Title: SEMANTICS AND ONTOLOGICAL COMMITMENT

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Degree: MASTER OF ARTS

This thesis examines the relation between semantics and several aspects of ontology. Carnap attempted to distinguish legitimate ontological questions from ontological pseudo-problems on semantic grounds. This program is examined and shown to fail in Chapter II.

Chapter III through Chapter VI present Quine's criterion of ontological commitment. The related problems of regimentation and non-referring terms are analyzed in detail.

Chapter VI examines the semantic theory upon which Quine's criterion is based. It is shown that extra-linguistic reference is not a necessary condition for meaning in this system.

The final chapter presents Bergmann's objection to Quine's approach. His criticism is answered by appeal to the semantic theory outlined in the preceding chapter.

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24 January 1972.

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of Master of Arts in the Department of Philosophy.

McGill University
24 January 1972

ACKNOWLEDGEMENTS

I would like to thank my advisor, Professor Harry Beatty, for the help he has given me. I would also like to express my appreciation to Professors Harry Bracken and Myrna Gopnik. Their ideas have had an indirect, but important, effect upon this essay.

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CHAPTER I

INTRODUCTION

The relation between meaning and existence is central to metaphysics. Russell's theory of definite descriptions was designed to eliminate an ontological problem: what does it mean to say that an entity does not exist? Quine has continued in the tradition of Russell making contextual definition a foundation of his criterion of ontological commitment. Bergmann has also noted the inseparability of semantics and ontology. His ideal language philosophy provides a means of making this connection precise.

In this essay I shall deal with two aspects of the relation between semantics and ontology. The first involves the relation between semantic theory and meaningful ontological questions. A variant of this problem was pursued by the Logical Positivists. They tried to reject certain questions as meaningless on the basis of syntactical considerations. Semantics was not an explicit part of their analysis. Carnap claimed in his Logical Syntax of Language that "a special logic of meaning is superfluous ... All the questions which it is desired to treat in the required logic of meaning are nothing more than questions of syntax ...".[1]

The use of semantics to arbitrate between genuine and pseudo-problems of ontology is examined in terms of Carnap's later philosophy. The treatment will be brief as it reduces to the second aspect of the meaning-existence relationship.

Semantics is also crucial in considering the problem of ontological commitment. In the second part of this essay I will examine the semantic presuppositions in the ontic criteria proposed by Quine and Bergmann. The relation between these semantic assumptions and their corresponding ontologies will be made clear. In the process I will answer criticism against Quine's criterion of commitment by appealing to certain aspects of semantics.

CHAPTER II

CARNAP'S APPROACH

Language and ontology

Carnap's metaphysics serves as a convenient introduction to both of the questions mentioned above. The relation of semantic considerations to both ontic commitment and meaningful ontological problems is explicit in his writing. Before examining his position, however, it is important to note a distinction which I shall make throughout this essay. I will be concerned, as are Quine and Carnap, with ontological commitment of theories and the criteria by which we can evaluate such commitment. I will examine neither the meaning of 'existence' nor the problem of existence in isolation from language.

There are several reasons for this decision. The first is based upon a methodological consideration. Any ontological (and indeed any philosophical) investigation must be carried out within a language. Whether we examine questions about absolute existence or theoretical commitments we must use a language as our tool. But before we can even begin to consider ontological questions we must know what it means to be committed to an entity in the language of analysis. Explication of ontological commitment is therefore a precondition of any ontological investigation.

There is another justification of this restriction which I consider more fundamental. I fail to see how we can even make sense of the notion of existence in abstraction from language. As both Quine and Carnap have

argued our conceptual scheme arises conjointly with the development of language. That is, conceptualization on any considerable scale is inseparable from language.[1] It makes no sense to attempt to "detach ourselves from that conceptual scheme and objectively compare it to an unconceptualized reality".[2] Our ontological presuppositions arise from the interaction of language, conceptualization, and assessment of sensory input in light of these. In short "the fundamental-seeming philosophical question, How much of our science is merely contributed by our language and how much is a genuine reflection of reality? is perhaps a spurious question ... To answer the question we must talk about the world as well as about language, and to talk about the world we must already impose upon the world some conceptual scheme peculiar to our own special language".[3]

I certainly do not consider this a conclusive argument for the inseparability of language and ontology. It does, however, offer some justification for relativizing ontological discussion to particular languages or theories. If there are more important aspects of ontology to be dealt with our discussion will at least provide a means for attacking them. Before we examine any aspect of ontology we must understand what it is for something to exist.

Internal and external questions

Carnap was well aware of the distinction I have just made.[4] The division parallels the line he draws between ontological pseudo-problems and genuine questions about existence. His position is that one may ask meaningful questions about existential commitment within a language but we cannot significantly talk of absolute existence. We must now make these notions

precise and illustrate their semantic foundations.

Any ontological discussion, according to Carnap, must be couched within a linguistic framework. Such a framework is determined by both syntactic and semantic rules. The former incorporate a standard recursive definition of well-formedness. Semantic rules are of three kinds. There are rules of truth (following Tarski; Chapter VII), meaning postulates, and rules of designation. These latter introduce predicates and individual constants. Recognizing a new type of entity in our linguistic framework requires two amendments to the system. We must first add a rule of designation. The new rule introduces a general term, or higher level predicate, permitting us to say of the entity that it is of the particular kind we wish to recognize. If we wish to talk about e.g. "properties" in a framework designed to describe things we must first add the predicate 'is a property' to the framework.

Second, we must add a variable ranging over the type of entity we wish to recognize. Constants, naming such entities, are substitutable for these variables. In our example we would also have to add property-variables to our thing-framework if we want to talk about properties.

A distinction can now be made between two types of ontological question. First, there are questions about the existence of entities <u>within</u> a given framework. These are called internal questions. Within a thing-framework questions such as "Do unicorns exist?" or "Do tables exist?" fall under this heading. In our example of a property-framework the question "Is red a property?" is likewise perfectly sensible. (In fact it can be answered affirmatively if we consider red the value of a property-variable.)

The second type of existence questions are external ones. They con-

cern the existence or reality of the framework itself.[5] The questions "Do things exist?" and "Do properties exist?" are external questions with respect to thing and property-frameworks. Carnap considers these meaningless or pseudo-questions.

It is meaningful to ask about the entities to which we are committed within a particular language. There are several criteria by which we might establish such commitment. Questions about the reality of a linguistic system, however, are meaningless. For Carnap 'to exist' means 'to exist as an element of a system'. Hence 'existence' cannot be predicated of an isolated system itself. He has thus produced a semantically legislated division which sorts out ontological pseudo-problems. We may meaningfully question whether elements of a system exist. We cannot question the existence of the entities corresponding to the general predicates introduced by our semantic rules. (It should be noticed that a pseudo-question is relative to the particular framework in which we happen to find ourselves. While "Do properties exist?" is meaningless in a property-framework it may be a genuine question within a concept-framework.)

Upon further analysis we see that this position is simply an extension of an earlier one. This is Carnap's doctrine of universal words. "A word is called a universal word if it expresses a property (or relation) which belongs analytically to all the objects of a genus, any two objects being assigned to the same genus if their designations belong to the same syntactical genus."[6]

These universal words are precisely the higher order predicates which must be introduced into a framework if we are to admit new entities. Thus 'thing' is a universal word because it expresses a property (i.e. being a thing) that belongs analytically to all the objects of a genus; specifically,

the genus of things.

But we are now faced with a problem. On this analysis we must admit every predicate as universal because any predicate 'P' is such that it expresses a property (i.e. being a P) that belongs analytically to all the objects of a genus; specifically, the genus of P's.[7] The distinction between universal and non-universal predicates is therefore vacuous. In light of this, however, the distinction between external and internal questions also loses its cogency. As we saw external questions challenge the existence of properties expressed by universal predicates. Since any predicate is a universal predicate the external-internal dichotomy vanishes. On this analysis we have as much right to question thing-frameworks as chair-frameworks, electron-frameworks, and number-frameworks. Rejecting questions about any of these requires us to reject analogous questions about the others. Conversely, if we think it meaningful to speak of e.g. chairs without explicitly considering chair-frameworks we need not hesitate about questioning things either.

If Carnap were able to give some independent criteria by which a "syntactical genus" is defined this problem could be avoided. (Carnap uses syntactical in a misleading way here. It turns out, for example, that both 'number' and 'thing' delineate syntactical genera; cf. footnote II.7) But such a characterization is not forthcoming. Two words are of the same genus if they can be substituted for each other in all contexts without changing the significance of these contexts. If substitution of one word for the other reduces a meaningful expression to a meaningless one they do not belong to the same genus.

Unfortunately the notion of "meaningfulness of a sentence" is (in the

absence of a satisfactory semantic theory) as obscure as that of syntactical genus. Furthermore if we could judge which sentences were meaningful we would not need Carnap's external-internal distinction to begin with. We could apply our test directly to the questionable sentences without bothering about the purported division.

Carnap's dichotomy between meaningful and pointless ontological questions cannot be defended by considering the semantics of the system in which we are working. With the collapse of this criterion he must also re-evaluate his position on the existential commitments of a language. Acceptance of a framework, Carnap maintains, does not entail ontological commitment. In accepting a thing-framework, for example, we do not commit ourselves to the existence of things. Asking about the reality of the thing world (an external question with respect to a thing-framework) is pointless. We should rather ask about the practical value (e.g. for science) of accepting such a framework. Our acceptance is a pragmatic matter to be judged on the grounds of efficiency, fruitfulness, and simplicity among others.

But if the external-internal dichotomy falls then either all ontological questions are meaningful or all are pseudo-problems. Questions about things and questions about chairs are of the same ontological status. Both speak of entities although they appear to be of quite different types.

Quine argues that some concepts are more central to our linguistic and conceptual framework than others. Because of their fundamental character we do not often question them. This, however, does not mean we <u>cannot</u> question them. Nor should we expect that the answers to these questions will be of the same form as answers to less general questions. As Bergmann has said "ontology is not a night in which all cows are black".

