REFERENCE AND EMPTY REFERENCE

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Alle Irrtümer haben ihren Wert.
Jedoch nur hie und da,
Nicht jeder der nach Indien fährt
Entdeckt Amerika.

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ABSTRACT

The stage setting for the thesis is the intimate connection between the problem of reference and that of intensionality. The thesis is a survey of attempts to arrive at an account of truth and meaning for languages containing empty singular terms.

We begin with a general account of intensional predicates. We give reasons to doubt that intensional verbs can take direct objects, and adopt Quine's strategy for intensional predicates like "seek", "worship", "refer". We discover certain complexities in verbs like "love", "hate".

When we examine the standard formal semantics we discover that to accommodate empty reference, we have to modify that approach. There are several ways to take in empty names. They fall broadly into two categories: theories without truth value gaps and theories with them. None of the theories which we examine is without difficulty. To dispose of empty reference would mean losing an important part of our discourse about the universe. We attempt to give an account based on the Kripkean theory of truth. This allows truth value gaps but retains the equivalence $T\ulcorner p\urcorner \equiv p$. Our proposal is not successful. This leaves no choice but to return to the standard formal semantical framework without gaps and to a theory of Tyler Burge. This is unfortunately incomplete. It may not be completable. Many semantically significant occurrences of empty names can be got into opaque contexts. For these we give an account which is inspired by Frege's account of "als ob" in "Ausführungen über Sinn und Bedeutung" in the Nachgelassene Schriften and by Davidson's analysis of oratio obliqua.

Existential statements we put on one side as a special problem. Residual occurrences of empty names in transparent contexts are explained metalinguistically.

CONTENTS

INTRODUCTION

Philosophers have worried about the nature of objects of desire. Intensional predicates such as "search", "want", "worship", pose prima-facie a problem. They disturb our natural expectation that a sentence which has the grammatical form of subject, relation and object is true if and only if the entity named by the subject term stands in a certain relation to the entity named by the object term. This expectation is there before we embark on any theory of reference or theory of truth. And we are guided by this expectation in our formulation of a theory of reference and a theory of truth. The demand that this expectation be met gives an intuitive support for an extensional system - a system in which the truths of sentences are explained in terms of the extensions of components. Given that the extensional system is the natural system, what we seem to need to do with intensional sentences is to find a rationale for treating them as involving some non-standard functioning of predicates, terms, etc. This is of course to follow the general direction of Frege's "On Sense and Reference".

Intensional predicates have an important role: many of our activities have an intensional character, and in order to understand a language which describes such activities in terms of intensional predicates, we need to understand the logical form of such sentences as "x seeks y", "x worships y", "x wants y" etc. We require from an adequate overall account of the workings of language that the account describe and explain the semantical workings of intensional predicates and of their real or apparent objects.

The importance of empty reference can be explained in the following way. We use and have to use vacuous names whether known or unknown to us, which have no reference and predicates which nothing satisfies. But if all this is so then a semantical theory must recognize the need to interpret empty names and predicates and to evaluate the sentences containing them. Even if we were ourselves omniscient we should still need to describe the beliefs of those less fortunate.

We cannot readily conceive of a state of affairs in which our knowledge protects us from uttering sentences which (on one theory at least) have no truth value or in which we no longer need to frame scientific hypothesis relating to suppositional entities which may turn out not to exist. The sort of ignorance just described may issue in outright mistake. There also appears to be the case where knowing that we are ignorant we wish to make a hypothetical ascription to a thing, say Vulcan, conditionally upon its existing. We may hope that any semantical theory which is adequate to the first sort of situation may be adequate to the second as well. Both of these are utterly different from fiction; but again a theory which solves the two problems already mentioned may yield as a byproduct a solution to the traditional problem of fictional names.

What seems to be clear about sentences containing empty names such as "Vulcan" is that they are not meaningless. Scientists once believed such sentences, eg. "Vulcan disturbs the perihelion of Mercury" and we can understand their belief. They may have been wrong but it was not in the ordinary sense nonsense that they believed. It appears at first sight to follow that there should be no problem about stating the meaning of such sentences.

If we take Frege's explanation, then the sense of a sentence is the thought that those conditions are satisfied which must be satisfied for the sentences to be true. If sentences with empty names say something, then it seems we must be able to state what would have to be the case for them to be true. To identify the sense of a sentence with its truth conditions is in effect to accept Davidson's programme that giving the theory of meaning for a language is giving the theory of truth for that language. Since we can state the truth conditions of sentences independently of their truth values, it appears at first sight that we should be able to give a theory of truth which will embrace any scientific theory regardless of whether it is true or false and, one is tempted to add, regardless even of its being, as things actually are, neither true nor false - provided only that it says something. It appears then that the theory of truth cannot be limited to actual objects. Whether a scientific theory such as the theory about Vulcan is true looks as if it ought to be a matter of empirical investigation. The matter of its semantics ought, it seems, to be independent of that. If we can investigate the truth of such a theory then there must already be something it means. Or so it seems.

The thesis is an attempt to arrive at an account of meaning and truth for a natural language containing serious non-denoting names. It takes seriously and exploits the intensionality of the notion of reference by extending to "refer" a treatment which Quine originally introduced for such predicates as "seek". The thesis attempts to show that there is an intimate connection between the problem of intensionality and that of reference.

The problems of empty singular terms and of intensionality are connected in this way: in intensional contexts empty singular terms clearly have some semantic role. Using empty terms in intensional and apparently intensional contexts we can make true assertions. Regarding sentences such as "The Greeks worshipped Zeus" there is a general agreement about their truth values. But as for sentences containing empty terms in extensional contexts, e.g. "Vulcan is a planet", our intuitions are not very clear.

The thesis can be divided into three parts. In the first place we shall begin with some general considerations about intensional predicates and their objects. The criteria of extensionality are given as the usual principles of intersubstitivity and the law of existential generalization. We try to show that intensional sentences do not (in a phrase of Davidson) wear the logical form on their sleeves: the grammatical objects are not the logical objects. Intensional predicates do not take direct objects but take propositional objects. We illustrate the problem with some examples. We discuss three unsatisfactory answers to what "El Dorado" refers to in "Aguirre sought El Dorado". (1) "El Dorado" refers to El Dorado. (2) "El Dorado" refers to the concept of El Dorado. (3) "El Dorado" refers to a possible object.

We expound Quine's strategy for intensional predicates and apply it to the problematic sentences. Several objections to Quine's strategy can be answered reasonably well.

Then we apply Quine's strategy to some other predicates: "worship" and "love" to fortify our confidence before applying it to the main project.

We next attempt to give an account of an intensional notion of reference, following the Quinean pattern in part I. There are at least two different notions of reference: speech-act reference and semantic reference. We adopt Quine's proposal for both notions of reference. "Refer" is seen as an intensional predicate to be paraphrased as "purport to mention", where "mention" is purely extensional.

We conclude that postulating an intensional notion of reference does not lead directly to any evaluation procedure for sentences containing empty names in extensional contexts.

We then discuss various proposals for evaluating sentences containing empty names in extensional positions. The orthodox approach of Tarski - Davidson does not accommodate such sentences.

We examine in detail the view that such sentences do express genuine thought. It might appear that such sentences lack a definite truth value since the orthodox approach has not given us their truth conditions. Dummett has pointed out that admitting truth value gaps conflicts with the schema True$\ulcorner p \urcorner \equiv p$. We can divide the non-orthodox proposals according to how this conflict is resulved. There are four possibilities: (0) Reject both truth value gaps and $T\ulcorner p \urcorner \equiv p$; (1) Reject truth value gaps and retain $T\ulcorner p \urcorner \equiv p$; (2) Reject $T\ulcorner p \urcorner \equiv p$ and retain truth value gaps; (3) Retain both gaps and $T\ulcorner p \urcorner \equiv p$. (There is a hybrid between (1) and (3): Smiley's system in "Sense without denotation". This rejects both $T\ulcorner p \urcorner \equiv p$ and truth value gaps for the metalanguage and retains truth value gaps for the object language. This view shall be examined in an appendix.

The possibility (0) requires no discussion since no such actual theory has been put forward.

In (1) there are three distinct accounts: (A) Frege's system in the <u>Grundgesetze</u> which requires Λ as the reference of all empty singular terms; (B) Scott's system in "Existence and Description in formal logic" which is a modification of Frege's system; (C) Grandy's system in "A definition of truth for theories with intensional definite description operators" which is a modification of Scott's system.

The possibility (2) is van Fraassen's supervaluations. We shall examine this account in the light of the possibility (3) which is Kripke's new theory of truth, which proposes to retain both $T\ulcorner p\urcorner \equiv p$ and truth value gaps.

We attempt to give a theory of truth for a language containing partial predicates and empty singular terms in the spirit of Kripke's proposal. This proposal proves to have a fatal flaw. We return once more to the only remaining theory without gaps, viz. Tyler Burge's theory. There are fundamental objections against Burge's account.

After that the time has come to assemble the general difficulties of empty reference, and to collect up the requirements we have arrived at in the course of the argument. We account for the failure of various theories to satisfy the requirements. We conclude with a reassessment of the standard semantics and propose a way of accommodating empty reference based on Frege's account of "als ob" and on Davidson's analysis of indirect discourse. This final proposal leaves unresolved some problems about empty names.

CHAPTER I

INTENSIONAL PREDICATES AND THEIR OBJECTS

Are there intensional predicates which take direct objects, i.e. are there any intensional predicates that stand for relations which hold between the objects which are designated by their terms?

The usually accepted criteria of extensionality for predicates are the principle of intersubstitutivity and the law of existential generalization:

(A) $(x)(y)(x=y \ \& \ Fx \rightarrow Fy)$.

(B) $Fa \vdash (\exists x)\ Fx$.

Predicates that fail to meet these criteria are commonly said to be intensional. So far as grammar is concerned, we can divide predicates which fail (A) and (B) into those which take individual direct objects of the normal kind, and those which do not. Examples of the first kind are:

Aguirre sought El Dorado.

The Greeks worshipped Zeus.

Examples of the second kind are:

Leverrier conjectured that Vulcan disturbs the perihelion of Mercury.

Galileo said that the Earth moves.

We shall be concerned here with the first sort, the sort which appears to take direct objects.

The question whether there are intensional predicates which take direct objects can also be put this way: are the grammatical objects of these predicates also logically speaking their objects? We shall take up some examples to illustrate the hypothesis that there are no intensional predicates which take direct objects. Then we shall give a general argument to support this view.

Take "seek" in

(1) Aguirre sought El Dorado.

"Seek" fails to meet both of the criteria of extensionality. Given El Dorado = the city paved in gold, we might say that Aguirre sought the city paved with gold[1]. Perhaps this is all right - after all, a city paved in gold would have served very well for a man with Aguirre's particular purpose. But this does not guarantee intersubstitution generally. Given, suppose, that El Dorado = the land of cannibals, then we cannot say that Aguirre sought the land of cannibals. Again, if an explorer seeks a certain place x and x is the place of his death, it may be wrong to say that he sought the place of his death. Existential generalization is problematic also because from "Aguirre sought El Dorado" we cannot conclude that there exists something which Aguirre sought.

How then is "El Dorado" to be interpreted in "Aguirre sought El Dorado"? There are at least three different answers that regard "seek" as having a direct object: (1) "El Dorado" refers to El Dorado. (2) "El Dorado" refers to the concept of El Dorado. (3) "El Dorado" refers to the possible object El Dorado.

View (1) seems unsatisfactory because El Dorado does not exist. It does not follow from Aguirre's search that there was something he sought. But (prima facie, at least) this would follow from the proposed analysis, as apparently would the intersubstitutability of identicals. Even the motivation for view (1) will disappear, however, if we follow Frege in refusing to be misled by grammar in giving a logical analysis. The grammatical object of the predicate "seek" is "El Dorado". El Dorado need be no more than the grammatical object, however.

View (2) is suggested by Frege's doctrine of indirect sense and reference [(2)]. In oblique contexts words refer to what is normally their sense.

Church's amendment[(3)] of Frege's doctrine seems just as hard to understand as Frege's doctrine. Church states that, according to a Fregean analysis, "Schliemann sought the site of Troy" expresses a relation between Schliemann and "the concept of the site of Troy". First, I should object that using the term "concept" which has a clear technical meaning in Frege's philosophy to explain the distinct Fregean notion of sense only adds confusion to obscurity. Second, in spite of Church's remark that his interpretation of Frege does not imply that Schliemann sought the concept of the site of Troy, it has not been made plain in this passage of Church's book how else we should understand the account Church offers. For this does suggest that "Schliemann sought the site of Troy" expresses a relation between Schliemann and the concept of the site of Troy. If the relation in question, seeking, is a genuine relation, it ought to relate its terms, which are here the seeker, Schliemann, and what is sought, the concept site of Troy. According to Church's account (in the sample sentence), seeking is a relation between Schliemann and the concept: what can this mean except that Schliemann and the concept stand in the relation of seeking as the seeker and what is sought?

There are further objections of Carnap[4] and Davidson[5] to the effect that the difficulty of explaining what indirect sense and reference are become more acute when we consider multiply intensional or oblique contexts. We shall not elaborate on these objections, for even if they could be met, what the obscurity or failure of Church's account indicates is that even for simply oblique contexts, Frege's doctrine will resist a coherent formulation if we admit intensional predicates with direct objects.

There is an important insight in Frege's doctrine to be rescued all the same. In oblique contexts the references of words have to be seen as not contributing in the usual way to the truth conditions of the main sentence. If we keep this insight, and leave on one side Church's particular appreciation of it, then we are to that extent less tempted to posit possibilie or other entities as references of terms in referentially opaque contexts.

View (3) can be presented as follows. If

(1) Aguirre sought El Dorado

is a fact, then

(1)' Aguirre sought something

must also be a fact. What Aguirre sought cannot be an actual object given that El Dorado does not exist. The only candidate for Aguirre's object of search is the possible object, El Dorado. The advantage of seeing El Dorado as a possible object over View (1) might be said to be that we can distinguish (1)' from

(1)'' There is something Aguirre sought

which is false.

The distinction between (1)' and (1)'' seems important. Perhaps an adequate account of "seek" should preserve this distinction and explain it.

That admitting possible objects to be objects of intensional predicates does not give us a satisfactory account of "search" however, becomes clear when we try to state the truth-conditions for (1) in terms of search for a possible object. We would have:

> (1) is true if Aquirre sought the possible object El Dorado.

First, it seems false to describe Aguirre as searching for a possible object. How does one look for a possible object, as opposed to an actual object? Second, if it makes sense to describe Aguirre as looking for a possible object El Dorado, we should be able to distinguish Aguirre's search for El Dorado from Columbus's search for India, which would be a search for an actual object, and from Phenias's search for the round square, which would be a search for an impossible object. We should then have to give different accounts for what seems to be the same phenomenon - subjectively at least. And it is to the subjectivity of the experience that we are trying to be sensitive. Aguirre thought that El Dorado was an actual object. Otherwise he would not have started out at all.

Some remarks about the general strategy of possible world semantics for propositional attitudes are called for. We shall mention Hintikka's approach briefly for it might seem to be an alternative to the approach we adopt. Hintikka holds, in general, that the presence of a propositional attitude means that possible worlds other than the actual one have to be considered[(6)]. Hintikka proposes to analyse "believe" as follows:

> a believes that p = in all possible worlds compatible with what a believes it is the case that p.

There are some difficulties with this proposal before we even look for extensions to such verbs as "search". Does it make sense to talk as there would be a reckoning of the totality of what a believes? What about the logical consequences of such beliefs? Even if these issues could be settled, there is a simple objection which a possible world semantics approach cannot answer: when the beliefs are intended as beliefs about the actual world, it cannot be correct to analyse them as beliefs about a possible world.

Apart from Quine's well-known objections about the criteria of identification for possible objects, the value of applying the apparatus of possible worlds to our problem is something which their champions have still to demonstrate. They have yet to show their analyses are "life like". If we can explain the phenomenon of intensionality without the apparatus, so much the better.

Having seen how some attempts at introducing intensional predicates with direct objects are not successful, we can try to give a general argument to show why there are not such predicates.

It would seem that for there to be intensional predicates which take direct objects the two criteria of extensionality would semetimes have to come apart. For a predicate to be intensional, it has to fail at least one of the criteria. But for the predicate to have a (logical) direct object it seems that at least (B) existential generalization has to be true. If someone seeks a, then he seeks something - this is something some of our opponents have insisted upon; even if, if a = b, he does not necessarily seek b. This is how things looks before we attribute more structure to "seek" than grammatically appears.

