingly complex.

We do apply logic to sentences whose truth values vary with time and speaker. We leave temporal and pronominal references unfixed, and even the senses of ambiguous words, simply because the circumstances that would settle these matters on any particular occasion of utterance may be expected to settle them uniformly for the space of the argument. Occasionally this expectation fails and we have the *fallacy of equivocation*. Appliers of logical theory must keep alert to this hazard and, when it threatens, expand the offending sentences: not into eternal sentences, but just enough to mark any differences that would otherwise be brought out by vicissitudes of the argument.¹ The relation of eternal sentences to our logic is like that of silver dollars to our economy: mostly we do not see them, but we reckon in terms of them.

The primary distinction of eternal sentences is that they are the repository of truth itself, and so of all science. Insofar as a sentence can be said simply to be true, and not just true now or in this mouth, it is an eternal sentence. When our objective is an austere canonical form for the system of the world, we are not to rest with the renunciation of propositional attitudes and the subjunctive conditional; we

¹ Cf. my *Methods of Logic*, pp. xvi, 43.

must renounce also the indicator words and other sources of truth-value fluctuation.

'Because' and like idioms of causal type go the way of the subjunctive conditional. With these and the propositional attitudes set aside, and modality and intensional abstraction dropped (§§ 41, 44), and quotation reduced to spelling (§ 30), and the indicative conditional canalized (§ 46), no evident reason remains for imbedding sentences within sentences otherwise than by truth functions and quantification. How powerful this combination is has been borne out by extensive logical regimentations of parts of science, especially mathematics, at the hands of Frege, Peano, and their successors.

Taking the canonical notation thus austere, and holding also to the formal economies of Chapter V, we have just these basic constructions: predication, universal quantification (cf. § 34), and the truth functions (reducible to one²). The ultimate components are the variables and general terms; and these combine in predication to form the atomic open sentences. What thus confronts us as a scheme for systems of the world is that structure so well understood by present-day logicians, the logic of quantification or calculus of predicates.

Not that the idioms thus renounced are supposed to be unneeded in the market place or in the laboratory. Not that indicator words and subjunctive conditionals are supposed to be unneeded in teaching the very terms—'soluble', 'Greenwich', 'A.D.', 'Polaris'—on which the canonical formulations may proceed. The doctrine is only that such a canonical idiom can be abstracted and then adhered to in the statement of one's scientific theory. The doctrine is that all traits of reality worthy of the name can be set down in an idiom of this austere form if in any idiom.

It is in spirit a philosophical doctrine of categories, except that it is peculiarly relative in its import. Of itself it sets no limits to the vocabulary of unanalyzed general terms admissible to science. But it sets limits to the ways of deriving complex predicates, complex conditions or open sentences, from those undictated components. It is a doctrine that limits what can be said of things to (a) such "prime traits" or general terms as may be expressly admitted sever-

² This is Sheffer's familiar reduction. See e.g. my *Mathematical Logic*, pp. 45 ff., or *Methods of Logic*, p. 11.

ally on merits beyond this doctrine's purely relativistic concerns, and (b) such "derivative traits" as can be formulated in those primary terms with help of predication, quantification, and truth functions alone. It delimits what counts as scientifically admissible construction, and declares that whatever is not thus constructible from given terms must either be conceded the status of one more irreducibly given term or eschewed. The doctrine is philosophical in its breadth, however continuous with science in its motivation.

Short of fixing the totality of admissible unanalyzed general terms, one might still consider distinguishing some absolute philosophical categories of such terms. Also, short of fixing the universe of admissible objects, or values of variables of quantification, one might consider distinguishing some categories in the way of basically diverse subuniverses: thus physical objects versus classes versus perhaps sundry other conspicuously distinct sorts of things. One might then go on to declare that terms in only certain of the categories of terms are significantly predicable of things in certain of the subuniverses. An example is the theory of types which Russell propounded as a means of coping with the antinomies of naïve set theory. Also apart from that technical context there has been a concern among philosophers to declare meaningless, rather than trivially false, such predications as 'This stone is thinking about Vienna' (Carnap) and 'Quadruplicity drinks procrastination' (Russell). Here we witness sometimes just a spontaneous revulsion against silly sentences and sometimes a remote project of cutting meaningful language down to something like empirical size. But since the philosophers who would build such categorial fences are not generally resolved to banish from language all falsehoods of mathematics and like absurdities, I fail to see much benefit in the partial exclusions that they do undertake; for the forms concerned would remain still quite under control if admitted rather, like self-contradictions, as false (and false by meaning, if one likes). Tolerance of the don't-cares (§ 38) is a major source of simplicity of theory; and in the present instance it counts double, sparing us as it does both the settling of categories and the respecting of them.

As for the technical motivation in set theory, alternative courses to Russell's are well known which depend on no language bans; indeed Russell's own substantive theory is easily so transcribed as

to avoid that expedient.³ All in all, I find an overwhelming case for a single unpartitioned universe of values of bound variables, and a simple grammar of predication which admits general terms all on an equal footing. Subsidiary distinctions can still be drawn as one pleases, both on methodological considerations and on considerations of natural kind; but we may think of them as distinctions special to the sciences and unreflected in the structure of our notation.