In justifying a sentence like 'x is a rabbit' we look to our senses for evidence. In the case of 'x is a property' or 'x is a number' the evidence is much more difficult to isolate. "Existence statements in this philosophical vein do admit of evidence in the sense that we can have reasons, and essentially scientific reasons, for including numbers or classes or the like in our ontology ...".[8]

We see here a natural development of the Carnapian position. External questions are pragmatic and internal questions are ontological. Quine has argued against the dichotomy. In conflating external and internal all ontological questions become pragmatic ones. Thus "physical objects are postulated entities which round out and simplify our account of the flux of experience, just as the introduction of irrational numbers simplifies the laws of arithmetic".[9] But "the myth of physical objects is superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience".[10]

Carnap has failed to produce semantic criteria by which we can select meaningful ontological problems. Consideration of the semantic rules of our language does not delineate this group. There are, as Quine holds, meaningful existence questions of all types. Some are more central or basic to our conceptual scheme than others. But there is no linguistic way of drawing this distinction as sharply as Carnap desires. A theory can meaningfully be said to be committed to both things and tables, numbers and primes, properties and colors. We shall now examine the mechanism through which these commitments arise. Semantics here plays a more essential role.

CHAPTER III

QUINE'S CRITERION

Clarification

Quine's criterion for determining the ontological commitment of a theory is by now familiar. "The objects whose existence is implied in our discourse are finally just the objects which must, for the truth of our assertions, be acknowledged as 'values of variables'; i.e. be reckoned into the totality of objects over which our variables of quantification range."[1] Putting it aphoristically: To be is to be a value of a variable.

For Quine the existential quantifier becomes the sole channel of ontological commitment. We are committed to the existence of the things which are values of the quantified variables of our theory. It is essential to understand Quine's use of "value". Bindable variables (i.e. those variables which can be juxtaposed with the quantifier) stand in place of names of entities. The denotata (or nominata) of these names, the entities themselves, are the values of the variables. This terminology is not universal and has led to some confusion.[2]

Suppose our discourse contains the following sentence:

(3-1) (Ex) (x is the president of the U.S.A.).

The truth of (3-1) is assured by substituting the name 'Nixon' in place of the second occurence of the variable. This makes the sentence following the quantifier true. The denotatum of 'Nixon' (i.e. the man himself) is said to

be the value of the bound variable which makes (3-1) true. The value is thus an extra-linguistic entity.

The values of the bindable variables of our discourse constitute the ontology to which our discourse is committed. But there are several incipient problems with this formula. We would do well to clear up these ambiguities before examining the efficacy of the proposal.

In the first place there are alternative formulations of Quine's criterion of commitment. We must make these readings explicit. A theory is ontologically committed to the values of its bindable variables. These values are just those entities which must be assumed to exist if all the statements of our theory are to come out true. Thus a close link is established between the predicates and entities which a theory recognizes. We might even rephrase our criterion as follows: a theory is committed to just those entities of which some of the predicates must be true in order for our whole theory (i.e. all statements within the theory) to be true.[3] These formulations are easily seen to be equivalent. If for each predicate the theory contains a complementary one, then for every value of a variable some predicate or its complement is true of that entity. Conversely, if a predicate is true of a thing we may apply existential generalization to a statement involving the name of that entity to exhibit it as a value of a bound variable. We shall return later to the relation between predicates and ontology.

We must also consider exactly what our criterion commits us to. If I claim that there is a prime number between 10 and 12 I am committed to the existence of primes between 10 and 12. But am I also thereby committed to prime numbers greater than 10 or primes simpliciter? Quine answers that

"entities of a given sort are assumed by a theory if and only if some of them must be counted among the values of the variables ..."[4] (italics mine). Claiming that

(3-2) (Ex) (x is prime . $10 \leq x \leq 12$)

therefore commits us to prime numbers in general. If, however, we were to reparse our statement as

(3-3) (Ex) (x is a-prime-between-10-and-12)

this would not, I take it, be the case. In (3-3) the "given sort" of entities are 'primes-between-10-and-12'. (3-2) commits us to two sorts of entities: those which are 'prime' and those which are 'between-10-and-12'.

Bindable variables

As straightforward as the criterion appears there are still radically different interpretations of what it means. We are committed to the values of our bound variables. The question "Which variables are, or can be, bound?" is a natural one to ask. Quine equivocates at this point. He feels uncomfortable quantifying over all but individual variables. Predicates are construed as schemata rather than names. Since, on Quine's analysis, schemata are not names they have no denotata. Hence it makes no sense to speak of binding predicates since "values of predicate schemata" do not exist. An aim of Quine's regimentation (Chapter IV) is therefore to manoeuver all entities to which we want to be committed into the position of an individual variable. Generally 'bound variable' is an elliptical way of referring to a bound individual variable.

This position is unproblematic in dealing with things like chairs, unicorns, primes, and the like. Confusion sets in only when we want to commit

ourselves to the existence of e.g. properties (as distinct, for the moment, from classes). We can assert that

(3-4) (Ex) (x is a property)

or simply

(3-5) Red is a property.

and treat them as we would any other entity. But we can also waive the restriction Quine places upon variables of quantification and assert that

(3-6) (EF) (Ex) (Fx).

In treating 'F' as a bindable letter we must consider the substitution instances for it as denoting entities. In the case of predicates it seems natural to construe these denotata as properties or attributes.

This appears to be Bergmann's interpretation of Quine's criterion. On his reading our commitment to properties arises through "expressions of the form '(EF) (..F..)' which are colloquially rendered by 'There is (exists) a property such that ...'".[5] Quine does not object to this construal of his doctrine provided we recognize that "unbindable predicate variables, viewed simply as schematic letters, carry no ontological commitment ...".[6] (Bergmann's interpretation follows quite directly from his view of semantics as we shall see below.) If, however, we must be committed to abstract entities Quine would prefer classes to Bergmann's properties.

Classes are easily introduced into our ontology by considering predicate letters as bindable class variables. The difference between class and attribute can be made explicit in our notation. While (3-6) can commit us to either attributes or classes the statement

(3-7) (Ex) (xεy)

translates (3-6) into a statement of class membership. Formulation (3-7) is

preferable in that identity conditions for classes are straightforward while identity conditions for properties or attributes are an uncharted realm.[7]

The notion of "value of a variable" is alien to all but logical and perhaps mathematical discourse. But it is of course not the case that all other types of discourse leave us free of ontological commitment. If our method for determining commitment is to be adequate it should capture the fact that classical mathematics is committed to numbers, realist physics to electrons, phenomenalists to qualia, and most of us to tables, chairs, and rabbits. I shall now consider this problem in detail.

CHAPTER IV

REGIMENTATION

Synonymy

Quine maintains that the existential quantifier is the logical counterpart of such ordinary language phrases as "there is some entity such that..." and "there are things such that ...".[1] Whatever the meaning and function of these locutions the quantifier plays an analogous role.[2] This of course does not mean that ordinary language is infallible. There is good reason for couching our criterion in logical terms. While '(Ex)' may be a counterpart of "there is an x such that", the quantifier functions within a system of logic. Utilization of this whole system provides the key to uncovering our ontology.

Surface grammar can be philosophically as well as linguistically deceptive. Before deciding upon the ontology of a theory we must therefore eliminate the misleading linguistic idiosyncrasies it contains. This clarification can be achieved by paraphrasing the discourse in some standard or canonical language. Quine refers to this translation procedure as regimentation. According to Davidson we would like to have

> " ... a theory that makes the transition from the ordinary idiom to canonical notation purely mechanical, and a canonical notation rich enough to capture, in its dull and explicit way, every difference and connection legitimately considered the business of meaning. The point of canonical notation so conceived is not to improve on something left vague and defective in natural language, but to help elicit in a perspicuous and general form the understanding of logical grammar we all have that constitutes (part of) our grasp of our native tongue".[3]

The canonical notation with which we shall be concerned is first-order predicate calculus. One goal of the present chapter is to show that we are far from having the "mechanical translation procedure" of which Davidson speaks.

Quine believes that regimenting a true sentence in predicate calculus solves the problem of ontological commitment. The values of the quantified variables of our regimented sentences are the things which our discourse recognizes. But even if we grant Quine's criterion of commitment we are faced with a problem. We must be able to determine what constitutes a "paraphrase" into the canonical language. While we need not expect to find Davidson's "translation algorithm" from ordinary language into logical we do have a right to ask for the general criteria by which we can pair a sentence with its paraphrases. We might also be tempted to look for a way to rate the "correctness" of one paraphrase with respect to others. The limiting case of this procedure might be some formal rule by which we pick out "the right" logical translation of a sentence.

The most obvious criterion is the following:

(4-1) A sentence S is a paraphrase of a sentence S' just in case S has the same meaning as S'.

The closer in meaning the better the paraphrase. This simple rule, however, is not available to Quine. In its rejection we see another important connection between semantics and ontology.

Proposal (4-1) depends upon a semantic theory which admits of "sameness of meaning" of sentences. Quine rejects any such semantic theory. To understand Quine's position it is useful to examine the corresponding theory of translation with which it meshes. This is the doctrine of "indeterminacy".[4]

Given a sample of data we shall always be able to formulate substan-

tially different sets of hypotheses to "agree with" the data base. The relevant sense of "agree with" can be illustrated by a simple example. Suppose our data sample can be represented on a graph as the set of all ordered pairs of integers whose first and second members are identical. (We do not yet have any information about non-integral rationals or reals.) In this case both the theories consisting of the single axiom

(4-2) (x) (y) (x=y)

and

(4-3) (x) (y) (Ix.x=y.v.-Ix.x=-y)

(where 'Ix' means 'x is an integer') "fit" or "agree with" the data we have amassed. Yet they are substantially different. Suppose we came across a sample of data representable as an ordered pair of two identical non-integral rationals. "Theory (4-2)" would fit the new data base but (4-3) would not.