There is no obvious difficulty yet. On the surface it might seem that the two criteria are independent of one another. It might be thought that the failure of (A) intersubstitutivity does not imply nor is implied by (B) existential generalization(7). For the failure of (A) is not in itself a failure of existence of the objects referred to by singular terms. It is rather a question of the attitude - knowledge or belief or whatever - of the subject, the manner in which the object is identified depending on this attitude. The failure of (B) on the other hand is simply a failure of existence of the objects referred to.

What this argument extablishes is that reasons for the breakdown of (A) and (B) in referentially opaque contexts can be described apparently independently. But the unsurprising fact that the reasons for their failure can be stated separately - after all they are two different criteria - does not prove that we really do have straight forward cases where one is satisfied without the other.

We could argue for the inseparability of (A) and (B) as follows. Starting with (A), we understand it as saying that for all values of "x" and "y", if they are identical, whatever is true of one, is true of the other. (A) implies that if there are objects which are F's, then they are F's no matter how they are referred to, no matter what name is used. But surely we cannot have some object being F without some particular object being F. Thus the only conceivable interpretive apparatus for (A) and the application of (A) already seems to bring in principles which justify (B). Any instance of (A) involves definite objects. Suppose $(a=b \; \& \; Fa \rightarrow Fb)$, then surely a has to be a definite object. But "Fa" cannot be true unless there exists something which had to be F for it to be true that Fa. "Fa" could not be true if its truth grounds were indeterminate and its truth grounds could not be determinate if it was not determinate or determinable <u>which</u> thing a was. But how is that possible without a existing?

Let us look at the matter the other way round. Starting with (B), we can say that, if it is true that an object is F, then it certainly is true that there is something, namely this object, which is F. And if a is F, it is F no matter how it is referred to. Now suppose that it were held that there was an object b such that a = b and such that b was not F. Then the object which "a" and "b" denoted would have to both have and lack the property F.

It is not that (A) entails (B), or that (B) entails (A). In classical logic, of course, they do, but it is begging the question to argue from that. It is rather that it is hard to see how to interpret the symbolisms involved by either (A) or (B) without being forced to find both plausible.

It would take something more than this to prove that there cannot be any intensional predicates which take direct objects. At best, it has been suggested why the attempts to introduce them have not been successful. Given the plausibility and connexion of the two criteria of extensionality, it will not be easy to give a coherent account of such predicates.

CHAPTER II

QUINE'S STRATEGY FOR INTENSIONAL PREDICATES

At this point what we naturally look for is another way of seeing these phenomena of intensionality. An obvious candidate is Quine's strategy[8]. This treats intensional predicates as having propositional objects. This amounts to assimilating the intensional predicates with direct object constructions to those with "...that..." constructions.

Quine analyses intensional predicates as having two different senses, "relational" and "notional", corresponding to the wide and the narrow scope of the existential quantifier. Taking one of Quine's examples

(2) Ernest is hunting lions

the relational reading is

(2)' $(\exists x)$ (x is a lion & Ernest strives that Ernest finds x)

and the notional reading is

(2)'' Ernest strives that $(\exists x)$ (x is a lion & Ernest finds x).

Quine states that the advantage of paraphrasing intensional predicates in the above manner to uncover propositional attitudes and extensional predicates is that we can express the contrast between (2)' and (2)" and arrive at a general theory for intensional predicates apparently governing direct accusatives[9]. We can paraphrase other intensional predicates in terms of "strive that" or "wish that". Quine interprets (2)' as saying that Ernest is hunting a particular lion, "a stray circus property, for example", and (2)" as saying that Ernest is hunting just any lion. (2)" is taken to be the correct rendering of (2). (2)' is seen as involving an improper quantification into a propositional attitude idiom from outside. Quine claims that quantification into a referentially opaque context is a dubious business. Quine's examples are meant to show that quantifying into an opaque context results in either nonsense or outright falsehood. Take "Giorgione was so-called because of his size". Existential generalization would lead to "(∃x) (x was so-called because of his size)" which is clearly meaningless[10]. Another example which is closer to our concern is

Ctesias is hunting unicorns.

We cannot allow

(∃x) (x is a unicorn & Ctesias is hunting x)

since unicorns do not exist. Apart from Quine's reasons for disallowing quantification into opaque contexts in general, just the fact that we seek, hunt, and want what is non-existent should be enough to make us suspicious of applying existential generalization from outside to singular terms inside propositional attitude contexts.

There are several objections to Quine's strategy which we must meet before we can use it. And there is one which we should dispose of immediately.

It might be thought that the reading of (1) Aguirre sought El Dorado, Quine would prefer

(1)'' Aguirre strove that (∃x) (x is El Dorado &
Aguirre finds x)

implies that Aguirre strove to bring about the existence or create El Dorado. For it appears that (1)'' can be unpacked into

(1)''' Aguirre strove that (∃x) (x is El Dorado &
(∃x) (Aguirre finds x)[11]

which might be said to be equivalent to

(1)'''' Aguirre strove that ($\exists$x) (x is El Dorado &

Aguirre strove that ($\exists$x) (Aguirre finds x).

The first conjunct of (1)'''' appears to say that Aguirre strove to bring about the existence of El Dorado. There is one quick way with this objection. The objection depends on a principle of inference relating to opaque contexts which we should not accept. In opaque contexts substitution of logically equivalent formulas does not necessarily preserve truth. We can say that the move from (1)'' to (1)''' is not allowed because in an opaque context we cannot admit the replacement of $(\exists x)(Fx \,\&\, Gx)$ by $(\exists x)\, Fx \,\&\, (\exists x)\, Gx$.

Another, and related way with the objection is to forbid the move from (1)''' to (1)''''. It might be said that striving to bring about p & q does not necessarily entail striving to bring about p separately.

We come now to the more serious objections. The second objection is that Quinean paraphrase is too linguistic. The activity of search, for instance, is analysed by Quine as an attitude towards some statement, as striving to make true a certain sentence about the seeker and the object which is sought. Quine allows that describing a mouse's fear of a cat as fearing true to certain English sentence is unnatural but "without therefore being wrong"(12). But it might be objected that it is wrong to describe Aguirre's search for El Dorado as his endeavour to make true some sentence. Searching for a city paved in gold in South America is not reducible to endeavouring to make true some sentence. It might even be said that the Quinean reading is not far enough removed from Church's account of Schliemann's looking for the concept of the site of Troy(13). It may be said that we cannot press all intensional predicates into the mold of indirect speech, simply because searching for something is far too unlike saying something. This objection would also apply to the generalization of other intensional predicates of Davidson's theory of oratio obliqua.(14).

We can attempt to answer this objection by minimizing the linguistic factor. We can say that Quine's paraphrase does not reduce the activity of searching for El Dorado to an attitude to a sentence. The point is that one cannot search for El Dorado without endeavouring to bring about a certain state of affairs, a state of affairs which can be described with the English words "I find El Dorado". But it need not be described with that sentence, though if we want to say what state of affairs we shall have to say it somehow. Just as if we want to call an animal by a species name we shall have to use some expression. This does not show that species are linguistic.

Quine's kind of paraphrase is justified then just to the extent that whenever we search for something we also strive to bring something about and that something is something which may be expressed by the subordinate clause of Quine's analysis. Of course, this does not give the complete account of what the activity of searching, or trying to bring about that one finds something, amounts to, even if that were possible. That was not the claim we made for Quine's strategy: the claim is that we get closer to the logical form of the sentence

(1) Aguirre sought El Dorado

and that we can clarify its truth conditions without resolving every outstanding question about the analysis of all the other concepts involved.

The third objection is this: Quine's paraphrase applied to (1) produces a dilemma. Before any analysis of (1), it is clear that in seeking El Dorado Aguirre was not seeking just any old place. So the reading of (1) which Quine would prefer

(1)'' Aguirre strove that ($\exists$x) (x is El Dorado & Aguirre finds x)

gives us, it may be said, a false account of one natural understanding of (1). We are left with the wide scope reading which says that Aguirre sought a particular place

(1)' ($\exists$x) (x is El Dorado & Aguirre strove to find x)

(or, sidestepping the problem of quantifying in, we shall adopt Quine's suggestion and rephrase the wide scope reading as ($\exists$x) (x is El Dorado & Aguirre strove to make true of x, $\hat{z}$ (Aguirre finds z)). But this is definitely wrong, since El Dorado does not exist.

Quine's own examples were about searching for <u>a</u> unicorn, or <u>a</u> lion. When we apply Quine's analysis to sentences containing singular terms, the distinction between the wide and the narrow scope should not be stressed as the distinction between an indefinite and a particular, but as the distinction between existential import and no existential import. Our reply to the objection is that we should indeed take both (1)' and (1)'' to be about a particular place. For the proper name "El Dorado" <u>imports particularity</u> - or rather <u>for</u> Aguirre it does. We can keep, therefore, (1)'' as the correct rendering of (1).

The fourth objection follows up the third, however. It is that Quinean analysis fails to give us the correct reading of sentences such as

(4) Aguirre sought a city paved in gold.

(4) may well mean that Aguirre's search was directed at "any old" city paved with gold. But it may also mean - and usually does mean - that Aguirre's search was either directed to or directed <u>as if to</u>

(what he thought of as) a certain city paved with gold. In this instance, and for Aguirre, it was a particular - directed search, even if there was no such particular in fact. In that case the correct reading of (4) is that Aguirre sought a particular city. Quine shows no way to give this reading. The objector is quite right. Proceeding a la Quine, we have two readings but neither of them captures the sense just explained.

(4)' $(\exists x)$ (x is a city paved in gold & Aguirre strove to make true of x, $\hat{z}$ (Aguirre finds x))

(4)" Aguirre strove that $(\exists x)$ (x is a city paved in gold & Aguirre finds x)

We have the same difficulty here that seemed to arise with

(1) Aguirre sought El Dorado.

(4)' requires there to be a city paved in gold; and (4)" only represents the search for "any old" city paved in gold.

We shall discuss two possible solutions to this dilemma. Neither is without difficulty. First, we can refuse to take the desired reading of (4) very seriously, and dismiss the idea that there is such a reading as an illusion left by the name "El Dorado" which was essential to the explanation of the desired reading. But this is too defeatist and we then lose the means of expressing the distinction between searching for, wanting, and hunting a particular and searching for, wanting and hunting just any object. This is an important difference in the subjective experiences of people in these states - even when they are mistaken.

The second solution not only accepts that Quine's analysis does not yield the desired reading of (4) but also looks for a reading of (4) which will report Aguire as searching for a particular city without the utterer of (4) himself claiming that there exists any particular city which Aguirre sought. A first attempt at such a reading is

> (4)''' Aguirre strove that (∃ x) (x is <u>the</u> city paved in gold & Aguire finds x).

It might, for a moment, appear that by this "the" (4)''' captures the fact that Aguirre sought a particular city. (This may appear to hold regardless of what theory of descriptions we adopt.) However the difficulty with (4)''' is that the use of the definite description, "the city paved in gold" to paraphrase the original sentence which contained an indefinite description seems unjustified. (4)''' is a paraphrase of

> Aguirre sought the city paved in gold

and not of (4) read in the way that gives trouble. Perhaps Aguirre thought there was more than one such city, but aimed at El Dorado, and it is his search for El Dorado, in particular, that makes it true that he sought some particular city. The relational reading of (4), viz. (4)' said that Aguirre looked for a particular city. If we imbed (4)' in an intensional context to avoid the existential commitment (4)' implied, we have

> (4)'''' Aguirre behaved in accordance with the belief that
>
> (<u>or</u> for Aguirre it was as if)
>
> (∃ x) (x is a city paved in gold & Aguirre strives to make true of x, $\hat{z}$ (Aguirre finds z))

(4)'''' might seem slightly implausible as a paraphrase of the original sentence (4) which was much simpler. Normally philosophical paraphrases about logical form should not be permitted to exercise so much poetic license. It is difficult to see an orderly generalizable set of transformations by which (4) comes to be the surface structure of (4)''''. There is something ad hoc here. At the very end of the thesis, however, we shall see that there must always be something peculiar about contexts involving empty names. That explanation will help us here, when we look back from there to the present difficulty. It will if, as seems possible, the missing "particular" reading of (4) by which the objector has been struck depends on our prior understanding of such contexts as "Aguire sought (in particular) El Dorado", and on our being able to see (4), read the objector's way, as the generalization of that special sentence. (That it is a special sort, will only appear fully at the end.) For, for such contexts as (4), we normally get the particularity of seeking some particular city by exporting the quantifier. We are saying that perhaps the particularity we want for (4), understood in the troublesome way, is a kind of shadow of the particularity. We can normally get by exporting the quantifier - though we cannot actually do that here (on the normal reading of quantifiers). To allow that the desired reading of (4) is just possible is not necessarily to think that there is nothing special or irregular about what makes it possible. In the end we shall argue that empty names always require special treatment, and the reader can review then the question whether we have the right to use ad hoc means to explain by (4)'''' the possibility of the objector's reading of (4).

What is more worrying about (4)'''' than its ad hoc property, is the problem of sufficiency. The charge of insufficiency might be that (4)'''' does not capture the activity (4) describes, only the thought or belief. It might be said that the connection between Aguirre's thought and action suggested by (4)'''' is too tenuous for it to be a paraphrase of Aguirre's activity: given the mere thought or belief we ascribe to Aguirre, he need not have embarked on his adventure. If the objection is right and there is no necessary connection between (4)'''' and action, an amendment on this lines may be enough: Aguirre acted as if ($\exists$ x) (Aguirre sought x) and in as much as he acted so, it was for him as if ($\exists$ x) (x is a city paved in gold & Aguirre strives to make true of x, $\hat{z}$ (Aguirre finds z)).

We have already admitted that we have been forced here into the ad hoc, and promised a trial view of the whole subject which will help to justify the feeling that what we are struggling with is a special sort of case.

The fifth objection is that it is not certain whether Quine's strategy can be applied to intensional predicates in general. If Quine's strategy is to be of any value, it must give us an overall account of intensional predicates. Even if Quine's paraphases about the particular example were plausible, Quine's proposal of extending his analysis to other intensional predicates cannot be accepted straight off without further explanation for the following reasons. First, we have to admit that it is not clear that all intensional contexts contain hidden propositional attitudes and propositional objects. For instance, what are the corresponding propositional attitudes and propositional objects in

a knows b

a is acquainted with b

Dante loved Beatrice

The Greeks worshipped Zeus

Or are these less intensional than they look?

I admit that we have not shown that there cannot be any intensional predicates with irreducible direct objects. It may be said that to have shown that attempts at arriving at direct objects are defeated is only to have shown that the right account is not yet known. The only answer we can offer to this is to reply that Quine's strategy suggests how we can achieve something on Quine's pattern among intensional predicates generally, and without multiplying objects of desire, love and worship. Quine's pattern of analysis eliminates the need to posit extra objects. But this claim will only carry conviction if we first treat a few more of the apparently intensional predicates such as "love", "worship", which appear to take direct objects. And this we shall attempt to do in the next section.

The sixth objection is this: Quine's paraphrase involves an analysis of activities eg. hunting in terms of their aims, eg. finding. This is analogous to explaining games in terms of winning. Now, it is not clear that all activities are like games. When we cannot analyse an intensional predicate in terms striving or endeavouring towards a goal, the analysis will have to stray further from Quine's examples. Again the general issue can only be argued by reference to examples.

The quinean strategy was a reaction to the threat of incoherence. We have not proved that incoherence, only suggested it. But the suggestion the intensionalist has to answer is that if we cannot analyse an intensional predicate which apparently governs accusatives in terms of a propositional attitude and an extensional predicate (eg. in terms of an activity with an aim), then we cannot make much sense of that predicate.

CHAPTER III

INTERMEZZO : WORSHIP AND LOVE

A. WORSHIP

"Worship" is an obvious case to discuss, for it seems to be intensional. In true sentences, such as

(1) The Greeks worshipped Zeus

(2) The Egyptians worshipped Isis

"worship" fails both of the criteria of extensionality. Applying one of our variants on the Quinean strategy to (1) we have

(1)' The Greeks conducted themselves appropriately to the belief that $(\exists x)$ (x is Zeus & we hold x in fear & reverence)

where "hold in fear & reverence" is extensional. What is at issue is that Quinean notional reading can be given for sentences such as (1) and (2).