Still nothing has been said as to the make-up of the admissible vocabulary of unanalyzed general terms. But of this particular we may be sure: '=' will in effect be present, whether as an unanalyzed general term or in complex paraphrase, at least provided that the vocabulary of unanalyzed general terms is finite. For, write 'if Fx then Fy ' and vice versa with each of the absolute general terms of the vocabulary in place of ' F '; also ' $(z)(\text{if } Fxz \text{ then } Fyz)$ ' and ' $(z)(\text{if } Fzx \text{ then } Fzy)$ ', and vice versa, with each of the dyadic relative terms in place of ' F '; and so on to ' $(z)(w)(\text{if } Fxzw \text{ then } Fyzw)$ ' etc. The conjunction of all these formulas is coextensive with ' $x = y$ ' if any formula constructible from the given vocabulary is; and otherwise we can without conflict adopt that conjunction as our version of identity.⁴ In so doing we impose a certain identification of indiscernibles,⁵ but only in a mild way.

Thus let us call two objects *absolutely* discernible (in a notation) if some open sentence with one free variable is fulfilled by only one of the two objects, and let us call them *relatively* discernible if some open sentence with two free variables is fulfilled by the two objects in only one order. What the described version of identity does is declare identical just those objects that are not relatively discernible. It does not declare identical all objects that are not absolutely discernible. For there can be objects x and y and a relative term (say ' F ') such that Fxy and neither Fxx nor Fyy ; and under these circumstances x and y need not be absolutely discernible, yet neither will they count as identical, since not $(z)(\text{if } Fxz \text{ then } Fyz)$.

The observation that identity thus implicitly accompanies any

³ The outcome is not what Russell called typical ambiguity, but something like Zermelo's set theory. See my "Unification of universes."

⁴ Cf. Hilbert and Bernays, pp. 381 f.

⁵ See my *From a Logical Point of View*, pp. 70 ff., 107 ff., 117 ff., 123, for illustrative effects on the compositions of various universes of discourse.

finite vocabulary of general terms is a fitting scholium to §§ 12, 19, 20, 24, where I stressed the relevance of identity to the referential function of general terms. Also it gives a kind of justification of one's tendency to view '=', more than other general terms, as a "logical" constant.

Let us return now for a further word on our canonical grammar, which is down to predication, quantification, and truth functions. There is a technical reason for settling thus what constructions to allow even while leaving the fund of general terms open. For, various laws about logical transformations are proved by mathematical induction over sentence structure. That is, the laws are shown to hold for the simplest sentences and to hold also for sentences next more complex than sentences for which they hold, whereupon the conclusion is drawn that they hold for all. To argue thus we need to know the allowable constructions exhaustively, but only some few generally shared traits of the available simple sentences. When the constructions on sentences are limited to quantification and truth functions, one law that is easily proved by such induction is that of extensionality (§ 31).

Another reason for settling the constructions apart from the general terms is that the canonical forms are often wanted also in resolving confusions and programming deductive techniques where there is no thought of ultimate forms. Stopping short of the full course of rejections and reductions is no bar to applying the logic of quantification; we merely apply it as deep as the appropriate analysis happens to have penetrated. Surviving idioms of an extraneous sort—indicator words, intensional abstracts, or whatever—can remain buried in larger wholes which behave for the nonce as unanalyzed general terms.

But may we not still aspire to the discovery of some fundamental set of general terms on the basis of which all traits and states of everything could in principle be formulated? No; we can prove that openness is unavoidable, as long anyway as the sentences of a theory are included as objects in the universe of the theory. For, let $S_1, S_2, \dots$ be the sentences in the notation of a theory θ that have 'x' as sole free variable. Each of them is, for each object of the universe as value of 'x', true or false of that object; hence each of them, being also an object of the universe, is true or false of itself. We easily show that no general term definable in θ is true of exactly

those of $S_1, S_2, \dots$ that are false of themselves. (For, if ' F ' were such a term, then ' Fx ' would be true of itself if and only if false of itself.⁶) Such a term can be added, irreducibly supplementing θ .

Yet it is possible in general to subject general terms to a striking formal condensation. If the assumed universe of objects includes at least a modest fund of classes—actually none of more than two members are required for the purpose—then it can be shown that any vocabulary (finite or infinite) of general terms (absolute or relative) is reducible by paraphrase to a single dyadic relative term.⁷ Thus, at each stage in the supplementation of an open stock of general terms, we can encapsulate the whole stock in a single dyadic term. When new terms are added we can again do similarly; but the new single dyadic term will differ from the old in point of what pairs of objects it is true of.

Once we have said of a proposed theory that its constructions are to be predication, quantification, and the truth functions, we have settled just the logic of the theory. Questions then remain not only of its vocabulary of general terms, but also of its universe of discourse: the range of values of its variables of quantification. The very meaningfulness of quantification would seem to presuppose some notion as to what objects are to count as values of variables. Complete explicitness on this point is rendered unnecessary, however, by the fact that our quantifications usually depend for their truth upon only rather special denizens of a universe that admits of free variation in other respects. This is obvious for existential quantifications. That it is widely true also of universal quantifications becomes apparent when we reflect how commonly these take the form ' $(x)(\text{if } \dots x \dots \text{ then } \dots x \dots)$ '; here only those special objects matter that fulfill the antecedent.

But if full explicitness on an aggregate universe of discourse for science is not required, still some broad normative and methodological considerations relating to the topic are in order. I shall devote the remaining chapter to them.

⁶ This argument is in principle Cantor's. The form I have given it is reminiscent also of Grelling's paradox, and the use made of it is reminiscent of Tarski.

⁷ See my "Reduction to a dyadic predicate," and references therein to Kalmár and Craig. The recent remark on identity, which depended on finitude of the number of general terms, is strengthened by this result.