It is of course the case that supplementing our data base can eliminate one of the two proposed hypotheses. But given this new data we can construct other alternative theories. On Quine's view there is no amount of data for which we will be able to eliminate all rival hypotheses. There will always be this basic indeterminacy. Putting it concisely, the data always underdetermines the theory.[5]

In the case of language we have the possibility that rival hypotheses ("analytical hypotheses") about translating the meaning of a sentence in a language "can conform to all speech dispositions within each of the languages concerned and yet dictate, in countless cases, utterly disparate translations. ... Two such translations might even be patently contrary in truth value, provided there is no stimulation that would encourage assent to either".[6]

Given a sentence several different translations of it could accommodate

the same "speech dispositions". There might be no empirical consideration that would persuade us to accept one as a better translation than the others. On this view none of these alternatives can be said to capture "the real meaning" of the original sentence. In Quine's semantics there is no such thing.

The notion that each sentence is somehow tied to its unique meaning underpins the position that there is a correct translation of that sentence. But the view that sentences are somehow bound to a unique meaning or proposition (the "museum myth"[7]) is built on a mistaken semantic theory. If our semantics tries to assign meaning to sentences in isolation from the linguistic system in which they function it will be forced to postulate these disembodied "meanings". As we shall see below there is an approach to semantics which dispenses with "proposition talk" entirely by relating meaning to the linguistic system as a whole.

The point to be noted here is that Quine rejects the model of semantics which permits us to speak of a "correct" paraphrase or translation. This is because we are no longer permitted to speak about sentences having "the same meaning".

Pragmatic criteria

We might next look for pragmatic criteria by which to judge one paraphrase better than another. The pragmatic relation between a sentence and its translation is based upon the use to which the paraphrase will be put. It need not be specified in terms of similarities in the linguistic structure of the sentences involved. A non-pragmatic rule of paraphrase can be exemplified as follows: A sentence S is paraphrased by preceeding it with a double negation. We have no assurance, however, that such a paraphrase will be of any

pragmatic value. There is no guarantee that it will be useful.

A general rule is that a good paraphrase should simplify the unregimented theory whenever possible. But this principle tells us very little. While regimenting natural language sentences in logical notation simplifies doing proofs it is not likely to simplify e.g. giving orders. A simplification in this sense depends upon what we are trying to do with the theory. This can be contrasted with a formalist approach to simplicity as proposed by Goodman or Kemeny.[8]

Another pragmatic criterion is what Quine calls the "maxim of shallow analysis": "Expose no more logical structure than seems useful ...".[9] The extent of the paraphrase should also depend upon its use. We need only regiment those parts of our discourse which are relevant to the inquiry at hand. This usually involves at least elimination of ambiguity from the original sentences.

In short, a good paraphrase is one which aides us in conceptualizing and understanding the problem under analysis. Our choice of language and the paraphrase into that language are aimed at clarifying our theory and making it easier to use.

Unfortunately these pragmatic stipulations tell us nothing new. They impose no real restriction upon the notion of paraphrase. Without genuine constraints on translation, however, Quine's criterion of ontological commitment seems vacuous. We are committed to the values of the bound variables of our theory. But we have been given no procedure for translating our theory in the language which uses bound variables.

Our present situation is that given an unregimented sentence we know nothing about its ontological commitments. We cannot even determine the

possible range of commitment without first specifying the pragmatic parameters by which we choose the appropriate logical paraphrase. In this case, however, our criterion of commitment is useless. Its application rests on a paraphrase procedure which is left completely unspecified. Retaining Quine's criterion therefore demands there be specifiable relations between a sentence and a possible paraphrase. Lack of any such formal restrictions means that natural language sentences can be arbitrarily translated into logical language. This leaves little connection between the ontology of our theory and the range of the quantified variables.

Stimulus synonymy

We have seen above that synonymy ("sameness of meaning") cannot be a criterion for adequate paraphrase. Quine objects that saying "sentences are paraphrases if they are synonymous" tells us no more than we knew before. If we had some empirical method for determining when two sentences had the same meaning there would then be some point to the synonymy talk. Definition of 'synonym' in terms of intensions, propositions, semantic markers, and the like does not provide this empirical foundation. Quine's notion of stimulus synonymy, however, might be thought to provide the necessary behavioral support.

'Stimulus synonymy' tries to capture the meaning of the locution "sameness of confirming and disconfirming experience".[10] We say that two sentences are stimulus synonymous for a speaker if his disposition to assent to or dissent from them is the same in any given situation.[11] If a subject will be prompted to "use a sentence S" in the same situations in which he would a sentence S' then S and S' are stimulus synonymous for the speaker. (If this stimulus synonymy holds across a large portion of native speakers we say the

sentences are simply stimulus synonymous.) 'Using S and S' in the same situation' is equivalent on this analysis to saying that 'S and S' will be affirmed or denied by the speaker in the same contexts'. Alternatively we could say that the speaker would maintain they had the same truth value in all situations in which they could be used. We must now see whether this notion of stimulus synonymy can serve as a criterion for determining when one sentence is a paraphrase of another.

It is fairly easy to establish that under the above definition stimulus synonymy is not a necessary condition for paraphrase. Natural language is rife with ambiguity. It derives from various sources. Lexical ambiguity arises from polysemous words or phrases. Grammatical or syntactical ambiguity comes from (on Chomsky's analysis) different deep structures generating the same surface structure. Consideration of syntactical ambiguity is here sufficient. Given the sentence

(4-4) John wants to marry someone.

we might paraphrase it as either

(4-5) Someone is such that John wants to marry her.
(4-5') (Ex) (John wants to marry x)

or

(4-6) John wants it to be the case
that there is someone for him to marry.
(4-6') John wants it to be the case that (Ex) (John marries x).

Sentence (4-5) characterizes the "relational"[12] or "referentially opaque" sense of 'wants'. (4-6) catches the "notional" meaning of the verb. In

(4-7) John is looking for a unicorn.

'is looking for' exhibits the same ambiguity.

In these examples we have a clear case of paraphrases for which the

confirming and disconfirming instances could vary. Suppose that John will marry almost anyone he can get hold of. It still need not be true that any particular person is the object of his desire. Thus there might be no individual in our domain for which a speaker would assent to (4-5) while he would assent to (4-6). As one reading of (4-4) is (4-5) we have no linguistic guarantee that the reaction to (4-4) will be the same as to (4-5). Hence stimulus synonymy might fail.

It could be argued here that we will know the use to which the paraphrase will be put and therefore will understand the sense in which (4-4) is to be taken. But we are now looking for formal (non-pragmatic) conditions that tell us when we have a paraphrase. Stimulus synonymy alone does not provide this guarantee. One intention of regimentation is clarification of the original sentences. This usually means elimination of ambiguity from the unregimented discourse. Our example shows that this can lead to a breakdown of stimulus synonymy.

Truth-value gaps

A criterion of paraphrase related to stimulus synonymy is preservation of truth value. We might argue that both a sentence and its canonical representation must, at the very least, be conjointly true or false. Even this weak condition is at odds with the pragmatic guidelines we set out above. One aim of regimentation is to simplify the regimented theory. To this end, for example, we define the material conditional as true if it has a false antecedent. But it is quite easy to construct a case based on this definition in which a paraphrase has a truth value different from its unregimented counterpart. The example

(4-8) If there are as many men as women in Canada
then there are more men than women in Afghanistan.

would be regimented as a conditional. The contingent falsity of its antecedent renders the sentence true in this canonical form. This seems clearly contrary to our intuitions about the truth value of (4-8). Cases such as these, in which natural language is vague or noncommittal as to the truth of a sentence, are dubbed "truth-value gaps" by Quine.[13] Here again dependence of regimentation (and hence ontological commitment) on our semantic theory becomes explicit.

It is now in fashion in linguistic circles to extend this notion of truth-value gap as far as possible in ordinary language cases. This is done by labelling certain sentences "semantically anomalous" or meaningless. These anomalous sentences cannot take a truth value. If the linguists are correct logical paraphrase of such sentences is a serious distortion of ordinary language which can have undesired ontological consequences. In this case the regimentation threatens to give meaning to purportedly vacuous statements. However loose our criteria for paraphrase are they must at least block a meaningful sentence as a paraphrase of a meaningless one. The following are claimed to be semantically anomalous sentences:

(4-9) He painted the walls with silent paint.[14]
(4-10) The corpse is sleeping.[15]
(4-11) I poured the girl into the inkwell.
(4-12) The present king of France is wise.

It is clear that (4-9)-(4-11) can be easily translated into predicate calculus. Hence they must have well defined truth values.

The mistake is, I think, on the part of the linguists. "Semantic anomaly" is a concept resulting (in Morris' terminology[16]) from confusion of

semantics and pragmatics. While there may be some kind of pragmatic oddness in (4-9)-(4-11), in that the situations in which they would be used are unlikely, there is no reason to single them out as semantically unique. By pointing out an appropriate pragmatic context the "anomalous" character of these sentences disappears.

As an example compare (4-9) with the following sentences.

(4-9') He painted the walls with quiet, loud sad, happy grey depressing paint.

The difference between "loud paint" or "quiet paint" (which I do not consider at all odd) and "silent paint" surely must depend upon the particular speaker's situation, experience, etc. These need not be considered by a semantic theory. The sentences (4-9)-(4-11) are simply false, and not likely to be made true.

Sentence (4-12) presents a more difficult problem. As in (4-8) above it is responsible for a real truth-value gap in ordinary language. A property is predicated of a subject (denoted by a definite description) who does not exist. Strawson argues that such a gap renders the sentence meaningless.[17] For practical purposes of communication he is probably right.[18] But taking this position precludes regimenting (4-12) in our canonical notation. Hence our ontological criterion would be inapplicable to the sentence.[19]

To avoid this difficulty we accept the artificiality of filling the truth-value gap. Sentence (4-12) may be regimented in the manner of Russell, treating it as the conjunction of an existence clause (marked by the definite description) and a predication. The regimented version of (4-12) becomes

(4-12') $(Ex)\ (Fx.(y)\ (Fy \supset x=y).Wx)$.

('Fx' is to be interpreted as 'x is the present king of France' and 'Wx' as

'x is wise'.) In this case (4-12') is simply false as the first conjunct is false.