Can we give Quinean notional reading for sentences about "worship", in general? Consider Kripke's argument designed to show that we must give the relational reading for some sentences[15]. Kripke's example was

(3) Christians worship a loving god

Kripke applied Quine's analysis of "want" to "worship" to show that something was wrong with Quinean analysis of "worship". Kripke explains that

(4) I want a sloop

is given two readings by Quine:

(4)' $(\exists x)$ (x is a sloop. I wish of x that I have x)

(4)'' I wish that $(\exists x)$ (x is a sloop. I have x)

(4)' is taken as saying "There is a particular sloop I want" and (4)" as saying "I want any old sloop"; as Quine puts the matter, (4) merely expresses the desire for relief from "slooplessness". Kripke shows that if we apply this analysis to "worship" we run into a dilemma. Take

(3) The Christians worship a loving god

It would be given two readings in the Quinean analysis[16]

(3)' $(\exists x)$ (x is a loving god & Christians conduct themselves appropriately to the believing of x ($\hat{z}$.(we hold z in fear and reverence)))

(3)" Christians conduct themselves appropriately to the belief $(\exists x)$ (x is a loving god & we hold x in fear & reverence)

Now, according to Kripke, (3)' is interpreted as "There is a particular loving god that the Christians worship". And (3)" is interpreted as "The Christians worship any old loving god". (3)' is a report which no atheist would make. Yet an atheist needs to be able to report the Christians' belief. So (3)" is the proper candidate for that. But it fails, according to Kripke, to convey the particularity of the Christians' belief. Kripke concludes that since Quine's strategy has failed, the whole project of dismantling "worship" must be abandoned. The only alternative he thinks is to postulate the entities of worship.

If we are willing to admit worshipped entities into the ontology as Kripke appears to be, and give a wider range to the quantifiers, we can accept (3)' as true. But Kripke's observations do not show that quantification over worshipped entities is required. For (3)" cannot be held to say that the Christians worship any old loving god. The particularity Kripke seeks is already implicit in the belief[17]. We conclude with a few remarks about this strategy.

As Scott has advised, we have to be clear from the outset about the domain of discourse[18] and the range of quantifiers. We cannot in the midstream decide to admit new entities or enlarge the domain because some linguistic analysis seems to force it upon us. In the case of the range of quantifiers we are restricted by what there is. And that cannot be decided by a linguistic analysis. So it would seem less ad hoc to pursue Quine's sort of approach, as we have, than to postulate new entities.

B. LOVE

Is "love" intensional? We shall take two examples to illustrate the phenomena. The first example trades on the seeming incompatibility of love and hate.

(1) Kurt loves his best friend

(2) Kurt hates his wife's lover

It is said that we cannot hold

(3) Kurt loves his wife's lover

when we are given the identity Kurt's best friend = Kurt's wife's lover. So this is meant to show that there is an intensional notion of love. Some might want to claim, against this, that love and hate are not contradictories[19]. But even if we admit that it is possible to love and hate the same person, it might still seem that there is a sense of "love" which is not compatible with "hate". It might be the case that there are two senses of "love", intensional and extensional. Let us see if such a view can be given a coherent formulation. Could we say (as some have) that in the intensional case, the object of love is the individual concept and that in the extensional case, it is the individual himself? Individual concepts seem to involve the same difficulty that we found in Chapter I with such entities as senses or possible objects in the report about Aguirre's search for El Dorado. We said that to describe Aguirre's search for El Dorado as a search for a sense or a possible object simply misrepresents Aguirre's activity, since Aguirre sought what he believed to be an actual city. If Aguirre believed that El Dorado is a mere possible object, he would not have sought it in the jungles of South America. Reverting to love, Kurt believes that he loves the individual and not the individual concept, Kurt's best friend.

We can recognize and account for intensional love by distinguishing "love" from "love as". In "x loves y" "love" is extensional; in "x loves y <u>as</u> A", "love" is still extensional but "<u>as</u>" creates an additional intensional context. Applying this to the present example, if we just say (3) by itself and leave it at that, then it sounds as if it might abbreviate

(3)' Kurt loves his wife's lover <u>as</u> his wife's lover

or

(3)" Kurt loves his wife's lover and in loving him thinks of him under the description "lover of my wife".

Clearly both are false. But if (3) is arrived at by substituting in

(1), it does not mean (3)' or (3)". If we go back to the fundamental form of (1) we have

(1)^{o} Kurt loves his best friend as his best friend

Substituting in (1)^{o} we have

(3)^{o} Kurt loves his wife's lover as his best friend

for we substitute only in the transparent position after "love" and not in the opaque position after "as". (3)^{o} is clearly true. Reading (3) as (3)^{o} seems to resolve the apparent conflict the extensional notion of "love" created[20].

A second example is

(4) Dante loved Beatrice.

Historians and interpreters of Dante disagree about the existence of Beatrice[21]. It seems that there was a certain person called Beatrice, the daughter of Folco Portinari, whom Dante met when he was at the age of nine, and she at the age of eight[22]. The facts about this Beatrice are lost. She married and later died at the age of twenty five. Dante made no attempt to approach Beatrice. He saw her once in the street and another time at a banquet some years after their initial encounter.

Now it may be said that even if there was such a person as Beatrice in Florence at that time, it cannot have been this person that Dante loved. Certainly it may be said that he did not love the daughter of Folco Portinari, though if Beatrice was any body she was the daughter of Folco Portinari.

Let us take Dante's own account of his love for Beatrice in Vita Nuova and in Divine Comedy. In Dante's description of that phenomenon it is not a woman of Florence but the image of the forstate of salvation, the vision of perfection that Dante adored. Having had only a few brief, unintended chance encounters with Beatrice, Dante cannot have known the person. The qualities of virtue, nobility, purity, that he attributed to Beatrice had to do with the image, the vision of Beatrice that Dante formed, and not with the person. Dante's description of his love for Beatrice is like that of a mystical experience. The kind of worship and adoration that accompanied Dante's love, we can say, are characteristic of romantic love or courtly love tradition in Dante's time. It is a love of a non-existent idealized picture or image. To say that such phenomena are not love would be to impoverish and limit the notion of love against the established convention regarding a form of love. By appealing to the background of such convention and seeing Dante's love of Beatrice as exemplifying a special form of love, rather than attempting to analyse Dante's state of mind, we want to show that Dante's case was not an isolated incident of no generalizable interest or something which can be paraphrased away in some way that has nothing to do with love. The key is the intensionality of "as ..." in "loving x as ...".

Although Dante's case seems to present a stronger argument for intensionality of love than the first example, the same analysis via "love as" can be extended to give an adequate account. In general, the decision about extensional and intensional sense of predicates is not a matter of coming up with a doctrine which tells us which is the right reading but as Quine has put, in connection with transparent and opaque beliefs,"what is wanted is a way of indicating selectively and changeably just what position in the contained sentence are to shine through as referential on any particular occassion"(23).

Dante's love of Beatrice illustrates how illusory is the prospect of substitutivity breaking down without existential generalization breaking down. When we uncover the logical form x loves y as A, we see that neither is violated. The y-position continues to be transparent, even though the A position is opaque. What happens in ordinary English where the structure is hidden is that the opacity of the A position confuses us into thinking of the verb itself as having an intensional object place.

CHAPTER IV

REFERENCE

A. PRELIMINARY REMARKS

Before we attempt to give an analysis of "refer", which is the verb which all the foregoing discussion was designed to lead up to, we need to examine the range of examples to be accounted for by such an analysis. When we collect a full house of examples, the phenomena which raise the problem of empty reference can be divided into at least four types.

I. Speech act notion of "refer"

(1) Leverrier referred to Vulcan .

(2) Leverrier referred to Vulcan as the planet which disturbs the perihelion of Mercury.

(3) Leverrier referred to a planet .

(4) Scientists referred to caloric as the fluid which constituted heat.

(5) Schliemann referred to the site of Troy.

(6) Ponce de Leon referred to the Fountain of Youth.

(7) Bently referred to Ossian.

(8) The Scots refer to the Loch Ness Monster.

II. Semantic notion of "refer"

(9) "Vulcan" refers to Vulcan.

(10) "Vulcan" refers to a planet.

(11) "Vulcan" refers to the planet which disturbs the perihelion of Mercury.

III. Vacuous terms in extensional contexts

(12) Vulcan is a planet.

(13) Vulcan = Vulcan.

(14) Vulcan disturbs the perihelion of Mercury.

(15) Vulcan exists.

(16) Leverrier discovered Vulcan.

IV. Vacuous terms in fiction and myth

(17) Sherlock Holmes lived on Baker Street.

(18) Aphrodite = Venus.

(19) Aphrodite is the goddess of love who was born from the sea.

(20) Homer referred to Achilles.

The speech act notion of reference is a three-place relation between a speaker, a term, and its reference[24]. The semantic notion of reference is a two place relation between a term and its reference. We are concerned with vacuous singular terms in serious discourse which must be distinguished from fiction. But as a byproduct of our analysis of I-III, we might have a solution to IV.

Whether an adequate account of the phenomena in I-IV requires more than one notion of reference is a question that can be better answered when we have examined the notion of reference in I & II. But there are some preliminary remarks we can offer. On the surface, the three place relation of speech act reference seems clearly different from the two place relation of semantic reference. As Kripke has pointed out, the speech act referent of "x" is not always x but can be sometimes y or z, if the speaker has some appropriate mistaken beliefs[25]. The semantic referent of "x" is always x. The speech act notion involves speaker's intentions and beliefs in determining the reference of a term. We shall see how the two notions are related when we apply the Quinean strategy to both.

B. SPEECH ACT REFERENCE

The issue of intensionality of speech act reference turns on how we decide to treat the phenomena that are expressed by the sentences of class I, such as

(1) Leverrier referred to Vulcan.

(3) Scientists referred to caloric.

There are two possibilities. First, we might accept these sentences as prima facie true, i.e. they are given as historical facts. Then in order to explain their truth grounds we must postulate an intensional notion of "refer". For if we have only the extensional notion of "refer", given the standard procedure of stating truth conditions in terms of the reference of components, we cannot state the truth conditions if the components lack reference. Still less can these sentences receive the valuation True.

On the other hand we might, it may be said, interpret the sentences of class I as false. Since there is no such entity as Vulcan or substance as caloric, Leverrier did not refer to Vulcan, and scientists did not refer to caloric. If the sentences of the form "a refers to x" are never true, when "x" is empty, it might be suggested that we have no need for an intensional notion of "refer". But this interpretation simply makes "refer" extensional by fiat. To deny that sentences of class I are true on the ground that we cannot refer to non-existent entities presupposes the extensionality of "refer" and leaves sentences of class I unexplained.

The uncompromising extensionalist view entails some implausible consequences. First, we cannot have any correct report of mistaken acts of reference. If we take (1) and (2) to be false on the basis that Leverrier cannot have referred to Vulcan since Vulcan does not exist, then we cannot distinguish (1) and (2), correct reports of Leverrier's belief from incorrect reports such as

Leverrier referred to Vulcan as a falling star.

It is not as if he who says that Leverrier referred to Vulcan as the cause of the disturbance of the perihelion of Mercury might just as well have said that Leverrier referred to El Dorado as the cause of the disturbance.

Furthermore, if we follow the extensionalist in his reasoning for denying the truth of (1) and (2), then ought we not to have denied the truth of sentences such as

Aguirre sought El Dorado.

The Greeks worshipped Zeus.

on the same grounds? Given that El Dorado and Zeus do not exist, Aguirre did not seek El Dorado and the Greeks did not worship Zeus. But such an interpretation cannot be right.

So we can see the apparent need for an intensional notion of "refer", just as we perceived a need for intensional notions of "seek" and "worship". The fact that we continually seek, worship, etc. non-existents cannot be denied. What is needed is for these concepts to be analysed. To account for the activities of search and worship we had to postulate and analyse intensional notions of "seek", and "worship". Analogously, the fact that people refer to non-existents while having mistaken beliefs about the nature of such entities, should be a good reason for introducing an intensional notion of "refer".

C. OUR SOLUTION TO THE SENTENCES OF CLASS I FOLLOWS QUINE'S PATTERN

Let us suppose that "refer" can be paraphrased as "purport to mention" and that "mention" is extensional[26]. It might be thought that "purport" is not an appropriate propositional attitude here. We could go over some other propositional attitudes for the purpose of adding variety or refinement to our paraphrase. But this would distract from our main purpose, which relates to logical form.

Applying Quine's strategy to

(3) Leverrier referred to a planet

we have

(3)' $(\exists x)$ (x is a planet. Leverrier purported of x that he mentions x)

and

(3)" Leverrier purported that $(\exists x)$ (x is a planet. Leverrier mentions x).

as the relational and the notional readings of (3). The correct Quinean reading for

(1) Leverrier referred to Vulcan

is

(1)' Leverrier purported that ($\exists$x) (x is Vulcan. Leverrier mentions x).

As we have shown with

Aguirre sought El Dorado

the relational as well as the notional reading is to be taken as being about a particular place. So (1)', unlike the notional reading of (3), does not say that Leverrier referred to just any object. The justification for this was that the singular terms "Vulcan", "El Dorado", import particularity - or rather for Leverrier and Aguirre they do. Applying the strategy we have adopted for (1) and (3) to other sentences containing the notion of speech act reference is straight forward. We conclude that a Quinean strategy will give us a satisfactory solution for sentences containing empty names and the speech act notion of reference.

D. SEMANTIC REFERENCE

We come now to semantic reference. Adopting Quine's strategy once again, we might define "refer" as "purport to mention", as we have in defining speech act notion of reference. It might be thought that Quine's strategy for intensional predicates even if it is plausible for sentences with the speech act notion of reference, cannot be applied to sentences with the semantic notion of reference. Because here, there is no question of speakers holding any attitudes towards propositions. But we can say the following in answering this objection and show the connection between the two notions of reference. It seems plausible to hold that semantic reference can be intensional provided that speech act reference can be intensional. A word which semantically refers is cut out, designed by its semantic role, for use by speakers for speaker reference. So we could say that if Leverrier purported to mention Vulcan by "Vulcan", then "Vulcan" itself, at least in one standard use, purports to mention Vulcan.

Why not then paraphrase (9) as

(9)' "Vulcan" (by its presence as a constituent of a sentence making an assertion) purports that $(\exists x)$ (x is Vulcan & "Vulcan" mentions x)?

(10) could then be rendered as

(10)' "Vulcan" (by its presence in a sentence) purports that $(\exists x)$ (x is a planet & "Vulcan" mentions x).

If (9)' and (10)' could be taken as the correct rendering of (9) and (10), then we should have shown that "Vulcan" semantically refers and how sentences containing empty terms and the semantic notion of reference could be evaluated. What makes this possible is that although there is no such planet as Vulcan, the language which Leverrier spoke depended at, at least, one point in the supposition that there was. To explain what <u>he</u> meant, Leverrier himself would have said something of this form:

> By "Vulcan" I mean Vulcan - a planet which will prove to be disturbing the perihelion of Mercury.

<u>We</u> cannot say this of course, because we know there is no such planet. But surely this would not prevent us from understanding Leverrier or Leverrier's language.

This is scarcely a fully worked out idea; but for my purpose, and for purposes of logical form, it will be enough for us to be able to go on in due course to what directly concerns me.

E. APPLICATION OF THE INTENSIONAL NOTION OF REFERENCE TO SENTENCES WITH EMPTY TERMS IN EXTENSIONAL CONTEXTS

Does the intensional notion of reference explained in section D help us to evaluate sentences such as

(12) Vulcan is a planet.

(14) Vulcan disturbs the perihelion of Mercury?

In (12) and (14) there is no appearance of an intensional predicate. So these sentences seem to require quite a different treatment. We conclude that, even if we may have succeeded in showing the plausibility of the intensional notion of speech act and semantic reference, that in itself does not help us in evaluating sentences such as (12) and (14) even if it motivates us to try harder than certain philosophers have thought it necessary to do this. To show that "a" semantically refers in the sense so far defined does not answer the question: what is the truth-value of "Fa" when "a" is vacuous? For when "Fa" is an extionsional predicate, to evaluate "Fa" we have to see whether F is true of a. When there is no a, we cannot by the procedures presupposed in our own definition of "refer", via "mention" evaluate "Fa". We have as yet no way of evaluating any of the sentences in class III. Nobody who takes seriously the sentences in class III will be content with this situation. And it is this aspect of the problem of empty reference which will concern us for the rest of this thesis. In the following chapter, we shall examine the various approaches for evaluating the sentences in class III.

CHAPTER V

STANDARD FORMAL SEMANTICS FOR REFERENCE

It is obvious that the semantics of empty names cannot be given by any standard theory. But in order to see what an extension or adaptation of the standard theory would have to be like, and in order to characterize the semantic contribution of empty names, it is necessary to approach the problem via the standard theory. This theory is not entirely neutral because in the extension of Tarski's theory of truth to languages containing individual constants which we have borrowed from Mendelson[(27)] there is an inbuilt prejudice in favour of the idea that to say what a name means is to say what it stands for. And that is not obviously an uncontroversial idea. So when I get to that point I shall defend the idea and try to show that it is less controversial than it looks; and that formal semantics may therefore provide a neutral framework.

Frege held that to state the meaning of a sentence is to state the conditions under which it is true. Davidson has suggested that this is what is accomplished by a Tarskian theory of truth conforming to

> Convention T. A formally correct definition of the symbol 'True', formulated in the metalanguage, will be called an adequate definition of truth if it has as consequence all sentences which are obtained from the expression 'x ϵ Tr' (i.e. x is in the class of true sentences) if and only if p, by substituting for the symbol 'x' a structural descriptive name of any sentence of the language in question, and for the symbol 'p',

the expression which forms the translation of this sentence into the metalanguage(28).

The notion of translation which Tarski employs here is open to Quine's criticisms and might appear to make Davidson's project circular. Davidson has two ways with this problem. First in detailed technical work he concentrates on the case where object language is part of metalanguage, blocking thereby all perverse methods of assigning to every sentence x, even though x does not mean that p, a condition p such that

$$\text{True } x \equiv p.$$

This is called the "homophonic" way. Suppose that there is a theory of truth Θ such that for every sentence x, Θ has a theorem of the form

$$\vdash \text{True } x \equiv p$$

Suppose that every such equivalence given by Θ is true. Then there are infinitely many variant theories of Θ' of truth, constructed out of Θ as follows.

$$\vdash_{\Theta'} \text{True } x \equiv p \quad (\& \; 2x2=4)$$

All these equivalences will be true if Θ was true. What is more, these variant theories use the notion of truth essentially(29). The point is that the variants fail Tarski's translation condition. Only in the case where object and metalanguage are part and whole is there any purely formal method of ascertaining that the translation condition is met.

The answer to this problem is this. Θ is a correct theory of interpretation if Θ is true and meets all of Tarski's other requirements besides translation <u>and</u> Θ <u>also optimally fits all native speakers holdings true</u>. Optimally is meant here in the sense of minimizing the supposition of unexplained error in the beliefs which an interpreter using Θ would find himself ascribing to the speakers of the language. This is the principle of charity or of humanity.

Davidson thus has a way of displacing the word "translation" altogether from Convention T, in terms of a holistic non-formal requirement on theories of truth. This concerns the propositional attitudes of belief and desire. For our purpose it is sufficient that some account like this should be possible(30).

By Tarski's theory of truth, truth is defined as satisfaction by all sequences. Tarski gave the theory for a formal language but he stated that such a definition as his, owing to its universality, can be applied to natural language in so far as they can be made precise(31). In extending Tarski's definition of truth to natural languages there are some modifications we need to make. But the basic strategy is the same: (1) distinction of object language (the language for which the truth definition is given), and metalanguage (the language in which the definition is given), to avoid the semantic paradoxes; (2) an interpretation function which takes terms as arguments and objects as values; (3) a recursive definition of satisfaction for sentential functions; (4) definition of truth via satisfaction.

We shall not attempt to give an exposition of the whole orthodox theory but show how it can deal with names and in what way it must fail (as it stands) to define truth for sentences with empty names. We suppose that the sentences being characterized belong to English.

Consider a sentence of the form: Ft, where "F" is some primitive predicate and t is some term. Truth for this sentence (as for all other sentences) is satisfaction by all sequences. And for the sentence "Ft" the relevant satisfaction provision is, where s is a sequence variable,

$$(s)(s \text{ satisfies "Ft" iff } s^*(t) \text{ is } F)$$ [32].

We have a similar clause for each primitive predicate of the language (which is a sublanguage of English). The definition of the s* function is as follows. Where t is a variable 'xi' we have

$$(s)(s^*{}'x_i' = \text{the i-th member of s}).$$

Where t is a name 'a', we have

$$(s)(s^*{}'a' = a).$$

In a definition of truth for a language T, there will be a clause like this for <u>each proper name which has a denotation</u>. The mere schema will not enable us to say what each name actually means.

According to Davidson, the connection between Tarski's definition of truth and the concept of meaning is this:

> the definition works by giving necessary and sufficient conditions for the truth of every sentence, and to give truth conditions is a way of giving the meaning of a sentence. To know the semantic concept of truth for a language is to know what it is for a sentence - any sentence - to be true, and this amounts, in one good sense we can give to the phrase, to understanding the language[33].

Davidson maintains that any semantic proposal, if it is to be part of a systematic attempt to give in the end the semantics of the whole of the language, must be stated in a metalanguage which does not make use of concepts that are not directly required in understanding the object language[34]. The homophonic way is particularly useful in this connection. The metalanguage is employed as a means of defining the truth and meaning for the object language. As such it should not exceed the expressive resources of the object language except in as much as the metalanguage contains the extra predicate "true". This requirement will be very important, and when we use it later against certain theories, we shall say some more about it.

Postponing the problem of empty names, how well does this theory satisfy the other criteria for a semantic theory of names? It might seem that in this framework we are forced to say that "Hesperus" <u>means</u> the same as "Phosphorus". For clearly

$$s^*(\text{"Hesperus"}) = \text{Hesperus} = \text{Phosphorus}.$$

And this Mill-Russell result seems to throw away everything which Frege achieved in "On Sense and Reference". But although the above statement of equivalance is true, it does not amount, even for a Davidsonian, to "Hesperus" and "Phosphorus" having the same sense. Of course, if we had

$$\vdash_{\Theta} s^*(\text{"Hesperus"}) = s^*(\text{"Phosphorus"})$$

within a truth theory Θ, maybe that would entail that "Hesperus" and "Phosphorus" had to have the same sense. But this could not be proved within the truth theory unless we had within it

$$\vdash_{\Theta} \text{Hesperus} = \text{Phosphorus}.$$

But within the truth theory itself we cannot show that "Hesperus" and "Phosphorus" have the same reference. So we cannot show there that they have the same sense. In the truth theory Θ, "Hesperus" refers Hesperus iff

$$\text{(a)} \vdash_{\Theta} s^*(\text{"Hesperus"}) = \text{Hesperus}.$$

And "Hesperus" refers to Phosphorus iff

$$\text{(b)} \vdash \Theta s^*(\text{"Hesperus"}) = \text{Phosphorus.}$$

But how could (b) be proved in the truth theory? "Hesperus = Phosphorus" is not a theorem of any truth theory but indicates a non-linguistic fact.

Another way of putting this is as follows. It is true that s^*("Hesperus") = Phosphorus. So the s^* context is extensional. But $\vdash \Theta s^*$("Hesperus") = Phosorus puts the sentence "s^*("Hesperus") = Phosphorus", and its terms into a position which is intensional. That "$\vdash \Theta$" creates an opaque context suggests a way of coming to terms with the apparent intensionality of "refer". We may try saying that "Hesperus" refers to Phosphorus iff $(\exists \Theta)$ ((Θ is a correct truth theory for the interpretation of the language in question) & $\vdash \Theta s^*$("Hesperus") = Phosphorus). s^* is extensional but if $\vdash \Theta(s^*(\ ) = (\ ))$ creates an opaque context, then so does "refer" on this analysis.

The method of formal semantics is not then committed to "Hesperus" and "Phosphorus" having the same sense. The theory can be seen as saying that to fix the reference is to fix the sense without saying that two names having the same reference must have the same sense(35). There is nothing to prevent it from allowing for the obvious difference of sense between sentences such as

Tom believes that Cicero denounced Catiline.

and

Tom believes that Tully denounced Catiline.

It may seem that this brings us dangerously close to the description theory of proper names which Frege expounded in "On Sense and Reference" and which has been frequently criticized recently. The description theory must always seem an attractive alternative for those who want, as we do, to make sense of empty names. If it were right, it would help us. But the formal semantical framework does not commit us to it. And that is, in fact, lucky.

According to the description theory, the sense of a proper name is given by some definite description that is sufficient to determine the reference associated with the name. The sense of "Vulcan" could be "the planet which disturbs the perihelion of Mercury", and the sense of "Aristotle" could be "the teacher of Alexander". Kripke and others have pointed out the difficulties of this view. The general form of the main difficulty can be characterized as follows[(36)]. Let " xϕx" be some supposed synonym of a proper name n, and sufficient to determine its reference. Then where b is n's bearer, if " xϕx" had the sense of n, then "If b exists then b is ϕ" could not be false. But such a statement, when b is an ordinary object, can certainly be false. It follows that proper names cannot have their sense in the way Frege's theory explains.

But the way we explained that the formal semantic theory avoids identifying the senses of "Hesperus" and "Phosphorus" and the senses of "Cicero" and "Tully" are not involved in the replacing of proper names by descriptions or the giving of descriptions as synonyms for proper names. If somebody needs to know the sense of the name "Hesperus", we can tell him what it stands for. Even though Hesperus = Phosphorus, saying "it stands for Hesperus" is not the same as saying "it stands for Phosphorus". And of the two specifications of the sense of "Hesperus" the first is greatly to be preferred. They could only be equally good if the two names were notational variants. They are not notational variants in this case. This can be seen by thinking what supplementary explanations - not synonyms for "Hesperus" - would be natural to use with the explanation "it stands for Hesperus". These would be given by descriptions relating to the evening (when Hesperus rises). Both Wiggins and Kripke have stressed how such supplementary explanations of what, which heavenly body, one means by a name are not given in order that they should be understood as synonyms[37].

Empty names then are the only obvious difficulty in the standard formal semantic approach. They are a difficulty in that the theory has not provided for them. This is not to say that the theory provides against them. What we need is to see how if at all, we can extend the standard theory to take in empty names. The difficulties of doing this do not come out of any bias within the theory against empty names. The standard theory is neutral. The same difficulties arise in one form or another on every approach - except perhaps on some versions of the description theory[38]. But that theory has been refuted.

Suppose that the object language contained an empty term "Vulcan". Then it is empty in the metalanguage too. "s*("Vulcan")" by itself has no value since "Vulcan" is empty. The truth conditions for sentences such as

Vulcan is a planet.

Vulcan disturbs the perihelion of Mercury.

cannot then be stated since "s*("Vulcan")" is not available. The same difficulty actually arises earlier. Consider the semantic stipulation

s*("Vulcan") = Vulcan.

This has to be put forward as a truth of the metalinguistic theory of truth for the object language. But if "Vulcan" is empty, then it cannot even have a truth value in the standard theory.

In the standard theory s* has a value for every argument. When we add empty terms to the language, s* then becomes a partial function. There exists no value for s*("a") when "a" is an empty term. In a standard semantic theory, even when "refer" is taken to be intensional because "a" refers to a $\equiv \vdash \Theta s^*(\text{"a"}) = a$ and $\vdash \Theta s^*$ is intensional, we still have no means of evaluating sentences containing empty terms in extensional position. Until this difficulty is resolved even the intensional notion of "refer" will not help us to say that Leverrier referred to Vulcan.

It is well worth noting that the same difficulty would embarrass the description theory if it claimed to have any advantage for this problem, and if it claimed to explain the sense of "Vulcan" by "Vulcan is the planet which disturbs the perihelion of Mercury".

CHAPTER VI

EMPTY REFERENCE : PRELIMINARY CONSIDERATION

There are two possible reactions to the failure of the orthodox truth theory in explaining the meaning of empty singular terms and the truth conditions of sentences with empty names. The first is the approach taken by Geach, and by Kripke to a certain extent, which treats such sentences as actually meaningless, and empty names as having no semantic role. The rationale behind this approach would be that names get their meaning by naming their objects and when there are no objects corresponding to the names, we cannot say anything meaningful about them. The second approach insists on taking sentences containing empty names as expressing genuine thoughts, and treats empty names as making semantic contributions to sentences in which they occur. There are several different methods within this approach. We shall examine both approaches in turn.

For Geach the notion of "refer" or "name" is strictly extensional. Geach argues, in agreement with Parmenides, that one cannot name what is not there to be named[39]. Geach is concerned with "how we can re-describe such occurrences as worshipping an imaginary God or dreaming of an imaginary girl, without admitting that there are imaginary gods and girls."[40] Geach defends his view that we cannot name imaginary beings by framing what has subsequently been called "the causal theory of naming".

For Geach it is built into the notion of name that a name must be a name of an existent object. In Reference and Generality[41] Geach appeals to "acts of naming" to explain what a name is. A name is said to be a term that can be used in an act of naming. But it is not very clear what an act of naming is: saying "Hello Cat!" upon seeing a cat is considered by Geach as an act of naming. We would not normally regard "cat" as a name. In "The perils of Pauline", Geach brings in the acts of baptism[42]. For a word to be a name, we have to be able, in theory if not in practice, to follow the historical chain of usage to trace the introduction of the name. Both in the acts of naming and the acts of baptism, what is being appealed to is that names are introduced into the language ostensively. The initial users of a name have to be acquainted with the object named, or have to be in a situation where they can point at the object named[43]. Such an account of names would certainly succeed in discarding empty names as names. But this elimination by itself does not explain the phenomena of empty reference. Empty names are a part of language and the phenomena of empty reference needs to be explained.

In order to take care of empty names, Geach introduces the notion of "quasi-name". Names that are used without existential presupposition about their bearers function as quasi-names. "Zeus" would be a quasi-name for us. When a name is used as a quasi-name, what the speaker refers to is other people's intention to refer to an object by that name[44]. This might be plausible for Geach's example about the legend of Arthur but not for "Zeus". In the case of "Zeus", what we referred to is a god believed by the Greeks to exist and not their intention to refer to a god. We want to be able to ascribe beliefs to speakers without accepting the beliefs ourselves. Geach's solution would be that in reporting "Smith believes that the hill fort was built by Arthur", "Arthur" is used as a quasi-name by us. We do not refer by "Arthur" to Arthur but Smith's intention to refer to Arthur. There is a resemblance between Geach's solution and Church's interpretation of

Frege's analysis of oblique reference[45]. In oblique contexts, we were told that a name has its normal sense as the reference. In Geach's solution a name stands for the intention of the sepaker. Davidson's objection in ("On Saying That" and elsewhere) to Frege's analysis of oblique contexts, that it is implausible to maintain that a name gives up its pedestrian reference and picks up an exotic entity, seems to apply to Geach's solution equally.

(It is difficult not to feel that Geach has put his own proposal in an unfortunate way. I do not like the way it is put. But there may be some similarity between his general approach to the problem of empty reference and that into which I am driven at the end of this thesis.)

An approach which takes empty names more seriously than Geach's seems more promising. It is certainly not obvious that sentences such as "Vulcan is a planet" are strictly meaningless. So, inasmuch as in the standard theory of truth we cannot assign truth conditions to sentences with empty names, we need to try to modify or extend the standard theory to do this.

One way of dealing with empty terms has been to make sentences containing them to be without a determinate truth value. We have already suggested that this is at best half of a solution. For we still need to be able to assert in the metalanguage something true of the form $s^*(n) = b$ for each name n. That is a difficulty we shall struggle with. But Dummett has shown that there is even a prior difficulty.

Dummett expounds the difficulty as follows[46]. A popular account of the meaning of the word "true" is that "It is true that p" has the same sense as p, i.e. $T\ulcorner p \urcorner \equiv p$. This explanation of "is true" determines uniquely the sense, or at least the application, of this predicate: for any given proposition there is a sentence expressing that proposition, and that sentence states the conditions under which the proposition is true [47]. If we admit truth-value gaps, this explanation appears incorrect. Suppose p contains a singular term which lacks a reference, then the approach under discussion takes p as lacking a truth-value. p therefore is not true, and hence the statement "It is true that p" will be false. "p will therefore not have the same sense as "It is true that p" since the latter is false while the former is not... In general it will always be inconsistent to maintain the truth of every instance of "It is true that p iff p" while allowing that there is a type of sentence which under certain conditions is neither true nor false." [48].

We see in this way that truth value gaps conflict with Convention T. Convention T requires that an adequate theory of truth should yield as a theorem for any sentence p, a biconditional of the form $T\ulcorner p \urcorner \equiv p$. To question $T\ulcorner p \urcorner \equiv p$, therefore, amounts to questioning Tarski's requirement - at least in the precise form he gave it. Theories which accept truth value gaps would have to provide a new criterion of material adequacy.

Dummett's argument provides a very handy way of classifying non-orthodox theories and their consequential treatments of sentences containing empty singular terms. Let us see how the incompatibility between the truth value gaps and the equivalence $T\ulcorner p \urcorner \equiv p$ can be resolved. There are four possible ways: (0) Reject both truth value gaps and $T\ulcorner p \urcorner \equiv p$; (1) Reject truth value gaps and retain $T\ulcorner p \urcorner \equiv p$; (2) Reject $T\ulcorner p \urcorner \equiv p$ and retain truth value gaps; (3) Retain both.

Possibility (0) has not been taken up anywhere; since it has no obvious virtues, we shall not discuss it.

There is a hybrid theory between (2) and (3) which, space allowing, I would like to examine in the appendix. It does not advance the main argument.

In the following chapters we shall discuss each of the other possibilities.