We should expect regimentation to do some violence to ordinary language. The procedure may create truth values where they did not exist before. However it has not been shown guilty of the more serious charge of turning vacuous sentences into meaningful ones. With the failure of both stimulus synonymy and preservation of truth value as a necessary condition for paraphrase we must look in another direction.

Inference and ordinary language

I have mentioned above that a semantic theory need not explain meaning in terms of isolated sentences. On Quine's view it must take the whole linguistic framework into account. A sentence acquires meaning through its "place" within a language. This is defined by its relation to other sentences. (These notions will be made more precise in Chapter VII.) This suggests another criterion of adequate paraphrase. The sentences which are related in the original discourse must also be related in its regimentation.

The idea can be pictured in the following way. Language is viewed as a network of interconnections between sentences (and derivately, between words). Our logical paraphrase should characterize the most important natural language relations. Some interconnections will have to be eliminated. Statements such as (4-4) are related to divergent sets of sentences through ambiguity. If the purpose of regimentation is clarification we would do well to eliminate the ambiguity from our regimentation. This problem can be avoided by considering only one interpretation of the ambiguous sentence. Only one stimulus synonymous sentence is regimented at a time.

Another problem is determining the "important relations" between natural language sentences. Here again we come to an irreducible pragmatic barrier. I do not think there is any formal way to specify the relevant sense of 'important'. Our regimentation should try to characterize those relations between ordinary language sentences which are relevant to the inquiry underway. The present purpose is to preserve the semantic interconnections within the original discourse. On our analysis translation into predicate calculus makes clear the logical structure of a sentence which is central to its meaning. These logical relations are claimed to be part of any speaker's knowledge about that sentence.[20]

In an early article Quine asserts that the incorrectness of rendering

(4-13) John is hunting a unicorn.

as

(4-14) (Ex) (x is a unicorn . John is hunting x)

"is conveniently attested by the non-existence of unicorns".[21] Sentence (4-14) implies the sentence

(4-15) (Ex) (x is a unicorn)

or "there are unicorns". Quine's claim is that the natural language sentence (4-13) does not have (4-15) as a semantic component. A speaker does not consider the existence of the direct object of 'hunt' as necessary for correct usage.

From the truth of

(4-16) John and Mary ate at the restaurant.

we know that we can infer

(4-17) John ate at the restaurant.

We do not want our regimentation to allow the inference from

(4-18) John and Mary met at the restaurant.[22]

to

(4-19) John met at the restaurant.

This is a condition which any adequate paraphrase of (4-18) must satisfy. Part of our understanding of the verb 'meet' is that two people must participate in a meeting. (We could alter the semantic interconnections of our linguistic framework to allow the inference from (4-18) to (4-19). The repercussions of such a move would be extensive.)

Our regimentation proposes a mechanism through which these relations might be realized in language. Paraphrase into predicate calculus allows us to analyze semantics in terms of truth-functional connectives. Some have argued that this is not enough equipment to handle the relations found in natural language. To this end propositions, semantics markers, transformations, etc. have all been invoked.

If there are semantic connections in ordinary language which cannot be characterized in terms of implication, consequence, and the like predicate calculus is an inappropriate canonical language for this task. Part of the aim of the present section is to show that this is not the case. Regimentation into logical language can preserve those important semantic relations between sentences which are part of any speaker's knowledge of his language.

We can illustrate these ideas by examining Davidson's regimentation of action sentences.[23] His aim is to make clear their underlying logical form or structure. In doing so he claims to capture certain important semantic relations which these sentences exhibit in natural language.

Given the sentence

(4-20) John washed the car.

we can treat 'wash' as an ordinary "relational" transitive verb. Sentence (4-20) would thus be regimented as

(4-20') Washed(John,the car).

Next consider the sentence

(4-21) John washed the car in the garage.

We might now view 'wash' as a three-place predicate. The extra argument is the adverbial phrase. (4-21) can be parsed as

(4-21') Washed(John,the car,in the garage).

An immediate objection to this procedure is that it can generate an infinite number of primitive predicates. This would make learning a language a very difficult task.[24] The sentence

(4-22) John washed the car in the garage at noon.
(4-22')Washed(John,the car,in the garage,at noon)

must then be treated as containing a four-place relation 'wash' which has no logical connection to that of (4-21). It seems clear, however, that all of (4-20)-(4-22) are somehow closely related. This relation is made explicit if we realize that (4-21) implies (4-20), and (4-22) implies both (4-21) and (4-20). These implications are blocked by the proposed paraphrases (4-22') and (4-21').

This observation can be generalized. We can adjoin <u>any</u> number of adverbial modifiers to (4-20) to obtain a new sentence S. Our original sentence (4-20) will then be implied by S. Kenny refers to this property as "variable polyadicity".[25] On Davidson's view any adequate paraphrase of (4-20) and its adverbial expansions must take these relations into account.

We must therefore find some way to regiment (4-20)-(4-22) which satisfies this logical desideratum. Davidson suggests that action verbs like 'wash' be treated differently than ordinary relational transitives (such as 'taller than'). He proposes that "verbs of action--verbs that say 'what someone did'--should be construed as containing a place, for singular terms or variables, that they do not appear to".[26] We would thus regiment (4-20) as

(4-23) (Ex) (Washed(John,the car,x))

to be read as "There is an event x such that x is a washing of the car by John". One place action predicates might be transcribed on the model of

(4-24) John fell.

as

(4-25) (Ex) (Fell(John,x))

reading "There is some event x such that x is a falling of (by) John".

The need for making explicit our criteria for regimentation here becomes apparent. In order to preserve certain relations characteristic of action sentences Davidson has suggested a particular regimentation. This proposal, however, uses events as the value of a bound variable and thus admits them into our ontology. This commitment was not explicit in the unregimented sentences. If we view action verbs on the analog of relational predicates it is indeed quite a surprising result. This ontological consequence can be avoided. We might deny that the proposed relations need be captured by our logical translation. In some sense they are not relevant to the meaning of the action sentences. This is a radical move and requires justification. It amounts to rejecting a plausible criterion for paraphrase on the basis of a bias about our ontology. We might also try to preserve the relations through a regimen-

tation which does not quantify over events. For present purposes, however, we shall accept Davidson's proposal noting its effect upon our ontology.

There is no longer any problem with (4-21) and (4-22). Their logical translations are respectively

(4-26) (Ex)(Washed(John,the car,x).In(x,the garage)).
(4-27) (Ex)(Washed(John,the car,x).In(x,the garage).At(x,noon)).

Existential specification and simplification yield the required inferences (along with several others which were partially obscured in the original sentences; e.g. from (4-27) we infer that something happened at noon). It has been objected that this proposal not only preserves all the original relations but adds some of its own.[27] From (4-26) we may infer that

(4-26') The washing took place in the garage.

Sentence (4-21), on the other hand, might mean that John was standing outside the garage and merely squirting the car with a hose. In this case we would need further analysis of the notion of an action to see whether the purported implication is correct. Also, the phrase 'in the garage' might only modify 'the car' while the washing actually took place in the living room. In this case the implication would be simply incorrect. I do not find these objections cogent. They rest on an ambiguity of the unregimented sentence. As remarked above we need only consider one reading of a sentence at a time when we represent it canonically. An aim of regimentation is clarification. It therefore cannot be faulted for making the meaning of a sentence more precise.

The following example from philosophy of science makes even more explicit the consequences of relation preservation as a criterion of adequate paraphrase. An action sentence such as

(4-28) John knocked the book onto the floor.

would be parsed as follows on Davidson's analysis:

(4-29) (Ex)(Knocked(John,the book,x).Onto(the floor,x)).

In a recent paper Professor Aronson[28] has pointed out that 'knock' belongs to a particular class of transitive verbs; those verbs for which 'cause' is a "dimension-word". Austin considers a dimension-word to be "the most general and comprehensive term in a whole group of terms of the same kind, terms that fulfill the same function".[29] (Other words belonging to this class are 'push', 'make', 'lift', etc.). Aronson points out that there is syntactic evidence for this classification. A grammatical transformation exists between those locutions such as (4-28) and parallel sentences using the verb 'to cause'. "In sentences containing transitive verbs and objective complements 'cause' can be substituted, along with other modifications, for the transitive verb."[30] A sentence with the grammatical form

(4-30) Noun Phrase+Transitive Verb+
Direct Object+Objective-Complement+

can be replaced by one of the form

(4-31) Noun Phrase+caused+Direct
Object+Copula+Objective Complement.

Thus (4-28) can be transformed into

(4-32) John caused the book to be on the floor.[31]

The claim is that the applicability of this particular transformation enables us to sort out causal from non-causal locutions.

(It is important here to stress the difference between an objective complement and adverbial phrase. Aronson's analysis hinges on this distinction. An objective complement is an adjective, noun, or the equivalent of either which both completes the action described by the verb and modifies or or qualifies the direct object. An adverbial phrase, on the other hand,

modifies the action described by the verb. The use of the objective complement in a transitive locution marks it as causal.)

Returning to Davidson's analysis of (4-28) we see that it implies the sentence

(4-33) (Ex)(Knocked(John,the book,x)),

or 'John knocked the book'. But what regimentation shall we give to (4-32), the transformation of (4-28)? It is clear that we cannot analyze it in the same manner. This would allow us to infer

(4-34) John caused the book.

(parallel to (4-33)). This is an implication we must block. The problem here is that 'cause' relates the subject to a whole sentence while the transitive action verb it replaces relates the subject to another term (a noun phrase).

On Davidson's analysis it appears that we must either (i) treat the 'cause' of (4-32) as a three-place predicate with the objective complement as one of the arguments or (ii) treat 'caused-to-be-on-the-floor' as an unstructured diadic predicate. Neither of these alternatives is desirable. Approach (i) yields an infinite number of primitive predicates due to the variable polyadicity of the causal statements; e.g. 'John caused the book to be on the floor, at noon, in the house, willfully, maliciously, etc.' Proposal (ii) has the same consequence. It also prevents us from speaking of any syntactic relationship between notationally different causal locutions.