CHAPTER VII

REJECTION OF TRUTH VALUE GAPS AND RETENTION OF T⌜p⌝ ≡ p : FREGE'S THEORY

Frege has given two different accounts of sentences containing empty singular terms. On the surface the account given in the *Grundgesetze* which rejects truth value gaps might appear to be incompatible with the account given in "On Sense and Reference" which admits truth value gaps. We shall expound both accounts. The reason for classifying Frege's proposal under the type which rejects truth-value gaps is that Frege's proposal in *Grundgesetze* is intended for serious discourse which is our present concern. And the account given in "On Sense and Reference" is intended for fiction or myth.

In *Grundgesetze*, in the formal language that Frege sets up, the formation rules for singular terms state that properly constructed names must always have reference(49). This means that, names, descriptions, and sentences (since for Frege they are names of truth values) are required to have reference. This amounts to rejecting truth value gaps. But the formation rules do not guarantee that empty terms shall be excluded from the language. As Frege points out, even in the language of mathematics we cannot prevent the occurrence of empty terms such as "the divergent infinite series"(50). Frege does not disregard empty terms as lacking in semantic significance but proposes a remedy. Frege's stipulation for singular terms implies that the null class, Λ be the reference of all singular terms that are empty(51). To be precise, Frege's stipulation is formulated for definite descriptions. But since Frege treats definite descriptions on a par with proper names, we could extend the stipulation to cover empty names in applying Frege's theory to our problem of evaluating sentences with empty names in extensional contexts. Empty terms are reduced to non-empty terms by the stipulation. As we shall see, this creates some difficulty.

Given the stipulation, the evaluation of some of the sentences of group II, Chapter IV, is straight forward. " 'Vulcan' refers to Vulcan" would be true, since according to the rule "Vulcan" refers to Λ . "Vulcan = Vulcan" would be true since " $\Lambda = \Lambda$" is clearly true. "Vulcan is a planet" would be false since Λ is not a planet, and the same for "Vulcan disturbs the perihelion of Mercury". "Vulcan is not a planet" would be true.

The equivalence $T\ulcorner p \urcorner \equiv p$ is retained, for if "Vulcan is a planet" is false, then "It is true that Vulcan is a planet" is also false.

It might seem that such an assignment of truth values corresponds with our intuitions about sentences containing emtpy names. But there are some difficulties with this account. One of the consequences of positing Λ as the reference of all empty singular terms is that Λ = Vulcan = Zeus = the round square = the golden mountain, etc. This upsets any notion of identity we might have about such entities, and any prospect of a natural treatment of natural language.

Furthermore, existential statements cannot be evaluated correctly. We would want to say that "Vulcan exists" is false. But " Λ exists" would have to be true given that Λ is the reference of " Λ ". If " Λ " itself were empty, there would be no point to the stipulation which makes it the reference of empty terms. This difficulty is directly connected with the reduction of empty names to non-enpty names by assigning Λ as their reference. In order to evaluate "Vulcan exists" as false, "Vulcan" must remain an empty name. We cannot go in to any of the problems of existential statements in this thesis. But we also cannot let pass a theory which renders those problems insoluable.

In Frege's account empty names are recognized as such. If, as in his formal treatment, they are then assigned a reference, he comes perilously close to maintaining that they are simultaneously empty and non-empty. In general, all reductionist treatment of empty singular terms seem to entail some such implausibility. (Other reductionist theories we shall consider are those of Scott and Grandy.)

Frege himself would not perhaps consider this as a valid objection. The matter is complicated by the fact that regards "exist" as a second level predicate so that sentences such as "Vulcan exists" might be considered by him to be meaningless. However, we can take such a sentence as meaningful as $(\exists x)$ $(x = \text{Vulcan})$. That seems to mean that Vulcan exists.

For sentences of fiction, Frege has a solution which should be sharply distinguished from his solution for sentences containing serious empty names. In "On Sense and Reference" Frege regards sentences of fiction to be truth-valueless(52). Frege's view that when we know the context of fiction, we have no reason for going forward to the question of truth values, seems to put fiction in its right place. But this view does not help us with serious discourse about non-existent entities, for we need to evaluate sentences in such a discourse.(53)

In the next two chapters we shall discuss Scott's modification of Frege's account and Grandy's modification of Scott's account.

CHAPTER VIII

REJECTION OF TRUTH VALUE GAPS AND RETENTION OF $T\ulcorner p\urcorner \equiv p$ (Continued) : SCOTT'S "EXISTENCE AND DESCRIPTION IN FORMAL LOGIC " (54)

Scott proposes a system in which empty descriptions and sentences containing them can be evaluated. We shall be concerned with the obvious extension of Scott's system to singular terms in general. We shall expound only the relevant parts of the system in such an extension, but our observations will apply equally to the original account. We shall then discuss to what extent Scott's claim is justified that his account is an improvement of the proposal Frege discussed in the previous section.

Scott states three motivating principles that have guided the precise formulation of his theory(55).

> Principle 1. Bound variables should range over the given domain of individuals.
>
> Principle 2. The domain of individuals should be allowed to be empty.
>
> Principle 3. The values of terms and free variables need not belong to the domain of individuals.

Scott's general strategy is to have two domains for the universe of discourse: the inner or actual domain consisting of individuals and the outer domain consisting of $*$, which corresponds to Λ in Frege's proposal. Principle 1 amounts to the usual treatment of the range of quantifiers and requires no special explanation. Principle 2 is interesting because it establishes Scott's theory as based on "universally free logic"[56]. An advocate of universally free logic might offer the following reasons in its defense. Principle 2 appears to be a sound guiding principle for logic, because it cannot be a proper concern in formulating logical laws that some objects exist. Quine objects to admitting the empty domain on the ground that (1) it involves a modification of the standard laws e.g. universal instantiation and existential generalization; (2) the empty domain has no practical importance; (3) we can keep the general laws and simply state the special provisions for the empty domain[57]. In answer to Quine's objections, it might be said, as Quine himself has said in a different context, that matters of fact should not be forced on matters of logic[58]. The standard systems of logic simply start with the assumption that the domain is not empty. From the point of application, this assumption is not unreasonable. But it might be said on Scott's behalf that for a general system universally free logic without any existential presuppositions is much more reasonable.

Principle 3 is very important for the basic idea of Scott's system. Scott exhibits the usefulness of Principle 3 as follows. Consider the question raised by Mostowski in connection with the empty comain[59].

> Namely, it is 'clear' that the formula
>
> $$xRx \rightarrow xRx$$
>
> is valid in all domains including the empty one. Similarly the sentence
>
> $$(xRx \rightarrow xRx) \longrightarrow \exists y\ (yRy \rightarrow yRy)$$
>
> is valid, because if x is given a value in the domain, then there is some value of y to satisfy the formula within the quantifier. On the other hand, the formula
>
> $$\exists y\ (yRy \rightarrow yRy)$$
>
> is <u>not</u> valid in the empty domain: hence the valid formulas are not closed under the rule of modus ponens when the empty

domain is included. The fallacy (or better inconvenience) here lies in allowing the second formula to be valid. The first formula is completely valid no matter what value we assign to x. The second formula will fail in the empty domain, however, if we recognize Principle 3. To have a valid formula we must modify the implication to read:

$$(xRx \rightarrow xRx) \wedge \exists y\ (x=y) \rightarrow \exists y\ (yRy \rightarrow yRy)^{(60)}.$$

What this discussion establishes is that when the empty domain is admitted, the rule of existential generalization must be modified to $Fa \wedge (\exists x)\ (x=a) \vdash (\exists x)\ Fx$.

Principle 3 leads directly to Scott's postulating the existence of at least one * outside the domain of the quantifiers. Under Principle 3 we no longer require the value of terms to be given within the domain. * is to be the value of all improper singular terms. For each domain A, we assign a null entity * such that $*_A \notin A$. Scott holds that to put * outside the domain is better than to follow Frege and have the reference of empty terms inside the domain(61). First we emphasize the impropriety of empty singular terms by giving their values outside the domain and thereby keep a natural reading of "($\exists$x)". Second, we recognize that when the domain is empty, we cannot have an entity in it.

To give a semantical interpretation for a language containing empty singular terms, Scott follows the standard procedure of using a structure, $\langle A, R \rangle$, where A is a set (the domain of individuals) and R is a binary relation (the interpretation of the predicate symbol $\mathbf{R}$). Then, relative to the given structure, Scott defines inductively the values of formulas (which are truth values) and terms (which are objects). We shall not reproduce the exact clauses of the inductive definition and the rules of inference and the axioms, since they are the standard ones, except for the clause which defines the value of empty terms as *, and the rule of universal instatiation

$$\text{(UI)} \quad \forall x \phi \wedge \exists x\,(x=\alpha) \rightarrow \phi(x/\alpha)^{(62)}.$$

If $\forall x \phi$ is true, it is not correct to conclude that $\phi(x/\alpha)$ is true unless α has a value in the inner domain.

Let us apply Scott's system to the sentences containing empty names in extensional positions. He considers[(63)]

$$\begin{array}{lll} v_i R*, & *Rv_i, & *R* \\ v_i=* & *=v_i & *=* \end{array}$$

Scott points out that when a formula has no free variables, the identity formulas are unproblematic. $*=*$ is true, as an instance of the axion schema (S3) $\alpha = \alpha$. And $v_i=*$, $*=v_i$ are always false when the variable Vi is bound (Principle 1). In Scott's system we can evaluate "Vulcan= Vulcan", "El Dorado = El Dorado", etc. as true. Sentences such as "Vulcan disturbs the perihelion of Mercury" would be evaluated as false, since $\langle *$, the perihelion of Mercury $\rangle$ the interpretation of the predicate 'disturb'. The relevant clause in Scott is

$$\models_A \alpha R \beta (s) \quad \text{iff} \quad \langle \| \alpha\,(s) \|_A, \; \| \beta\,(s) \|_A \rangle \in R^{(64)}.$$

Scott considers the effect of

$$(I_3) \; * = \alpha \;\vee\; * = \beta \rightarrow \neg\, \alpha R \beta \;^{(65)}.$$

This amounts to a restriction that the relation of a structure be confined to existing individuals. As Scott points out, this schema (I_3) is not valid in Scott's system, as it is formulated. However, it could be validated by choosing $*_A$ to lie outside the field of the relation R. But Scott considers this as undesirable because we expect that the valid formulas should be closed under substitution of formulas for predicate symbols. Clearly (I_3) becomes invalid when R is replaced by =, if we are to keep the usual properties of identity even for non-existents.

We shall conclude our exposition of Scott's system by comparing it with Frege's account which it proposes to replace. First, in Scott's system we can give a correct evaluation of "Vulcan exists". This is a definite advantage over Frege's account. Translating the sentence as $(\exists x)$ (x = Vulcan), we can evaluate it as false. Under the semantical rules in Scott's system $(\exists x)$ $(x = \alpha)$ is true only when the value of α exists in the actual domain(66). The value of "Vulcan" would be *. By putting * in the outer domain, Scott's system gives a correct evaluation of existential statements involving empty terms.

Scott regards it as one of the advantages of his system that the laws of identity are preserved. But as with Frege's account, * being the value of all empty terms, all identity statements involving any two empty names would be evaluated as true. And there seems little point in preserving self-identity for non-existent entities, if we have at the same time sentences such as "Vulcan = El Dorado" as true statements of identity. Our objections to Frege's in relation to intensional relations and meaning apply in their entirety to Scott's *: by means of * we still cannot correctly describe Aguirre's search for El Dorado in particular. Aguirre tried to bring it about that he finds El Dorado. We only know what that means if we know what "he finds El Dorado" means. We cannot interpret that sentence in any natural way in Scott's system; though it is fair to say Scott could be invited to say something special to such cases.

Our last remark is that Scott's system will not yield a homophonic theory of truth answering to Davidson's reasonable requirement in "Semantics for Natural Languages".[67] There is an essential mismatch between the object language and the metalanguage. In the object language empty terms, e.g. "Vulcan" are without a value. But in the metalanguage which gives truth conditions of the object language sentences, such terms acquire * as their reference. For the object language we have only one domain, the actual domain. But in the metalanguage we have two domains, actual and outside domain containing *. We have to start trying to talk sense about *. Does * exist or not? Can Scott really have it both ways? It is not at all obvious that Scott's system meets the intuitive requirement upon an adequate theory of truth for a natural language: that the metalanguage and the object language draw on the same concepts.

In the next chapter we shall examine Grandy's proposal which is explicitly intended to meet this last requirement (which Grandy accepts) and is intended as an improvement on Scott's theory.

CHAPTER IX

REJECTION OF TRUTH VALUE GAPS AND RETENTION OF $T^{\ulcorner}p^{\urcorner} \equiv p$ (Continued) : GRANDY'S THEORY IN "A DEFINITION OF TRUTH FOR THEORIES WITH INTENSIONAL DEFINITE DESCRIPTION OPERATORS"(68)

Grandy's aim is closer to our purpose than the previous theories of Frege and Scott: to give a theory of truth which meets the requirements of Tarski and Davidson, for a natural language containing primitive non-denoting singular terms. The theories of Frege and Scott were chiefly concerned with formal languages. Grandy distinguishes, as we do, the singular terms in myth and fiction from those in serious discourse. He points out that the serious motivation for extending logic to include non-denoting singular terms is that "in everyday talk we use singular terms which we believe but do not know, denote; it seems desirable to have a logic which acknowledges this fact, and it seems plausible that a theory of truth can be formulated which expresses this fact."(69)

Grandy's theory is formulated with what he calls an intensional definite description operator as an integral part. We shall not be concerned with the special properties of definite descriptions but with empty singular terms in general. Grandy states three objectives for the theory(70). First, a coherent semantics for a non-extensional definite description operator. By a non-extensional definite description operator Grandy means one such that the formula $(x)\ (Ax \leftrightarrow Bx) \rightarrow \imath xAx = \imath xBx$ is not valid. This is one of the main differences between Scott's system and Grandy's. If we recall, Scott considers the preservation of this formula, which is a principle of extensionality, to be one of the advantages of his system. One of the reasons for insisting that all improper descriptions assume the same improper value is to preserve this law. As we shall see, Grandy regards this account to be formally coherent but unnatural for ordinary discourse and takes a different approach to prevent sentences such as "the present king of France = the present queen of France" being true.

The second objective is that for any singular term t, t=t should be valid. The axiom s=s and the schema $s{=}t \rightarrow As \rightarrow At$ are valid for all terms(71). Grandy's justification for including the usual identity theory for all singular terms is that identity statements are, he says, the clearest examples of sentences containing empty terms being true.

The third objective is that we should give a definition of truth for the language in a metalanguage with the same logical apparatus. We require the theory of truth which is of the kind well exemplified by homophonic theories. We shall not be concerned here with the first objective. The second objective is unproblematic. It was met by Frege's account and Scott's. The third was not met by either. We shall expound Grandy's system in some detail to see whether it is natural and whether it meets the third objective.

The logic used in Grandy's system is most similar to that of Scott's. It resembles free logics in general in that inference from (x) Ax to At or from At to $(\exists x)$ Ax is permitted only with the additional premise that $(\exists x)(x{=}t)$. But it is not a universally free logic, as Scott's is, because the domain of individuals is assumed to be non-empty(72). Singular terms are permitted to be at least potentially denotationless in the sense that they may have no denotation in the range of values of the variables, i.e. we cannot infer $(\exists x)(x{=}t)$ from t=t.

The semantics for Grandy's system is an extension of Scott. The first step is to permit an arbitrary non-empty set of objects (disjoint from the domain of individuals), D*, to function as a pseudo-domain for the non-denoting singular terms to pseudo-denote[(73)]. In effect, instead of * as the denotation of all empty singular terms we have $*_1 \ldots\ldots\ldots *_n$ as denotations of $t_1 \ldots\ldots\ldots t_n$. D* need not be finite. The second step is to permit the assignment of pseudo-denotation to a description to depend on what objects in the pseudo-domain satisfy the formula to which the description operator is applied. The theory treats the description operator as having a broader range of values for the variables it binds than the quantifiers. But, as we shall see, the actual formulation of the model theory leaves this point unclear.

We shall not attempt a complete exposition of Grandy's particular formulation of the theory but focus on the most relevant aspects. Even this will involve us in criticism of certain technical details. Fortunately there is another theory, Burge's, which amends Grandy's in various ways and removes the defects we complain about. We shall come to Burge later.

Grandy states the syntax of a language L which is a metalanguage of a second language OL, then he gives the model theory for L, and the truth theory for OL, different from the model theory. In the syntax the notable features are as follows. Proper names are treated as 0 place function-words, atomic sentences are treated as 0 place predicates.[(74)] The axioms and the rules are the standard ones with the exception of A_5. $((v)(Av) \wedge (\exists v)(v=s)) \rightarrow As$. The additional premise $(\exists v)(v=s)$ in (A_5) reflects the fact that Grandy's system is based on free logic. A_9 $(\exists x)(x=x)$ is notable because it shows that Grandy's system is not based on <u>universally</u> free logic.

The model theory is considerably different from Scott in that an interpretation of L is a quadruple $\langle\phi, D, D^*, \pi\rangle$, where D & D* are disjoint non-empty sets; π is a function defined on all subsets of $D \cup D^*$ whose values are elements of $D \cup D^*$, (x) $\in$ D iff $x \cap D = \{\pi(x)\}$, ϕ is a function defined on all terms, wffs, predicate letters and function symbols. Grandy has indicated that only the description operator ranges over both D and D*[(76)]. But the clause for the universal quantifier as it is stated shows that we quantify over D* as well: "(g) $\phi((v)A) = T$ iff for every interpretation $\langle \psi, D, D^* \pi\rangle$ such that ϕ and ψ agree on all predicate and function letters and all variables except possibly v, $\psi(A) = T$"[(77)]. If we added "and $\psi(v) \in D$", then quantification would be restricted to the actual domain.

Let us see how Grandy's model theory can be applied to evaluating the sentences of II. "Vulcan = Vulcan" would be true, for we have "(j) $\phi(s=t) = T$ iff $\phi(s) = \phi(t)$" ϕ(Vulcan) would be, say, $*_v \in D^*$ according to "(h_o). For each f_i^o $(f_i^o) \in D \cup D^*$"[(78)].

"Vulcan is a planet" and "Vulcan disturbs the perihelion of Mercury" would be <u>true</u>. The relevant clauses are:

(Cn) For each p_i^n, $n > o$, $\phi(p_i^n) \subseteq (D \cup D^*)^n$

(d) For each atomic wff $p^n(s_1 \ldots\ldots s_n)$, $\phi(p^n(s_1 \ldots\ldots s_n))$ $= T$ iff $\langle \phi(s_1) \ldots\ldots \phi(s_n)\rangle \in \phi(p^n)$

(Cn) allows the extensions of predicates to be in D and D*. (d) allows the above sentences to be evaluated as true. The model theory Grandy states provides us with an evaluation procedure for sentences containing empty names. Thus the metalanguage L has been adequately characterized by the given model theory.

Now we can see how the truth theory for the object language OL is framed in L. The relation between OL and L is characterized without the notion of translation. For each predicate or function letter in OL there is a corresponding predicate or a function letter in L. There is a one place predicate D in L whose intended interpretation is the domain of OL. L has the adequate resources to describe the syntax of OL. We assume a correspondence between the vocabulary of OL and a subvocabulary of L. Grandy formulates the definition of truth via the standard procedure of satisfaction of formulas by sequences of objects. The axioms T_3 and T_4 for assignment of values to singular terms require some explanation. In the model theory for L, it is explicitly stated that the values of singular terms can be in D or D*[(78)]. In the truth definition it is not clear whether T_3 assigns values to empty names. We can interpret it by comparing it with T_4 together with Grandy's remark that the pseudo domain D* is not brought in the truth definition and conclude that empty names are <u>not</u> given values by T_4. In T_4 it is clear that only proper definite descriptions are assigned values[(79)]. In order to define values of terms other than variables, we have an axiom for each function letter f^n

$$T_3.(\alpha)(\underline{s}_1)\ldots(\underline{s}_n).\alpha(f^n(s_1\ldots s_n)) = f^n(\alpha(\underline{s}_1)\ldots\alpha(\underline{s}_n))$$

There is a parallel axiom for $\imath$

$$T_4.(\alpha)(\underline{v})(\underline{A})(\underline{\imath vA}) = \imath x(D\wedge(\exists\beta)(\alpha \approx^{v}_{x} \beta \wedge \beta \text{ sat } \underline{A}))^{(80)}$$

Why is Grandy so shifty about this? If in L the quantifiers range only over D, then the predicate "D" is superfluous - but he uses it in T_2 and T_4; anyhow, the quantifiers of L cannot range only over D unless D is closed under sequence formation. Besides, if one compares T_3 with h_n and footnote 11, it looks as if we must be quantifying over DuD*; otherwise T_1 would have to be

$$(\exists \alpha)(v)(\exists x)\ (\alpha(v) = x \ \&\ Dx)$$

at least. He is too sketchy about what his sequences are sequences of, i.e. things in D or in DuD*[81].

There are further difficulties with T_3 and T_4. Burge has shown that these axiom schemas have untrue instances[82]. "For example they yield the sentences:

(9) What any sequence α assigns to 'the successor of the moon' is identical with the successor, of what α assigns to 'the Moon'."

(9) is untrue because there is no successor of what every sequence assigns to "the Moon" and there is no assignment by α to "the successor of the moon".

Another objection stated by Burge is that Grandy's system is not successful in avoiding implausible identity statements which Grandy proposed to eliminate. As in Scott's system, sentences such as "the present king of France is identical with the only unicorn on the moon" can be proved in Grandy's theory when we add an axiom "(x)(Present King of France (x) $\leftrightarrow$ Unicorn on the Moon (x))".

We shall conclude with some general remarks regarding the kind of approach taken by Grandy.

Grandy anticipates the objection that the pseudo domain and the pseudo objects invoke possible worlds and possible objects[83]. Grandy's defense is that the pseudo-domain is respectable in the model theoretic context and does not enter the truth definition. But how is Grandy going to show that anything which follows from a set of true sentences is true in L, unless he mixes up model theory and truth definition? And in just the way he does not want to.

Grandy's assumption underlying his project, that if we do not mention the domain of non-entities in the language in which the truth definition is given, we are not committed to these entities, seems questionable. Grandy states that the matters of ontology and intensionality can be better explained after the model theory and truth theory have been given for then it is easier to argue that the pseudo-domain is respectable in the model theoretic context and does not enter the truth definition[83]. This does not sound right. We do not need to go to the model theory and truth theory to know our ontological committments. We know it at the level of object language when we introduce the singular terms as referring to objects Grandy states that although the model theory requires a domain D* of non-entities, these entities are unreal "only from the point of view of the object language"[84]. In giving the theory of truth, "the dubious domain (of non-entities) vanishes entirely for no mention of it was made..."[84]. But how can the pseudo domain, once introduced by Grandy, vanish? In the metalanguage when we take the singular terms of the object language as part of it, the denotations of the singular terms are still with us, and so is the domain D* which consists of the denotations of some singular terms. Of course, in the metalanguage, the denotations of the names of the object language singular terms are the singular terms and not the objects denoted by these terms. But in giving the theory of truth which is to give the truth conditions of, e.g. "The king of France is bald", we are concerned with objects and not expressions such as "the king of France". So whatever object, real or unreal, we are committed to at the object language level, we are equally committed to at the metalanguage level, for to give a truth definition we have to talk about the denotation of the expressions and not just about the expressions.

We conclude that in spite of the initial promise of Grandy's theory, his objectives cannot be achieved without substantial modification of his theory. In fact, Tyler Burge has proposed a method of securing a great deal of what Grandy wanted and we shall come to Burge's theory in due course. But before the reader loses the thread of the argument, he may prefer to see the advantages and disadvantages of truth value gap theories. They may seem to have much more promise.

CHAPTER X

GAP THEORIES : LAMBERT AND van FRAASSEN

There are reasons having to do with semantical paradoxes and the difficulties of "universal languages" to think that there may always have to be sentences to which we cannot give a settled truth value. These considerations might affect the problem of definite descriptions. Definite descriptions are what we use to try to designate paradoxical entities in e.g. set theory. The connexion of these problems with the problem of vacuous names is much less direct. Names after all are finite in number (at a stretch, denumerably infinite perhaps). Each is connected, or is purported to be connected, with a designatum, and connected so by some convention which gives meanings to these signs. It is not like that with definite descriptions in particular. It does not hold that for each definite designation there is a separate convention. Their functioning depends on the semantic properties of their parts. It is this which makes them useful in the constructions which bring us at the limit to paradox.

It follows that there should be self-sufficient reasons to postulate truth value gaps for sentences with empty names. All writers on the subject that I know of who have wanted gappy evaluation have thought there were self-sufficient reasons. On the other hand, as we shall see in Chapter XI, systems with gaps invented to deal with paradoxes do appear to provide a possible framework for empty reference.

"Gappy" evaluation procedures for sentences involving empty names fall into the second class in the Dummett classification. We begin with gap theories which abandon the equivalence $T\ulcorner p \urcorner \equiv p$, in particular van Fraassen's theory in "Singular terms, truth value gaps and free logic"[85]. We shall make the transition to this, however, via the no-gap theory in Lambert and van Fraassen's Derivation and Counterexample, which they claim to be readily adaptable to van Fraassen's "supervaluation" approach for gappy evaluation.

In Derivation and Counterexample Lambert and van Fraassen present a system of universally free logic as an extension of classical quantification theory with identity to include the empty domain. Before weplunge into the actual system, some general remarks about the value of universally free logic are called for. The justification for admitting the empty domain is that "it is not a logical truth that there is something rather than nothing"[86]. It would seem that as a matter of principle a system of logic should not have existential presuppositions about the domain or the language. "There are many areas of ordinary discourse in which non-referring terms occur and free logic is meant to be usable in the logical analysis of such discourse"[87]. Free logic is intended to provide "principles of reasoning in situations where the objects of our discourse are either non-existent or have only putative existence. So it enables one to measure the worth of reasoning in fictional discourse as well as in discourse about, say the hypothetical entities of science"[38].This reinforces to some limited extent, though not in the terms I should have chosen, what I have already endorsed about the importance of free logic for empty reference.

Now we shall focus on the distinguishing characteristics of Lambert and van Fraassen's system, "IntElim (*=)" in Derivation and Counterexample.[89] All singular terms are to be regarded as having no existential import. Neither Fa ⊢ (Ex)(x=a), then, nor Fa ⊢ (Ex)(Fx) are valid. Lambert and van Fraassen argue that if all singular terms were treated as having existential import - with the result that a simple statement containing a singular term could not be true unless that term really referred to something, then "a great number of common English statements could not be accommodated". According to Lambert and van Fraassen, there are true sentences which appear not to entail any existence claim. "Zeus is not identical with Allah", "The ancient Greeks worshipped Zeus" are given as examples of such sentences.

Whether these are good reasons for extending standard quantification theory depends on how seriously we regard discourse about non-existent entities. But an attempt to give a non-reductive account of such discourse cannot be without some direct or indirect value.

The statement of the rules of universal and existential generalization and instantiation differ from those of Scott and Smiley[90]. Van Fraassen and Lambert proceed by restricting the operations of the usual rules to formulas that do <u>not</u> contain individual constants. The formulas to which the rules apply never therefore contain empty referring terms. For instance, from (x)Fx we can infer Fx or Fy but not Ft, "t" being a metalogical variable for variables and constants. It is the case where "t" is a constant that invalidates $(x)Fx \vdash Ft$. A free variable is treated as a name which refers to an existent. A bound variable ranges only over the domain. The values of free and bound variables are taken from the domain. This treatment of free variables differs from Scott's system in which the values of free variables were allowed to be outside the domain. One advantage of this is that, as Lambert and van Fraassen note, IntElim (*=) extended to include singular terms does not differ in its account of logical truth with respect to statements containing only variables.

Formulas involving quantifiers that are valid in the standard systems are valid in IntElim (*=) when additional existential statements are supplied. In the standard systems $(x)A \supset (t/x)A$, $A \supset (Ex)(x/t)A$ are valid. In IntElim (*=), they need to be supplemented by $(Ex)(x=t)$: $(x)A \supset (Ex)((x=t) \supset (t/x)A)$ and $A(t/x) \supset ((Ex)(x=t) \supset (Ex)A)$.[91]

The rules of identity are extended to the entire class of singular terms. "In the case of non-referring terms correct usage of identity ascription cannot be decided by appealing to the sameness of reference. So we choose to accept the principles of self-identity and substitutivity of identity to govern correct usage there".[92] The rules are:[93]

$$\text{I I} \quad : \quad t=t$$

$$\text{I.E} \quad : \quad t_1=t_2, \quad A \vdash (t_2/t_1)\,A.$$

Given these rules, sentences such as "Pegasus = Pegasus", and "the golden mountain = the golden mountain", are provable. But Lambert and van Fraassen observe that it is not prima facie inconsistent to say that Pegasus is not Pegasus. The rules of identity need not be extended to all singular terms, although they can be extended without any logical difficulties. t=t is not a logical truth. "That 'Cicero = Cicero' is true, is no doubt indisputable since the person referred to by 'Cicero' must be exactly the person referred to by 'Cicero', namely Cicero. But this only establishes that 'Cicero = Cicero' is true, not that it is logically true".[93] It might seem right to accept "y=y" as being true of any replacement of "y" by any singular term. As Hailperin and Leblanc write, "We feel indeed that a statement of the form w=z is true if and only if z designates whatever w designates. But w designates whatever w designates, whether or not w designates anything. Hence w=w should be true whether or not w designates anything."[94]

Here we want to raise an objection. This view about identity is difficult to defend. It seems to accept the pre-"On Sense and Reference" view of identity as a relation between names or signs. If identity is a relation between objects, as it must be, how can "Vulcan = Vulcan" be true given that the sentence does not mention any objects that have the relation of identity? The inclination to regard such sentences as true seems to arise out of treating identity as a relation between signs and not objects. As Frege has exposed, such a view cannot be defended(95).

Lambert and van Fraassen's "metatheory of free logic" utilizes the notion of truth in a model to give a theory of truth for a language containing non-referring singular terms. To begin with, we have a model M, which can be taken as a possible world (in a non-commital sense, to be explained later) and the domain of M, which is a set of inhabitants - things which exist in M(96). "How can we find out whether 'Pegasus flies' is true in M if 'Pegasus' does not designate anything in M? The answer to this question is: we can not find out. Since Pegasus does not exist, there are no facts to be discovered about him".(97) Lambert and van Fraassen point out that we can arbitrarily assign such sentences a truth value. We have considered this approach as it was taken by Frege and found it inadequate. The approach Lambert and van Fraassen take is Fregean in spirit.

> We can say that due to its occurrence in some story (say in Greek mythology) the name 'Pegasus' has acquired a certain connotation. Due to this connotation we may feel that 'Pegasus swims' is false and 'Pegasus flies' is true. To get all the true sentences in the language, then, we need as part of a model M also a <u>story</u>. This story has to be consistent with the facts in M, of course; if M is the real world, the story may say that Pegasus flies but not that Pegasus exists nor that Pegasus is identical with some real horse.(97)

A model M consists of a domain D (a set empty or non-empty), an interpretation function f, and a story S. The function f assigns to each predicate P a relation f(P) among the elements of D, and each element of D to one or more constants. (It is assumed that each thing in D is denoted by some constant.) The story S is a set (empty or non-empty) of atomic sentences, each of which contains some constant to which f has assigned no element of D[(98)]. Then the definition of the sentences and the usual connectives are as follows. "$M \models A$" stands for "the value of A in M is T".

(a) $M \models Pa_1 \ldots a_n$ iff either $Pa_1 \ldots a_n$ is in S or $\langle f(a_1 \ldots a_n) \rangle \in f(P)$.

(b) $M \models \neg A$ iff not $(M \models A)$.

(c) $M \models (A \& B)$ iff $M \models A$ and $M \models B$.

(d) $M \models (A \vee B)$ iff $M \models A$ or $M \models B$.

(e) $M \models (x)A$ iff $M \models (b/x)A$ for every constant b to which f has assigned an element of D.

Every statement has a truth value in a model. We shall be only concerned with the clause (a). It seems that (a) is not adequate in specifying just which sentences of fiction are true in M. "$M \models Pa_1 \ldots a_n$ iff either $Pa_1 \ldots a_n$ is in S ..." would include any sentence of S to be true in M. Lambert and van Fraassen simply state that the sentences of S would have to be consistent with the facts in M. If (a) is to be an adequate definition, this idea has to be somehow incorporated into it. We cannot rely on what we "feel" is true because the story says certain things. Given just (a), we cannot say that 'Pegasus exists' is false in M, if it is in S. Lambert and van Fraassen could say that "exists" is different from other predicates in that its extension is the whole domain, the objects in the domain; it can only be applied to singular terms which refer. But then we could say by the same token that the sentence "Pegasus flies" conflicts with the facts in M, for the extension of "fly" is a part of the actual domain and it applies only to singular terms that refer. In other words, if we are going to accept sentences such as "Pegasus flies" as true in M because the story says so, there is no reason not to accept whatever else is asserted in the story: "Once upon a time there was ..."

Regarding the truth status of identity statements in M, Lambert and van Fraassen offer the following explanation.