Another problem with these suggestions is the fact that there are inferences to be drawn from (4-32). If John caused the book to be on the floor we know that he has caused something to happen. We also know that the book is on the floor. These relations are captured in the following regimentation of

(4-32):

(4-35) (Ex)(Ey)(Cause(John,y,x).On(the book,the floor,y)).

This can be read (in a somewhat artificial manner) as "There is some event x and some situation (event) y such that x is John's causing of y, and y is the book's being on the floor". From (4-35) we can infer

(4-36) (Ex)(Ey)(Cause(John,y,x)),

"There is an event x such that x is John's causing of something"; or more simply, "John caused something". It does not, however, allow us to derive (4-34). The parsing also makes perspicuous that relation between the direct object and objective complement which is the trademark of causal locutions on Aronson's analysis.

There are several consequences of this treatment which are important to note. Davidson's proposal suggests that we regiment sentences involving verbs such as 'knocking' in terms of events. Aronson has argued that such sentences can always be transformed into a locution using the verb 'cause'. This new sentence is semantically related to its untransformed root; (see fn IV.31). They have a semantic core in common. These claims jointly entail that we be able to regiment the transformed version of the transitive verb statement in terms of events. If two sentences have a semantic element in common the ontological commitments based upon this element should be the same in both sentences. With a bit of violence to ordinary English we have shown this to be the case.

Our regimentation of (4-32) has another ontological consequence. It shows that causal locutions commit us to two things: an event and a state of affairs.[32] While these entities are obviously related they are not the same.

The observation is somewhat obscured in the transitive verb form (4-28). It might seem from (4-28) that the knocking of the book and the book's being on the floor commit us to only one event. But from the existence of the event of John's knocking the book we cannot be sure of the situation of the book's being on the floor. This is at least a problem for the "single event" interpretation of the causal statement. Final analysis in part rests on the formulation of individuation criteria of events. The important feature to note here is the way in which our regimentation has suggested an ontological consequence which is not obvious in the unregimented sentence.

Contrasting the inferences derivable from (4-28) with those from (4-32) lead to radically different regimentations of them. This difference in logical form reflects an important grammatical distinction. Sentence (4-28) contains a factitive transitive verb which takes a noun phrase as its direct object. In (4-32) 'cause' takes a sentential object. Our logical transcription made this difference explicit by relating the subject of (4-32) to a variable which takes a state of affairs (or event) as its value.[33]

Sufficient conditions

We might next try to specify some sufficient conditions for adequate paraphrase. I think Quine's philosophy of language precludes this possibility. A set of sufficient conditions would allow us to assert once and for all that certain sentences "mean the same" as others. A paraphrase that satisfied these conditions could be considered a correct paraphrase. On Quine's view, however, sufficient conditions must be irreducibly linked to pragmatic factors.

The essential point is that any condition can be sufficient to guarantee adequate paraphrase if that paraphrase satisfies the pragmatic considerations

at hand. As an example let us suppose the conditions which must obtain for stimulus synonymy to be a sufficient condition. Under normal circumstances it is clear that the sentences

(4-37) That animal is hirsute.

and

(4-38) That animal is a mammal.

have different meanings. We would not call them paraphrases of each other. Yet the fact that they contain coextensive predicates assures that they will be applicable in the same situations. The sentences are therefore stimulus synonymous.[34] This does not, however, contradict the assumption that stimulus synonymy can be a sufficient condition for adequate paraphrase.

Suppose an amateur zoologist is given a set of pictures. He is told to separate them into two groups; one pile for mammal-pictures the other for amphibian-pictures. In this situation (4-38) would be a perfectly adequate paraphrase of (4-37). It will probably even aid the zoologist in his task. Pragmatically speaking it is a "correct paraphrase". Goodman has made the same point in another connection.[35]

Even the weaker restriction that paraphrases be materially equivalent can be sufficient. This is the case if we are only worried about truth value preservation in extensional languages.[36]

I shall not belabor this point any further. While it seems consistent with Quine's philosophy to specify necessary conditions for a paraphrase I do not think we can formulate sufficient ones. These will inevitably interfere with the pragmatic constraints we have placed upon our regimentation.

CHAPTER V

NAMES

Professors Harman and Donagan agree that the occurrence of an entity as a value of a bound variable is a sufficient condition for recognizing its existence.[1] Reading the quantifier as we normally do it is indeed difficult to deny that referring to entities via the bound variables carries this commitment. If the words "there are x's" do not commit us to the existence of x's it is unlikely that any locution will. In this sense Quine's criterion reduces to the truism that a theory is ontologically committed to whatever it says there is.[2] But Quine's is not the only reading of the quantifier. Before we examine the semantic basis of his criterion we should look at another approach to quantification and existence.

Quine takes bindable variables to be the sole channel of existential commitment. Other positions are possible. Some philosophers[3] have used extra-logical constants (e.g. names) as a vehicle for noting existence.

We should first note that the existence of an individual constant or a name (in its standard sense) is not sufficient to insure the existence of a corresponding entity. Any non-referring name (e.g. Pegasus) establishes this. More generally given any extra-logical constant, say 'a', we cannot be sure that it has a non-null denotation. We cannot be sure, that is, unless the statement '(Ex)(x=a)' is true. Only under this condition do we know that 'a' is actually being used to name an object; that is, that our use of 'a' is

performing an ontological, rather than a merely notational, function in our theory. It is the existential quantifier, not the name or constant itself, that carries the existential commitment.[4]

The objection might be raised that "ordinary names" are quite different from "logically proper names". Establishing that the former are insufficient to insure ontic commitment does not establish the insufficiency of the latter. I shall not examine this criticism in any detail, but I think the following consideration relevant.

Any language must have a means of distinguishing expressions which refer from those which do not. In the case under consideration we must have some criterion for distinguishing genuine "logically proper names" or genuine "elementary proper names" from spurious ones. This criterion might be formulated metalinguistically as e.g. all and only names of a certain linguistic form denote entities.[5] Or we could, just as easily, use the objectual reading of quantification as Quine suggests. The point is that in any language we will want to say that 'a' does not refer while 'b' does.[6] The quantifier, or some metalinguistic device, seems necessary to this end. Names alone are not sufficient.

Quine's "objectual" reading of the quantifier determines ontological commitment by relating terms of our discourse to extra-linguistic entities. The attempt to use logic to establish this connection has been criticized. Followers of Lesniewski, for example, maintain that logic should be kept pure and divorced from any extra-linguistic consideration.[7]

It is also maintained that the objectual reading of quantification can be made to yield counterintuitive results. If we read the existential

quantifier as "there is something such that ..." it is argued that there are certain statements which cannot be expressed within logic.

One example is the statement "something does not exist". Quine's rendering of this would have to be "there exists something (e.g. an entity) that does not exist".[8] While the latter is an obvious contradiction the former seems a truism. We might even construe it as an existential generalization on 'Pegasus does not exist'. Quine, on the other hand, must impose a restriction against generalizing on 'Pegasus' (or any other non-referring name) on pain of deriving the above noted contradiction.

These are interesting observations but they do not constitute a criticism of Quine.[9] He proposes his reading of the quantifier as a means of establishing ontological commitment. He cannot then be faulted for failing to keep his logic pure. The occurrence of the statement '(Ex)(x does not exist)' in a theory would mean that we are committed to some entity in our theory and this entity does not exist. But this is a contradiction (although not of the S.-S variety). The very position an entity holds within our theory renders it existent. Ontologically speaking, to be is to be an element of a system.

Substitutional quantification

Professor Marcus has raised similar criticism against Quine's interpretation of quantification.[10] She feels that we need a reading of

(5-1) (Ex)(Fx)

which has the force of

(5-2) Some substitution instance of 'Fx' is true.

or

(5-3) There is at least one value of x for which 'Fx' is true.[11]

We saw above that the use of names was not sufficient to insure any type of ontological commitment. The substitutional interpretation of quantification as exemplified in (5-1)-(5-3) is not a necessary condition for commitment either.

To see this we need only consider a universe with a non-denumerable number of entities. By hypothesis we will not be able to name some of the elements. If we choose to read (Ex)(Fx) as "some substitution instance of 'Fx' is true" we may have the paradoxical situation in which '(Ex)(Fx)' is false while something in our domain is actually an F.

For illustration let us take the real numbers as our universe. Since they are non-denumerable the statement 'There are unspecifiable real numbers' is true.[12] But the entities guaranteeing the truth of the statement are definitely not objects with names. The statement would therefore be false under the substitutional interpretation of quantification.

We should note that this argument is quite general. It does not depend upon the type of name we plan to substitute for our bound variable. Further, the more general result that names are not a necessary condition of commitment follows directly from the example. If we are content to work within a denumerable domain each element can correspond to some linguistic form. In this case it is possible for names to carry the entire ontological burden. But for non-denumerable domains there will, by hypothesis, be entities which have no corresponding linguistic form. In the end indenumerable and indefinite universes are what give point to objectual quantification.[13]

These results are not surprising. If we go to lengths to keep our logic pure of ontology we should not then expect it to be an adequate vehicle for

depicting ontology. By construing quantification in terms of substitutable expressions rather than real values we waive reference. Distinctions between truth and falsity are preserved but we no longer have a referential dimension.[14] This is precisely what interests us in ontological questions.

Even in dealing with domains of denumerable individuals we can argue that objectual quantification is necessary. We still have problems of non-referring names and constants. Developing the theory of definite description introduced by Russell Quine has proposed a method for eliminating all singular terms from regimented discourse.[15] With this accomplished all reference to entities must be achieved via the variables of quantification. But since names and singular terms can be eliminated without affecting the commitment of our theory they are certainly not necessary for establishing such commitment. Quantifiers, on the other hand, cannot generally be eliminated in favor of names. Quine's criterion of commitment seems to be the fundamental one.

CHAPTER VI

PREDICATE SCHEMATA

Harman points out that the sufficiency of Quine's criterion of commitment turns on the truism that "what a theory says there is is what the theory says there is".[1] But it is not a truism that a theory is committed to only those entities which it "says" there is. It might be the case that a discourse can be committed to other entities as well.

The crux of the problem is to determine the degree to which the linguistic forms of our language commit us to an ontology. We must decide to what extent e.g. first-order predicate calculus is ontologically neutral with respect to the interpretation which can be placed upon it. Quine is of the opinion that ontological commitment arises only through the variables of quantification. It is then legitimate to ask about the criteria for determining which terms in our theory may be bound. The problem is crucial to sorting out our ontology. If, for example, the predicate letters are construed as names substitutable for predicate variables we are committed to the values denoted by the letters. As discussed above this leaves us with either classes or properties (or both) in our ontology. In Bergmann's system undefined descriptive constants of all types are a vehicle for ontological commitment. Individual constants refer to individuals (more precisely, individual constants are labels for "bare individuals"[2]) and the undefined predicate constants refer to universals.

Quine wishes to avoid commitment to abstract entities whenever possible. Unless he can avoid treating the predicate letters as names his own criterion forces him to accept their denotata in his ontology. His move is to construe the predicate letters of the calculus as schemata instead of names.

Words need not have extra-linguistic referents in order to function in a language.[3] 'And', 'not', 'but', 'when', and 'sake' are all non-referential but perform essential roles within the language as a whole. It can even be argued that such terms are "meaningless" in isolation from a context. One would be hard put, for example, to produce a non-contextual definition for 'sake'. The discourse dependency of these terms obviously does not affect their meaningfulness within the appropriate contexts. Such terms are called syncategorematic.[4]

Quine's overall view of language is that all components are to some degree syncategorematic. The meaning of every term[5] depends upon its place within the whole linguistic system. It is therefore senseless to speak of the meaning of words in isolation from the contexts in which they are used. Some terms, however, are less system dependent than others in that their extra-linguistic connections are strong. This is the case for Quine's bindable variables. They are the channel through which these extra-linguistic ties are established. They have, so to speak, a double allegiance.

On the one hand bound variables are themselves part of the linguistic system. The sentences in which they occur are related to other sentences of the discourse through the rules of inference, inductive generalization, or empirical and semantic considerations. On the other hand they have an extra-

linguistic link. They mark out the "boundary conditions" of experience with which the whole linguistic network must comply.[6]

Quine's view is that the predicates of a language serve no such dual role. They need not, and do not, correlate directly with the extra-linguistic boundaries of the system. They are syncategorematic deriving meaning only from the role they play within the language. While the variables are in some way directly connected to the reality external to language predicates must derive their meaning indirectly from their position within the linguistic system. Ontologically they are on a par with our logical connectives. Their semantic position is also quite similar.

Looking at language in this way we can begin to make sense of Quine's talk of predicates as schemata. A name establishes (if we are lucky) an extra-linguistic link with the linguistic system. In doing so it becomes less dependent upon that system for meaning. Names therefore maintain a degree of independence from the system in which they function. In the terminology of Frege and Strawson this amounts to saying that names are more "complete" than predicates.[7] In rejecting predicate letters as bindable variables we maintain the complete dependency of predicate meaning upon the system. The predicate letters simply stand in place of predicates. They do not name anything.

This point rests on a semantic assumption. Quine can only deny that predicates are names if he can explain how an undefined descriptive expression can be significant. As Donagan points out "the proposition that a given predicate is true of a given individual does say something about the world other than that the individual exists."[8] The question whether predicates

carry ontological commitment (and therefore whether Quine's criterion is cogent) reduces to whether a predicate can accomplish this without having a counterpart in the external world.

Bergmann is of the opinion that extra-linguistic counterparts must exist for each linguistic form of our ideal language. This is a referential theory of semantics in its most restricted sense. In the sentence e.g. 'This spot is green' each element is correlated with an extra-linguistic entity. 'This' (or 'This spot') and 'green' represent things; a "bare individual" and universal, respectively. 'Is' represents a "fundamental tie". The whole sentence is a complex of the kind called a "fact". Bergmann feels this pregnant ontology is necessary to make sense of the meaning of the sentence. For what can we be saying in asserting 'This spot is green'? On his view we say that 'This spot' refers to a spot, 'green' to a universal and 'is' signifies the relationship between the denotata.

Quine, of course, has another interpretation of what's going on in our semantics. Predicates derive meaning from their position within a system of language. Saying that a spot is green of course says more than that the spot exists (although treating 'the spot' as a definite description does commit us to a "spotted" ontology). It specifies the relation between 'the spot' and the other elements of the linguistic system.

We immediately know, for example, that the entity referred to by 'the spot' is not red, that it has been illuminated by light, that it is only reflecting light of a certain wavelength, that it is not 'not green', etc. Some of our conclusions about the spot follow logically from our initial statement. Others depend upon our knowledge of e.g. physics or ordinary lan-

guage color talk. The linguistic system in which we are working is the means of establishing the connection. 'This spot is red' positions 'the spot' within that system and allows us to draw certain conclusions about the denotatum of the label.

All this talk of "systematic placement" etc. is vague and metaphorical (as Quine himself tends to be). To make the claims more precise requires the development of an appropriate semantic theory. I shall now turn to this problem.

CHAPTER VII

A THEORY OF MEANING

Criteria

There are several things which an adequate semantic theory should do. It must first of all show how the meaning of complex sentences relates to simpler ones. Understanding a "new" sentence is in some way related to those previously learned. Otherwise we would never be able to learn a language. A semantic theory must account for the relation between sentences such as (7-1) and (7-2)

(7-1) (a) John kicked the bucket.
(b) John kicked the bucket in the yard.
(c) John kicked the bucket in the yard at noon.
(d) John kicked the bucket in the yard at noon deliberately.

(7-2) (a) Tex rode to the saloon.
(b) Hopalong is distraught.
(c) Tex rode to the saloon and (but, because, ...) Hopalong is distraught.

It has traditionally been assumed that the meaning of a sentence is dependent upon, or a function of, the meaning of its components ("words"). This approach seems a necessary one if the theory is to satisfy the above condition. However, the matter cannot be left here. The claim that "meanings of sentences depend upon component meanings" merely defines a problem. It is totally unenlightening as to how that condition is satisfied. Specifying the relation between words and sentences is a goal any semantic theory must achieve.

Some philosophers (e.g. Carnap, Katz) feel that the statement of this condition is also its solution. As a result they postulate "word meanings" as the primary semantic unit and leave semantic analysis at that. I think that this approach is totally unsuccessful in showing how sentential meaning depends upon the words in the sentence.

If we want to know the meaning of e.g. 'Socrates is mortal' it helps very little to be told the following:

> (i) 'Socrates' designates (refers to) the individual concept (individual) Socrates.
> (ii) 'is mortal' designates the property of being mortal.
> (iii) 'Socrates is mortal' means that the property of (ii) is attributed to the individual concept (individual) of (i).

One problem here is that the analysis is constructed to suit the sentence. Difficulty in handling other simple cases such as 'It is snowing' or the relation between the sentences of (7-1) in a similar manner rests on this fact. Our semantics may contain (iii) as one particular result, but this is to narrow a base from which to start. A second problem is that the notions of property, individual concept, and attribution seem in as much need of clarification as meaning does.

The moral is that words in isolation need not be the primary consideration of our semantic analysis. We must look at words in their relation to sentences if we are to understand how they contribute to the meaning of sentences. We should expect our semantic theory to make sense of the notion of "meaning of words". It can do this if it contains some type of recursive procedure which relates words to the meaning of the sentences in which they occur. The claim that sentences depend upon words for meaning just poses a

problem. We must now make clear what this dependence is.

In his discussion of an artificial language B Carnap claims that a "semantical system furnishes an interpretation of language B, since it contains rules which yield for each sentence s_i of B a truth-condition p_i such that s_i is true if and only if p_i. Once this truth-condition p_i is obtained we 'understand' s_i, we know what it 'says' about the individuals of the domain in question, what its 'meaning' is".[1]

A sentence is used correctly only if it is true of, or truly describes, the situation (state of affairs) to which it is applied. The meaning of a sentence is the set of situations of which the sentence is true. Hence, to know its meaning is to know those situations which it correctly (truly) describes.

A slightly different rationale for the same move is presented by Hintikka. He feels that the

> "whole concept of meaning (as distinguished from reference) is very unclear and usually hard to fathom. However it is understood, it seems to me in any case hopeless to try to divorce the idea of meaning of a sentence from the idea of the information that the sentence can convey to a hearer or reader, should someone truthfully address it to him. Now what is this information? Clearly it is just the information that the sentence is true, the world is such as to meet the truth-conditions of the sentence".[2]

Putting aside doubts about a workable theory of information for sentences the ideas elaborated here are quite close to Carnap's.[3] The meaning of a sentence is what it tells us about the world. Theory of meaning reduces to consideration of truth and reference.

Theory of truth

We know how a sentence "depends upon" a word when we know how the word

affects the truth value of that sentence. If we can produce a theory which shows how each word of a sentence influences its truth value the theory has given a semantic analysis for the sentence.

Showing how the truth value of a sentence depends upon the words which compose it is equivalent to stipulating the truth-conditions for it. These conditions make explicit when the sentence will be true and false. That is, they tell us the situations in which the sentence can be used correctly. But, as argued above, knowing how to use a sentence of our language correctly is indistinguishable from knowing its meaning.

If our theory also shows how a word affects the truth value of every context in which it can occur we have, by the same reasoning, a plausible analysis of the meaning of the word. Ultimately we want a theory which exhibits how <u>every</u> word of our language affects the truth value of every sentence in which it can occur. The semantic theory will thus give the meaning of every word and sentence in our language.

The procedure here is to reduce the problem of meaning to that of truth.[4] In view of Tarski's work such a reduction makes meaning more tractable. We want a semantic theory which will pair each sentence with its meaning. Specifically, the theory must entail a statement of the form

(7-3) 's' means that p

for each sentence 's' of our language. 'p' is a sentence which gives the meaning of 's'.