> If b designates something then b=c is true exactly if c also designates that very same thing. But if b does not designate anything then b=c is true exactly if it belongs to the story of the model ...
>
> (a) b=b is in S if and only if b is a constant that does not designate anything in the model.
>
> (b) if b=c is in S and A (which contains c) is in S (and A', which contains b, is in S) then both (c/b)A and (b/x)A' are also in S.[99]

The obvious reaction to (a) is that b=b can be in S even when b designates something in the model. For instance, in the theory about Vulcan, "Mercury = Mercury" is a true statement.

We conclude that Lambert and van Fraassen's metatheory of free logic does not give us an adequate theory of truth for languages containing nondesignating singular terms. This is not to deny that there is something right in their approach. Lambert and van Fraassen state that their development of free logic is motivated by what Russell called "the robust sense of reality"[100]. It is a virtue that the semantics for their system do not commit us to the realm of non-actual but possible beings. They stress that the "talk" about non-existents is just talk. For a model M, we can list $S_1 \ldots S_n$, the stories or theories in addition to the actual domain.

But does this mean that the semantics are just talk about talk? If it does, then the system is not really what it purports to be - an evaluation procedure for extensional sentences containing empty names. And the motivation for all the restrictions which Lambert and van Fraassen want to put on classical logic is not really sound. For classical logic ought then to be all right from this viewpoint provided only that it is applied to sentences which do not have the overt oratio obliqua understanding that they are to be read as saying "The story has it that ...".

But perhaps Lambert and van Fraassen do not want to say, what the above suggests, that there are no strictly true extensional sentences of the form "Fa" where "a" is empty. Rather they seem anxious to provide for the possibility that "Fa" could be true without a existing. That within the story "Fa" can hold without "a exists" holding outside the story seems to be something which impresses them. But the proper reaction to that is not a separate semantics for empty terms - after all saying that P in storytelling is speaking as if it had really been true that P - but an insistence that the storytelling mode is parasitic upon the ordinary mode of speakers and that at every point it simulates it. The right semantics on this view is the classical one. And the right approach to empty names is to say something extra about them after the normal semantics one completes. (We may well be driven to that approach ourselves in the end.)

One feels that these do not exhaust the possibilities for Lambert and van Fraassen. Perhaps another clue to their intentions is provided by the theory Lambert produced in collaboration with Meyer.[101] Meyer and Lambert's system, FQ, seems to be a natural extension of Lambert and van Fraassen's system. What we said above about the connotation of "Pegasus" due to its occurrence in a myth is expressed as "the nominal interpretation" of "Pegasus" by Meyer and Lambert. By means of nominal interpretation, they define "nominal truth". Briefly, Meyer and Lambert's approach can be summed up in this way: non-empty names are given "real interpretation". They are assigned real objects in the actual domain. The sentences containing non-empty names are to be evaluated as "really true" or "really false". Empty names, on the other hand are assigned "nominal interpretations". Meyer and Lambert state:

> Nominally it is evident that 'Pegasus is a horse' is true, and sharply differs from the nominally false 'Pegasus is a cow' ... 'Pegasus' is in the domain of, to coin a barbarism, horse-words.[102]

It is obvious, however, that "nominal interpretation" and "nominal truth" have to do with dictionary meanings of words and not with truth. It seems undesirable to speak of "real truth" and "real interpretation" and "nominal truth" and "nominal interpretation" in a semantical theory. Dictionaries give us meanings of words without involving nominal truth or interpretation. Saying something true involves more than just using words in a way which is saying something correct or acceptable. One consequence of FQ is that the so-called analytic sentences such as "All bachelors are unmarried", being nominally true, will belong to the same class of sentences as "Pegasus is a horse", or "All unicorns have one horn". The most undesirable of all the consequences of FQ is that all false theories become nominally true theories.

The natural move at this point is to change direction and introduce truth value gaps and regard sentences with empty names as lacking a definite truth value. Van Fraassen himself has developed a theory with truth value gaps, a theory of "supervaluations"(103). In Derivation and Counterexample, supervaluations are mentioned as a possible approach to the free logic described there.

Van Fraassen expounds the method of supervaluations in the following way. In order to present an interpretation of language L, we specify a domain of discourse D, a non-empty set of things and a function f which assigns reference to terms and extensions to predicates. f is a partial function: for some names t f(t) is defined and is a member of the domain D and for some other names that function is not defined. For some predicate F of L f(F) is the extension of F.(104) There is an asymmetry here in that van Fraassen allows partial interpretations for singular terms but not for predicates. In this respect Smiley's system which allows partial interpretations for both singular terms and predicates is more comprehensive.

The following table shows how supervaluations differ from classical valuations over a model (f ; D) when the language contains a predicate F, names a, b, and f(a) is defined and f(b) undefined. There are exactly two classical valuations V_1, V_2. s is a supervaluation.(105)

	V_1	V_2	s
Fa	T	T	T
$\sim$ Fa	F	F	F
Fb	T	F	-
$\sim$ Fb	F	T	-
Fb V $\sim$ Fb	T	T	T
(x)Fx	T	T	T
(x)Fx $\supset$ Fb	T	F	-

V_1 and V_2 differ only with respect to formulas with empty names. V_1 adopts the convention that formulas with empty names are true and their regulations are false. In V_2 the opposite holds. Valuation V_1 is adopted by Scott and Grandy. And V_2, as we shall see, is adopted by Burge. The supervaluation s, on the other hand, admits gaps and does not make arbitrary decisions with sentences containing empty names.

Let us illustrate how a supervaluation works with "Vulcan is a planet". According to the table, since f("Vulcan") is undefined, the sentence has no truth value. Nor does its negation, "Vulcan is not a planet" have a value. There is something natural about these rulings, perhaps. But then, in spite of the disjuncts being unevaluated, the disjunction "Vulcan is a planet or Vulcan is not a planet" is evaluated by the method of supervaluation, and evaluated as true. Normally "Fb V - Fb" is true if at least one component is true. With supervaluation this is not so.

As we shall see in the section on Kripke's theory of truth, this is not the only way of handling a gappy evaluation procedure; and we can maintain the classical interpretation of "v" in another way from van Fraassen. Once one has seen this, one finds it even more difficult to see how "Fb v - Fb" could be true even when both "Fb" and "- Fb" lacked a truth value. It violates our intuitions about disjunction that it could be true otherwise than in virtue of the truth of a disjunct. Surely "Fb v - Fb" should also lack a truth value. (As it does in Kripke's theory which uses Kleene's strong three-valued tables.) We shall return to this matter when we assess van Fraassen's distinction between the law of excluded middle and the principle of bivalence.

Van Fraassen's attitude to the law of excluded middle is obviously connected with a doctrine which he and Lambert refer to in Derivation and Counterexample(106) as "the venerable doctrine that the familiar truths of logic alone have no factual content". But what is so venerable about it? Certainly, if being devoid of factual content were their claim to being distinguished from other sentences, they should not differ very interestingly from "All mimsy were the borogrores and the mome raths outgrabe". Would it be all right to throw this, too, into the class of logical truth? It would do no harm - on van Fraassen's view. Logical truth is logical truth. So logical truths are truths. That the facts about the world do not invalidate them does not indicate that they are devoid of factual context. (What does that mean anyway?) Rather they agree with the world however it is.The reason surely why nothing can invalidate them is that they are logical truths. If they lacked factual content, how could they be applicable to the discourse about the world, or guide our discourse about the actual world? "True" means the same in a deduction whether applied to contingent or necessary premises. It is not a homonym.

It is strange, too, that the authors overlook the fact that the assignment of truth values in Derivation and Counterexample actually conflicts with the method of supervaluations which they refer as a possible treatment of their system. In Derivation and Counterexample, "Pegasus is a horse" is evaluated as true because of the myth about Pegasus. In supervaluations since "Pegasus" does not denote, the sentence is neither true nor false. So Lambert and van Fraassen are not justified in claiming to be able to assimilate easily the supervaluation approach into the system in Derivation and Counterexample.

Van Fraassen states that the unorthodoxy of interpretations with truth value gaps is mainly one of semantics. The reason why he says this is that the method of supervaluations forces one into making a distinction between the law of excluded middle and the law of bivalence. The "logical law of excluded middle" says that the sentence of the form P v - P is true. "The semantic law of bivalence" says that every proposition is either true or false, i.e. that one of P and - P is true and the other is false. In classical contexts the distinction between excluded middle and bivalence is without very much importance. $T(\ulcorner P \vee - P \urcorner) \equiv P \vee - P$. But according to van Fraassen the admission of true value gaps gives it content. $M \models (P \vee - P)$ is valid for all interpretations M, but it is not the case that for all M, either $M \models P$ or $M \models - P$.

There is a conflict between this distinction of excluded middle and bivalence and the principle $T\ulcorner P \urcorner \equiv P$, which van Fraassen puts as

(20) P if and only if it is true that P.

Van Fraassen says that he accepts (20) as plausible. Clearly the acceptance of (20), which is not different from Tarski's schema $T\ulcorner p \urcorner \equiv p$, should lead to accepting the equivalence of excluded middle and bivalence. For given

$$T\ulcorner p \urcorner \equiv p$$

and

$$P \vee - P$$

we have

$$T\ulcorner (p \vee - p) \urcorner$$

But van Fraassen attempts to avoid this result by rephrasing (20) as

(22) P; hence: It is true that P. It is true that P; hence: P.(107)

Then van Fraassen argues that we have as consequence of (22)

a* P; hence: It is true that P

b* not - P; hence: It is true that not - P.

From a* and b* the most we can deduce is

d. It is true that P or it is true that not - P.

if we are given not

c. P or not - P

but only

c* Either P is true or not - P is true.

(The latter is not excluded middle but bivalence.) So van Fraassen concludes that (20) when reinterpreted as (22) does not lead to bivalence following from excluded middle.

There are two things wrong with this. First of all it violates the deduction theorem, $A \vdash B \rightarrow \vdash A \rightarrow B$. Second, even if the rejection of the deduction theorem could be justified in some way, van Fraassen's way of establishing the compatibility between "(20) P if and only if it is true that P" and the distinction between excluded middle and bivalence seems to involve circularity. It appears that in order to maintain the distinction already introduced, van Fraassen assumes the compatibility between (20) and the distinction. Van Fraassen suggests that what he regards as only an apparent conflict between (20) and the distinction shows that we should reformulate (20) to avoid the conflict. Van Fraassen's suggestion that (20) should be rephrased as

(23) It is true that P if and only if it is true that (it is true that P)

if we wished to use a biconditional, seems to give us all instances of the schema

$$\text{True } s \equiv \text{True "True (s)"},$$

which is what van Fraassen elsewhere calls "concessitation" and not

$$T\ulcorner p \urcorner \equiv p$$

which is clearly (20). The new principle scarcely salvages that particular thing which we found plausible in (20).

We conclude that if we have $T\ulcorner p \urcorner \equiv p$, bivalence should follow from excluded middle. The effect of this by itself is not necessarily that we cannot distinguish bivalence from excluded middle, but that if we do distinguish then we must reject $T\ulcorner p \urcorner \equiv p$. We should then need a new criterion of material adequacy for theories of truth.

A consequence of distinguishing excluded middle from bivalence is that we cannot give the usual truth condition for $P \vee -P$. It is no longer the case that

'P v−P' is true iff P is true or −P is true.

It is then unclear how we should give the truth condition.

The conflict between $T\ulcorner p \urcorner \equiv p$ and the distinction of excluded middle and bivalence is not present in all systems with truth value gaps but is, so far as I know, unique to van Fraassen's formulation. The way in which we can admit both $T\ulcorner p \urcorner \equiv p$ and truth value gaps is by regarding $T\ulcorner p \urcorner$ as truth valueless when p lacks a truth value. The view that compounds are assertions whose values are uniquely determined by the truth values of the components gives support to such an interpretation. This leads me now to Kripke's theory of truth in which both $T\ulcorner p \urcorner \equiv p$ and truth value gaps are admitted.

To motivate Kripkean theory of truth, viz. a theory of truth with gaps for languages containing their own truth predicates, we shall here bring into the argument Parson's argument against van Fraassen's theory of truth.[108] There are two essentially different ways to a theory of truth here. If we follow Tarski, we have $T\ulcorner p \urcorner \equiv p$. That forces out the method of supervaluations. If we go against Tarski, however, we are not constrained by Tarski's restrictions or his hierarchy of languages to resolve the liar paradox. If we abolish the hierarchy of languages we cannot easily escape the obligation to try to approach a <u>universal</u> theory of truth. We shall see nothing wrong with the demand for a language that can state its own semantics or with a theory which applies to the very language in which the definition itself is given. But then it becomes doubly reasonable to demand that van Fraassen's theory of truth should apply to the metalanguage in which van Fraassen defines truth. (van Fraassen himself has an anti-Tarskian view of the semantic paradoxes.) Parson's argument shows that it cannot, and it questions the role of concessitation which van Fraassen accepted in place of $T\ulcorner p \urcorner \equiv p$, in van Fraassen's theory of truth.

Given concessitation, Parson argues, the concept of truth which van Fraassen's semantics explains is not the concept of truth in natural language which we set out to investigate. "True in the object language" diverges in a way van Fraassen ought to find unacceptable from "true in the metalanguage".

According to van Fraassen, the relation between A and T⌜A⌝, where 'T' expresses truth in the language, is concessitation: if A is true, T⌜A⌝ is true and vice versa.[109] Parsons remarks that this concessitation fails when we consider the liar paradox. Van Fraassen's truth theory says of the liar sentence that it is neither true nor false. This conflicts with concessitation. Parsons argues that given concessitation, it would be natural to say that when A is not true, T⌜A⌝ should be false. But when A is the liar sentence this does not work: when A is not true, T⌜A⌝ is not false but neither true nor false. The conclusion is that 'T' fails to express the concept of truth as it is used in the metalanguage. Parsons states that from the point of view of truth theories which attempt to give definitions of truth for languages containing their own truth predicates, eg. natural languages, van Fraassen's system has a serious flaw: '- T' of the object language and the phrase 'not true' of the metalanguage diverge in sense.[110] We have a sentence A such that (it is true to say in the metalanguage that) it is not true, but T⌜A⌝ the sentence that is supposed to say in the object language that A is true is not false, and - T⌜A⌝ is not true. This result goes against the idea that for a natural language there is no difference between what one can say in the language and what one can say about the language from outside.

Van Fraassen's theory has not produced a satisfactory account of empty reference. In order to find another theory of empty reference which does what van Fraassen attempts to do, we shall first expound Kripke's new theory of truth which diverges from all the previous theories in the manner in which it challenges Tarskian theories of truth as unsuited for natural language.

CHAPTER XI

DIGRESSION : KRIPKE'S THEORY OF TRUTH(111)

Kripke's theory of truth differs fundamentally from Tarski's theory in giving a definition of truth for languages containing their own truth predicates. In Tarski's theory, a truth definition cannot be given for semantically universal languages. Tarski's theorem showed that we cannot define truth for a language containing its own truth predicate without provoking the Liar Paradox. The point is that Tarski's account embodies his diagnosis of the Liar and, so viewed, his theory is like a major surgery for a hangnail. Kripke has found a way to be much less drastic and that embodies another diagnosis of the Liar.

Kripke's point of departure is the acceptance of the fact that natural language contains its own truth predicate; a theory of truth for a natural language should account for this fact. Kripke's strategy is simple: Tarski's theorem applies only to languages without truth value gaps(112). We can circumvent the paradox and also satisfy Tarski's criterion of material adequacy for a theory of truth, which amounts to the equivalence $T\ulcorner p\urcorner \equiv p$. For if we admit truth value gaps, then the paradox goes into the gap. We can say that natural language as a matter of fact has its own truth predicate, and that this fact, together with Tarski's criterion which must be satisfied by all theories, force the paradox into the gap.

We want to investigate whether Kripke's theory of truth provides a framework within which sentences with empty singular terms in extensional position can be evaluated. Kripke says that, with Strawson, we can regard sentences without truth values as meaningful(113).

> The meaningfulness or wellformedness of a sentence lies in the fact that there are specifiable circumstances under which it has determinate truth conditions (expresses a proposition), not that it always does express a proposition.(114)

Kripke's remark is intended for paradoxical sentences. But the same can be said for other sentences without determinate truth value, as Strawson said concerning sentences with empty singular terms(115).

We have seen that the orthodox theory does not accommodate sentences with empty singular terms. But we have not challenged the theory's title to be the correct truth theory for natural language. To motivate Kripke's proposal, we shall enumerate Kripke's objections against the orthodox theory of truth.