The above remarks suggest that we replace 'p' with the set of necessary and sufficient conditions for the truth of 's'. Instead of (7-3) our semantic theory need entail only equivalences of the form

(7-4) 's' is true if and only if p,

where 'p' is now a sentence giving the truth-conditions for 's'.[5]

It is obvious that the necessary and sufficient conditions for e.g. 'The book is red' to be true is that the book, in fact, be red. We therefore demand as a condition of adequacy that our semantic theory entail all equivalences of the form (7-4) where 's' is a name or structural description of p.

Tarski has argued that a recursive definition of the truth predicate can satisfy these conditions in a formal language.[6] The dependence of complex sentences upon their sentential components is made explicit by recursively defining the semantic properties of the logical connectives and quantifiers. The relation of component parts of a sentence (the words in it) to the sentence is exhibited through partial truth definitions of the form (7-4). Taking 'satisfaction' as a primitive of our theory we state that

(7-5) For any object a, a satisfies the sentential function 'Fx' if and only if Fa.

(This scheme can be extended to the general case where the given sentential function contains an arbitrary number of free variables.[7]) Truth is then easily defined in terms of the notion of satisfaction.[8] The definition therefore makes explicit the effect of linguistic terms upon the sentential contexts in which they occur. If a term refers to an object which satisfies a sentential function the sentence formed by replacing the free variable with the term is true. On our analysis, Tarski's theory of truth thus satisfies the criteria of adequacy for a semantic theory (i.e. a theory of meaning) outlined above.

Consequences

We should note that if these suggestions are correct Quine's distinction between a "theory of reference" and a "theory of meaning" is illusory.[9] Tarski's "semantic concept of truth" (which Quine considers a paradigm theory of reference) is alone sufficient to stipulate meanings for each term and sentence of the discourse to which it is applied.

The importance of the regimentation procedure discussed in Chapter IV should be mentioned in the present context. As formulated Tarski's definition of truth applies to formal languages. He himself points out that there is little hope of extending it directly to natural language.[10] If we can regiment sentences in terms of predicate calculus, however, we can use Tarski's proposal. Logical paraphrase allows us to apply both our semantic analysis and our ontological criterion. This is of course not coincidental. Both depend upon the perspicuous representation of a sentence's underlying logical structure or form.

Quine's problem is to explain how a predicate can "have meaning" if it does not refer. If predicate letters are merely "schemata" with no extra-linguistic correlate how can they tell us anything? What does it mean for a non-referring term to be significant in a "referential" semantic theory?

Predicates, as all other terms, function only within a linguistic system. It is in terms of this system that we must look for their meaning. The logical and empirical connections which relate a sentence to others of the discourse assign it a place within that system. If someone asserts

(7-5) The moon is round.

we have been told many things. We may infer that the moon is not square, its

shape can be described by a simple mathematical equation, it is either round or elliptical, it is not 'not round', the moon has been illuminated by light (otherwise it could not have been seen), the satellite is in a certain position with respect to the earth, etc. The relationship between the original assertion and these consequences carry the full semantic burden. We need have no recourse to the property of "roundness" to explain why (7-5) says more that 'The moon exists'. These ideas are made precise in the approach to semantics I have just outlined.

This analysis does not show that Quine's criterion of commitment is necessary. The possibility of becoming committed to entities through devices other than quantified variables has not been ruled out. But I think Donagan is wrong in presenting this as a condition of adequacy for Quine's proposal. The demand rests on confusion of ontology with ontological commitment. Quine is concerned with the latter when he suggests that the bound variables be used to delineate things recognized by a theory. As we noted in Chapter III this proposal itself does not discriminate against any entity. We can recognize e.g. attributes by referring to them via a bound individual variable. Quine's criterion provides a means of making perspicuous the ontology of a discourse.

If someone wishes to be obscure about his ontology that right cannot be denied him. If attributes do exist, and predicates are names for them, the very form of the predicate calculus will carry an ontological burden.[11] But the antecedent of this conditional has not yet been established. The above discussion shows that we cannot use an argument from semantics to establish its truth. We can make sense of predicate meaning without recourse

to universals. We need only realize that a theory of meaning can be supplanted with a theory of truth. The value of Quine's criterion is that it does not necessitate acceptance of a particular ontology as a precondition for its cogency.

I am well aware that my analysis leaves important questions unanswered. A crucial one deals with the semantic theory which I used to justify Quine's proposal. I have not explained how a predicate acquires the place it has in the linguistic system. This is another way of asking what it means for a predicate to be 'true of' or 'satisfied by' an individual. By adopting truth (or satisfaction) as our semantic primitive our theory sidesteps these questions. But it affords no less of an answer, I believe, than saying that "a predicate is true of an individual because it refers to a universal which is exemplified by the individual". A theory of truth provides an adequate semantic framework to explain how predicates can be significant without referring. Like logical connectives they function within a system and derive meaning from it. Questions about the nature and genesis of that system itself may be another matter entirely. In any case I shall not pursue them here.

A host of traditional problems with nominalist ontologies has also been ignored. I justify this lacuna by my primary concern with ontic commitment as opposed to ontology. Questions of existence must be dealt with at some point. But a precondition for this examination is that we know when an entity has been claimed to be an existent. It is this more modest goal I have sought to clarify here.

CHAPTER VIII

BERGMANN'S OBJECTION

In conclusion I shall consider a criticism which Bergmann has urged against Quine's criterion of ontological commitment.[1] It will serve to emphasize the importance of considering our background semantic theory in determining ontological commitment. He argues that our choice of primitives affects the possible situations which can be expressed in a language. From this Bergmann concludes that the predicates cannot be ontologically neutral.

We assume that a "world" is describable within first-order predicate calculus supplemented by both predicate and individual constants. Possibility in a world is introduced as the class of all synthetic statements that can be formed by means of the undefined descriptive constants. Thus, predicates can be used to define possibility.

Now consider the following statements:

$$\begin{array}{l}(8\text{-}1)\ F_1 \cdot F_2 = \Phi \\ (8\text{-}2)\ F_1 = G_1 \\ (8\text{-}3)\ G_2 = F_1 \vee F_2\end{array}$$

"It is clear that in this case every class definable in terms of F's is also definable in terms of G's and conversely. Yet the two 'worlds' determined by choosing once the F's and once the G's as primitive predicates do not contain the same possibilities".[2] In the F-world the statement $F_1 \cdot F_2 \neq \Phi$ is, according to Bergmann, a synthetic statement and expresses a possible state of affairs. It is easy to see that the same state of affairs is expressible

in the G-world as $G_1 \cdot (G_2.-G_1) \neq \Phi$. But this is a contradiction and therefore it does not describe a possibility in the G-world.

If two worlds differ in their possibilities they must be two worlds and not one. Bergmann thus concludes that "the undefined descriptive predicates of an ideal language are ontologically significant in a sense in which this could not be the case if they were 'replaceable' by others... as the illustration indicates, so to 'replace' the undefined descriptive predicates of an ideal language means to propose the ideal language of what is, if possibility is taken into account, a different world".[3]

In his reply to the criticism Quine[4] draws a distinction between the ontology and ideology of a theory. While the former concerns the entities of a theory the latter concerns the ideas expressable in it. Bergmann's example shows only that a "possible idea" in one world need not be possible in another. Changing primitive predicates therefore affects a theory's ideology not its ontology.

The ontology-ideology dichotomy is paralleled in the semantic distinction between a theory of reference and a theory of meaning. Variable value is a matter of the entities to which the variables refer. Ontology is thus handled by the referential part of semantics. Ideology is part of the theory of meaning in that this component of our theory explicates the notions of possibility, analyticity, etc.[5]

As I mentioned above the theory of reference which Quine presents (including a Tarskian definition of truth) is sufficient for handling the problem of meaning. Drawing a line between reference and meaning is therefore misleading. The two components are interdependent. It makes no sense

to talk of either in isolation. This was the point of the system dependency talk in the preceding chapters. While some aspects of the system are almost totally dependent upon it for meaning others have a more direct connection with the ontology.

Quine's reply to Bergmann amounts to this. The same ontology can be accounted for in different ways. By suitably adjusting the systematic interconnections of our linguistic framework we can produce different sets of ideas all compatible with a particular ontology. This is merely a metaphysical analog of a scientific truism that we noted in another connection; the data underdetermines a theory.

Quine leaves all "systematic interconnection" talk at the metaphorical level. It can be made precise through a referential semantics as outlined above. The importance of this approach is that it relates "the known truth-conditions of each sentence to those aspects ('words') of the sentence that recur in other sentences".[6] But this is just what is meant by system dependency.[7]

Our theory makes the meaning of the sentential components derivative from the meaning of whole sentences. In order to provide an adequate semantic analysis of any component a semantic theory must therefore consider <u>all</u> the sentential contexts in which the word can occur. The same is true of each sentential component in the language. But this means we must consider the whole language in analyzing the meaning of individual terms.[8] To use Quine's terminology, language is the ultimate parameter of semantic analysis. Bergmann fails to realize this. He therefore feels there is a semantic justification for the multiplication of entities in his ontology.

NOTES

Chapter I: Introduction

[1]R. Carnap, Logical Syntax of Language (London: Routledge and Keegan, Paul, 1937), p.259.

Chapter II: Carnap's Approach

[1]W.V.O. Quine, Word and Object (Massachusetts: MIT Press, 1960), p.3.

[2]W.V.O. Quine, From a Logical Point of View (N.Y.: Harper, 1953), p.79.

[3]Ibid., p.78.

[4]R. Carnap, "Empiricism, Semantics, and Ontology", reprinted in Meaning and Necessity (Chicago: University of Chicago Press, 1956).

[5]Carnap, Meaning and Necessity, p.206.

[6]Carnap, Logical Syntax, pp.290-296.

[7]Carnap's use of "syntactical" in the context of 'syntactical genus' is incorrect. 'Thing', for example, delineates a genus because of its meaning; not its form. For a similar confusion of semantics and syntax see N. Chomsky, Aspects of the Theory of Syntax (Massachusetts: MIT Press, 1965). He considers e.g. 'human' a selectional restriction to be included in the syntactic component of the grammar.

[8]W.V.O. Quine, "Existence and Quantification", Ontological Relativity and Other Essays (N.Y.: Columbia U. Press, 1969), p.97.

[9]Quine, Logical Point of View, p.18.

[10]Ibid., p.44.

Chapter III: Quine's Criterion

[1]W.V.O. Quine, Methods of Logic (N.Y.: Holt, Rinehardt, and Winston, 1964), p.224.

[2]Professor Marcus, for example, uses value to mean a name substitutable for the quantified variable.

[3]Quine, "Existence and Quantification", p.95.

[4]Quine, Logical Point of View, p.103.

[5]G. Bergmann, "A Note on Ontology", Phil. Studies, 1(1950), p.91.

[6]Quine, "Ontology and Ideology", Phil. Studies, 2(1951), p.12.

[7]It should be noted that the extension of quantification theory to include predicate variables is a serious matter. In construing predicates as bindable we do far more than admit a realm of universals mirroring predicates (Quine, Logical Point of View, p.121). The realm of classes thus admitted far outruns the conditions which can be formulated in language. The set of these linguistic descriptions is denumerably infinite. But Cantor's proof that the cardinality of a set is always strictly less than the cardinality of its power set can be carried out within the extension of quantification theory under consideration. The cardinality of the power set of linguistically describable classes will therefore be greater than the number of linguistic forms themselves. This means that there will be classes which have no linguistic correlate.

Chapter IV: Regimentation

[1]This idea is fairly explicit in all of Quine's writing. See in particular Quine, Logical Point of View, p.102.

[2]An analysis of the meaning of the quantifier and its ordinary language equivalents involves general problems about the relation between language, conceptualization, science, and reality. Using the quantifier does not provide an explication of existence; nor does the ordinary use of "there is a such-and-such". This analysis is not our present goal. We are just claiming that the quantifier is an adequate vehicle for establishing ontological commitment of a discourse.

[3]D. Davidson, "The Logical Form of Action Sentences", The Logic of Action and Decision ed. N. Rescher (Pittsburgh: U. of Pittsburgh Press, 1966), p.115.

[4]Quine, Word and Object, chapter II. See also his article "Ontological Relativity", Ontological Relativity, p.26.

[5]For more on this see C. Hempel, Philosophy of Natural Science (N.J.: Prentice-Hall, 1966), chapters III and IV.

[6]Quine, Word and Object, pp.73-74.

[7]Quine, "Ontological Relativity", Ontological Relativity.

[8]For details on this approach see N. Goodman, Structure of Appearance (N.Y.: Bobbs-Merrill, 1966), chapter III; and J. Kemeny, "Two Measures of Simplicity", Journal of Phil., 52(1955), pp.722-733.

[9]Quine, Word and Object, p.160.

[10]Ibid., p.63.

[11]Ibid., p.62.

[12]W.V.O. Quine, "Reference and Modality", Reference and Modality, ed. L. Linsky (London: Oxford U. Press, 1971), p.101.

[13]The problem of contrary to fact conditionals has been discussed extensively. See, for example, N. Goodman, Fact, Fiction, and Forecast (Massachusetts: Harvard U. Press, 1955), chapter I.

[14]J. Katz and J. Fodor, The Structure of Language (N.J.: Prentice-Hall, 1964), p.485.

[15]G. Lakoff, "Presuppositions and Relative Grammaticality", Studies in Philosophical Linguistics, 1(1969), p.105.

[16]C. Morris, Theory of Signs (Chicago: U. of Chicago Press, 1938).

[17]P.F. Strawson, "On Referring", in Classics of Analytic Philosophy, ed. R. Ammerman (N.Y.: McGraw Hill, 1965), p.315.

[18]B. Russell, "Mr. Strawson on Referring", Classics of Analytic Philosophy, p.335.

[19]This problem can also be eliminated if we choose a three-valued logic as our canonical language. Several linguists have opted for this move. See, for example, E. Keenan, "Two Kinds of Presupposition in Natural Language", Studies in Linguistic Semantics (N.Y.: Holt, Rinehardt, and Winston, 1970).

[20]Davidson, "Logical Form of Action Sentences", p.115.

[21]Quine, "Reference and Modality", p.102.

[22]This example was suggested by Prof. H. Beatty, McGill University.

[23]Davidson, "Logical Form of Action Sentences".

[24]D. Davidson, "Theories of Meaning and Learnable Languages", Logic, Methodology, and Philosophy of Science, ed. J. Hintakka (Amsterdam: North-Holland, 1965), pp.390-91.

[25]A. Kenny, Action, Emotion, and Will (London: Routledge and Kegan Paul, 1963), chapters VII, VIII.

[26]Davidson, "Logical Form of Action Sentences", p.92.

[27]E. Lemmon, "Comments on Davidson's Logical Form of Action Sentences", Logic of Action and Decision, p.96.

[28]J. Aronson, "The Grammar of Cause", Synthese, 22(1971), p.44.

[29]J. Austin, Sense and Sensibilia (London: Oxford U. Press, 1962), p.71.

[30]Aronson, "Grammar of Cause", p.417.

[31]Sentence (4-28) of course "says more" than sentence (4-32). In particular it tells us how the book came to be on the floor. We can make this explicit by noting that (4-32) is semantically entailed by sentence (4-28). There are problems in applying the notion of entailment to natural language. The important point, however, is that the sentences are not claimed to have the "same meaning".

[32]If we accept Lemmon's suggestion that events be identified with space-time stretches (fn. IV.27) it will be difficult to separate them from states of affairs. In any case we must specify criteria of individuation for both events and "situations" if we are to know what the values of our variables are.

[33]Presupposition preservation is also a candidate for a necessary condition of paraphrase. I shall not discuss this possibility here.

[34]This of course does not mean that the sentences are analytically equivalent in e.g. Carnap's sense (Meaning and Necessity).

[35]N. Goodman, Structure of Appearance (N.Y.: Bobbs-Merrill, 1966) p.45.

[36]For a good summary of the traditional objections to extensional languages see Carnap's Meaning and Necessity, or A. Church, "The Need for Abstract Entities in Semantic Analysis", Contemporary Readings in Logical Theory, eds. I. Copi, J. Gould (N.Y.: Macmillan, 1967), Church formalizes a logic of intensions in his "A Formulation of the Logic of Sense and Denotation", Structure, Method, and Meaning, ed. P. Henle (N.Y.: Liberal Arts Press, 1951).

Chapter V: Names

[1]A. Donagan, "Encyclopedia of Philosophy", Phil. Rev., 78(1970), chapter IV, p.107.

[2]G. Harman, "Quine on Meaning and Existence, II", Rev. of Metaphysics, XXI(1967-1968), p.346.

[3]Wittgenstein, Russel, Bergmann, Allaire, etc. have all held some form of logically proper name as the bearer of ontological commitment.

[4]Quine, "Existence and Quantification", p.94.

[5]J. Hintakka, "Existential Presuppositions and Their Elimination", Models for Modalities (Dordrecht: Reidel, 1969).

[6]J. Kaminsky, Language and Ontology (Illinois: S. Ill. U. Press, 1969), p.15. Also personal correspondence.

[7]Lejewski and Marcus are examples.

[8]E. Lushei, The Logical Systems of Lesniewski (Amsterdam: North-Holland, 1962), p.115.

[9]It is a criticism of a statement Quine makes in his reply to R. Marcus ("Reply to Professor Marcus", Contemporary Readings, p.298), but not of his criterion of commitment.

[10]R. Marcus, "Modalities and Intensional Languages", Contemporary Readings, p.278.

[11]See note III.2.

[12]Quine, "Existence and Quantification", p.95.

[13]Quine, "Ontological Relativity", p.107.

[14]Quine, "Reply to Professor Marcus", Contemporary Readings, p.298.

[15]Quine, Methods of Logic, pp.223-224.

Chapter VI: Predicate Schemata

[1]Harman, "Quine on Meaning and Existence", p.346.

[2]G. Bergmann, Logic and Reality (Madison: U. of Wisconsin Press, 1964), p.86.

[3]Bergmann disputes this claim. See reference in preceeding note.

[4]Quine, Word and Object, pp.103, 126, 132; Also Quine's Philosophy of Logic (N.J.: Prentice-Hall, 1970)

[5]I use 'term' in the Quinian sense throughout this essay. It applies to linguistic forms only. Strawson uses it to designate non-linguistic entities. See P.F. Strawson, Individuals (N.Y.: Anchor, 1963), part II.

[6]Quine, "Two Dogmas of Empiricism", Logical Point of View, p.42.

[7]Strawson, Individuals, part II.

[8]Donagan, "Encyclopedia", p.107.

Chapter VII: A Theory of Meaning

[1]R. Carnap, Introduction to Symbolic Logic (N.Y.: Dover, 1958), p.101.

[2]Hintikka, Models for Modalities, p.88.

[3]J. Hintikka, "Varieties of Information" Logic, Methodology, and Philosophy of Science, (Amsterdam: North-Holland, 1968).

[4]D. Davidson, "Truth and Meaning", Synthese, 18(1967), p.304.

[5]Ibid., p.307.

[6]A. Tarski, "The Concept of Truth in Formalized Language", Logic, Semantics, and Metamathematics (London: Oxford U. Press, 1956).

[7]Ibid., p.195.

[8]Ibid.

[9]Quine, "Notes on the Theory of Reference", Logical Point of View.

[10]Tarski, "Concept of Truth", p.165. But see also Davidson, "Truth and Meaning", pp.313-315.

[11]Kaminsky, Language and Ontology, chapter I.

Chapter VIII: Bergmann's Objection

[1]Bergmann, "A Note on Ontology".

[2]Ibid., p.90.

[3]Ibid., p.91.

[4]Quine, "Ontology and Ideology".

[5]Quine, Logical Point of View, pp.130-139.

[6]Davidson, "Truth and Meaning", p.311.

[7]Quine's metaphor of language as a "grid" or "field" are also made precise in this way (see Quine, "Two Dogmas", Logical Point of View).

[8]For an argument against Quine's "holism" see A. Hofstadter, "The Myth of the Whole: A Consideration of Quine's View of Knowledge", Journal of Phil., 51(1954), p.307.

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