The first objection is that Tarski's hierarchy of languages does not give us the accurate analysis of our intuitions concerning 'true'(116). It is stipulated that to avoid the paradoxes a language L_o cannot contain its own truth predicate. We have a metalanguage L_1 which contains a truth predicate $T_1(x)$ for L_o. The process can be iterated, leading to sequence (L_o, L_1, L_2, L_3,...) of languages, each with a truth predicate for the preceding. It is said that our language contains just one predicate "true", not a sequence of distinct "true_n" applying to sentences of higher and higher levels. A defender of the orthodox view might reply that the ordinary notion of truth is systematically ambiguous: the "level" in particular occurrence is determined by the context of utterance and the intentions of the speaker. We use implicit subscripts. Kripke rightly points out that this picture is unfaithful to the facts. If someone utters (4) he does not attach a subscript implicit or explicit to his utterance of "false" which determines the level of language on which he speaks. Furthermore, ordinarily a speaker has no way of knowing the levels of Nixon's relevant utterances for (4). Kripke's verdict is that the level of sentences such as

(4) All of Nixon's utterances about Watergate are false

does not depend on the form alone (as would be the case if "false" were assigned explicit subscripts), nor should it be determined in advance by the speaker, but rather its level should depend on the <u>empirical</u> facts about what Nixon has uttered. A statement should be allowed to <u>seek its own level</u> high enough to say what it intends to say. It should not have an intrinsic level fixed in advance as in the Tarski hierarchy. Notice that Kripke does nto dismiss the levels altoghether but advocates a different approach to how the levels are to be assigned to sentences. This is an important point which we shall take up in the analysis of Kripke's own proposal. The second objection is that sentences of the same level can judge each other but within the confines of the orthodox approach, if two sentences are on the same level, neither can talk about the truth or falsity of the other; the higher can talk about the lower but not conversely[117]. Suppose that Dean asserts (4), while Nixon in turn asserts

(5) Everything Dean says about Watergate is false.

We can assign unambiguous truth values to (4) and (5).

The last objection is that the orthodox approach is not usually stated with an account of transfinite levels[118]. There is no difficulty in the orthodox approach with asserting (6) Snow is white, and asserting that (6) is true and that "(6) is true" is true, etc.: the various occurrences of "is true" are assigned increasing subscripts. It is problematic to assert that all the sentences in the sequence are true. To do this, we need a metalanguage of transfinite level, above all the languages of finite levels. Kripke states that the problem of defining the languages of transfinite levels presents substantial technical difficulties and implausibilities.

Kripke's objections are meant to establish that Tarski's theory does not capture the notion of truth in natural language. But it seems that there is no objective way of deciding which is the best theory. Comparing the general strategies taken by two theories we could say the following: Tarski's approach revises the syntax of the language to prevent the liar paradox from being asserted. Kripke's approach revises the semantics to circumvent the liar paradox; it can be asserted but is outside of all possible extension of the truth predicate. Truth is now a partial predicate. It might be said that Tarski's approach is preferable: it might be said that it is better to revise the rules of syntax, which are not sacrosanct. The notion of truth cannot be mended without altering our basic intuitions. What this comparison reveals is that there is no ultimate criterion for deciding in favour of one theory rather than the other. However, we shall explore the usefulness of Kripke's theory for our purposes.

First, how do Kripke's objections against the Tarskian theory affect Davidson's proposal? If we look at the criteria of acceptability for a theory of truth and meaning formulated by Davidson, we can see that they are independent of the features of Tarskian theory that are considered by Kripke to be unsuited to natural language. The criteria could be equally well formulated within Kripke's theory. So Davidson's strategy of giving meaning via truth conditions can still be accepted.

Since Kripke's theory involves complexities that are not directly connected with our project, we shall not attempt to give a full explanation of the theory, but adapt it to a language containing empty terms[119], filling out the details using Kleene's strong three valued logic[120] which Kripke uses to illustrate the theory.

Kripke's proposal agrees with most of the alternatives to the orthodox approach on a single basic idea:

> there is to be only one truth predicate, applicable to sentences containing the predicate itself; but paradox is to be avoided by allowing truth value gaps and by declaring that paradoxical sentences in particular suffer from such a gap.[121]

CHAPTER XII

GAP THEORIES (Continued) NATURAL IMPLEMENTATION OF KRIPKE'S THEORY OF TRUTH APPLIED TO PROBLEMS OF EMPTY REFERENCE

A. MOTIVATION

Sentences with empty names in extensional position can be divided into three categories. We shall first list them and then state the underlying intuitions which suggest these verdicts.

(1) False: The sentences with empty names and non-empty names connected by predicates. Examples: "Leverrier discovered Vulcan". "Vulcan disturbs the perihelion of Mercury". "Aguirre found El Dorado".

(2) True: The negations of the sentences in (1). Examples: "Leverrier did not discover Vulcan". "Vulcan does not disturb the perihelion of Mercury". "Aguirre did not discover El Dorado."

(3) Undefined: The sentences with only empty names and extensional predicates (exception: "exist"). Examples: "Vulcan = Vulcan". "Vulcan is a planet". Exception: "Vulcan exists" which is clearly false.

The justifications for the above division are as follows. To say something true or false, we have to say something about the world and the entities in it. Extensional relations can only hold among actual objects. When we attempt to connect an empty name and a non-empty name by an extensional predicate, we say something false about the reference of the non-empty name: that it stands in such and such a relation with another entity. That assertion has to be false if there is no entity for it to bear the required relation. So we consider sentences such as

Leverrier discovered Vulcan

to be false and their negations to be true.

As for the sentences containing only empty names, how can they be true or false when there is nothing in the world for them to be true or false about? This is very different from saying that such sentences are meaningless.

Vulcan = Vulcan

Vulcan is a planet

are undefined, because given that "Vulcan" lacks reference, we cannot assign the value T or F to them. We follow Frege's reasoning here: it is of the reference of a name that a predicate is affirmed or denied. If a name lacks a reference, we cannot affirm or deny the predicate.[(122)] We cannot say of sentences which contain only empty names that they are true or false. It seems plausible to hold that using only empty names we cannot say anything true or false (about the world) but using empty names in combination with non-empty names we can. We shall propose a theory which attempts to capture these intuitions.

B. PRESENT PROPOSAL

Language L is based on free first order quantification theory with standard logical operations, =, individual constants, a, b, c ..., predicate constants, P, Q, R, individual variables x, y, z, x_1, y_1, z_1 ..., and the definite description operator ι. (To lighten the load of formal exposition function signs f, g, h ... will be thought of as defined, each of them by an axiom using 'ι' in the obvious way.) L contains empty singular terms and predicates with partial extension. A, B, C, are variables ranging over wffs of L, t, t_1 ... t_n over terms of L.

Since the truth theory is Kripkean, L may perfectly well contain its own truth predicate. Our eventual criticism of the proposal will depend on whether the statement of L's semantics can be turned back on itself. We shall find that it cannot. Not only that, the theory <u>depends</u> on the same devices behaving differently within the language being described and the language in which we are doing the describing. Enough has been said about the motivation for Kripke's theory to make clear how damaging a criticism this is. But it is worth emphasizing that the same argument would undermine the proposal even if we made (for Kripkean purposes) an otiose distinction between object and metalanguage. For Davidson's more modest requirements on language description are violated also. The same linguistic device cannot behave in different ways. We are talking about English in English. The axioms and rules underlying L are as follows.

A_1 If A is a tautology, $\vdash$ A.

A_2 $(x)(A \rightarrow B) \rightarrow ((x)A \rightarrow (x)B)$

A_3 $(X)(x=x)$

A_4 $t_1=t_2 \rightarrow (A(x/t_1) \leftrightarrow A(x/t_2))$

A_5 $(x)A \,\&(\exists y)(y=t) \rightarrow A(x/t)$

A_6 $(x)(x=\iota yAy \leftrightarrow (z)(Az \rightarrow z=x))$

A_7 $(x)(\exists y)(x=y)$

A_8 $(x)(x=t_1 \leftrightarrow x=t_2) \rightarrow (A(z/t_1) \leftrightarrow A(z/t_2))$ where x is not free in t_1 or t_2

A_9 $At_1 \ldots t_n \rightarrow (\exists y_1)(y_1=t_1)\& \ldots \&(\exists y_n)(y_n=t_n)$
where A is any predicate, including identity,
& where y_1 is not free in t_1.

A_{10} $(\exists y)(y=f(t_1 \ldots t_n)) \rightarrow (\exists y_1)(y_1=t_1)\& \ldots \&$
$(\exists y_n)(y_n=t_n)$ where y is not free in $t_1 \ldots t_n$,
& y_1 is not free in t_1.

R_1 If $\vdash A$ and $\vdash A \rightarrow B$, then $\vdash B$

R_2 If $\vdash A \rightarrow B$ then $\vdash A \rightarrow (x)(B)$ where x is not free in A.

We turn now to the theory of truth in L. The domain of discourse D is non-empty,(123) and consists of actual objects. s, s' ... are sequences of objects from the domain. Given a sequence s, s* is an interpretation function for all terms and predicates of L. Since L contains empty singular terms, s* is a particular function; for some arguments s*( ) has no value. $s^*(\overline{x_i})$ = i-th member of s. (The overlying device here is a <u>quotation</u> device.) $s^*(\overline{x_i})$ is always defined since sequences consist of actual objects from the domain, and the variables x, y, z, x_1, y_1, z_1 ... range over the domain. For each non-empty name n, we have an axiom of the form s*(n) = b. With each predicate letter of degree n we associate a domain $D^n(\overline{P^n})$ an extension of the form $S^1(\overline{P^n}) = \hat{z}$ (z is Q & $z \subseteq D^n(\overline{P^n})$) where the expression figures in the place marked by "Q" on the right hand side translates the predicate P^n. We also associate with each predicate letter an anti-extension by an axiom of the form $S^2(\overline{P^n}) = \hat{z}$(z is not Q & $z \subseteq D^n(\overline{P^n})$).(124)

We can then assign to each predicate letter an interpretation by an axiom of the form

$$s^*(\overline{P^n}) = \langle S^1(\overline{P^n}), S^2(\overline{P^n}) \rangle.$$

$s \overset{v}{\underset{x}{\approx}} s'$ is read "s' agrees with s in all assignments except that it assigns x to v". "v" ranges over variables of L. $s\frac{i}{z}$ is the sequence got by replacing the entity in the i-th place of s by the entity z. $\|A\|s = T$ is read "the value of A for the assignment is true" or "s satisfies A" or "the satisfaction value of A is truth". Note that the formula A here may be either open or closed. Similarly for $\|A\|s = F$ where F is falsity. $\|A\|s = u$ means that the satisfaction value of A is undefined. (The problems that this stipulation involves will surface in due course.) The postulates of the theory of truth for L are as follows.

T1. $(\exists s)(v)(\exists x)(s^*(v)=x)$

T2. $(s)(v)(x)(\exists s')(s \approx^{v}_{x} s')$

T3.1, 3.2 ... A finite list of axioms one for each non-empty name in the language and each of the form $s^*(n) = b$ where b is the entity which n designates. Where there is no entity designated by a name n, $s^*(n)$ is undefined.

T4.1 $(s)(z)\ ((\exists w)(\|\phi x_i\|s\frac{i}{w} = T \ \&\ w = z \ \&\ (y)(\|\phi x_i\|s\frac{i}{y} = T \rightarrow y = w)) \rightarrow z = s^*(\overline{\iota x_i \phi x_i}))$

T4.2 $(s)((\exists w)(\|\phi x_i\|s\frac{i}{w} = T \ \&\ (\exists y)(\|\phi x_i\|s\frac{i}{y} \ \&\ y \neq w) \rightarrow s^*(\overline{\iota x_i \phi x_i}) = \hat{z}(\phi z))$

T4.3 If no sequence satisfies $\overline{\phi x_i}$ then $s^*(\overline{\iota x_i \phi x_i})$ is undefined

T5. For each predicate letter of degree n there are axioms of the form (a), (b), (c) following.

(a) $\|P^n(t_1 \ldots t_n)\|s = T$ iff
$\langle s^*(t_1) \ldots s^*(t_n)\rangle \in S^1(\overline{P^n})$

(b) $\|P^n(t_1 \ldots t_n)\|s = F$ iff
$\langle s^*(t_1) \ldots s^*(t_n)\rangle \in S^2(\overline{P^n})$

(c) $\|P^n(t_1 \ldots t_n)\|s = u$ iff
$\langle s^*(t_1) \ldots s^*(t_n)\rangle \notin S^1(\overline{P^n}) \cup S^2(\overline{P^n})$

T6. $\| -A\|s = T$ iff $\|A\|s = F$

$\| -A\|s = F$ iff $\|A\|s = T$

$\| -A\|s = u$ iff $\|A\|s = u$

T7. $\| AvB\|s = T$ iff $\|A\|s = T$ or $\|B\|s = T$

$\| AvB\|s = F$ iff $\|A\|s = F$ and $\|B\|s = F$

$\| AvB\|s = u$ otherwise

T8. $\| A \rightarrow B\|s = T$ iff $\|A\|s = F$ or $\|B\|s = T$

$\| A \rightarrow B\|s = F$ iff $\|A\|s = T$ and $\|B\|s = F$

$\| A \rightarrow B\|s = u$ otherwise.

T9. $\|(v)A\|s = T$ iff $(x)(s')(s \overset{v}{\underset{x}{\approx}} s' \rightarrow \|(v)A\|s' = T)$

$\|(v)A\|s = F$ iff $(\exists s')(x)(s \overset{v}{\underset{x}{\approx}} s' \rightarrow \|(v)A\|s' = F)$

$\|(v)A\|s = u$ otherwise.

Definition of truth is $Tr(A) = df(s)\|A\|s = T$.

This proposal modifies the standard system just to the extent that it accommodates empty singular terms and admits truth value gaps. We should note that T6. and T7. conform with Kleene's tables for negation and disjunction. Negation is defined so as to preserve all instances of the schema $T\ulcorner p \urcorner \equiv p$. And P is true (false) if P is false (true) and undefined if P is undefined. Although we have truth value gaps, in effect the classical interpretation for negation is nowhere violated: a sentence is false iff its negation is true. (We shall return to Kripke's reasons for retaining a version of $T\ulcorner p \urcorner \equiv p$ in due course.) A disjunction is said to be true if at least one disjunct is true regardless of whether the other disjunct is true or false or undefined. (This interpretation of disjunction differs therefore from van Fraassen's supervaluations.)

As Kripke states[125], Kleene's strong three-valued logic does not require an <u>essential</u> modification of classical logic. It weakens the classical logic to the extent that $\|Av-A\| = u$ when $\|A\| = u$. But no extra truth values beyond truth and falsity are involved. 'u' can be understood as 'undefined' or unknown[126]. Kleene's tables are what we get if we interpret 'A is u' as 'it is not determined whether A is T or F'. 'u' can be thought of not as a truth value but as an 'epistemic value'. Kleene's explication of how 'u' functions is as follows.

> The status of u is not on a par with the other two values: u means only the absence of information that Q(x) is t or is f. We ask to be able to decide by an algorithm given x whether Q(x) ∨ R(x) is t or f (if it is defined) from information that Q(x) is t or is f (if it is defined) and like information about R(x). Information that Q(x) is u is not utilizable by the algorithm. If in case Q(x) is u, the algorithm gives e.g., t as value to Q(x) ∨ R(x) the decision to do so (for the given x, and R(x)) must not have depended on information about Q(x) since none was available ...[127]
>
> Unknown is a category into which we can regard any proposition as falling, whose value we either do not know or choose for the moment to disregard; and it does not then exclude the other two possibilities, 'true' and 'false'.[128]

The way Kleene interprets "u" is as "it is unknown whether true or false". But if this is the only admissible interpretation of "u" there is some difficulty in assigning u to paradoxical sentences, as Kripke does in his theory of truth. For it is not the case the value of paradoxical sentences are "unknown" or not yet determined. It is not as if they <u>will</u> sometime be determined, they are u at all fixed points, so everything that can be determined already is determined. There is a similar difficulty in Kleene's interpretation of "u" when assigning "u" to sentences with empty names which is what we hope to do. When we say e.g. the value of "Vulcan is a planet" is u, we cannot mean that the value is as yet unknown, or that it is not yet determined. What would we have to know to determine its value? We must mean that it definitely has no value T or F. In order to allow for sentences that definitely lack a truth value, we need to interpret "u" so as to cover "it is known that P is not true and P is not false", as well as covering "it is not known whether P is true or false". "u" will cover the disjunction of these, then.

Now we can apply the present proposal to some concrete examples. The truth value we want for

Leverrier did not discover Vulcan

is T. We shall work out the truth condition for this sentence translating it as $-(D, l, v)$. The clause for negation says that the negation is true iff the original sentence is false. So we have

$$\| -(D, l, v)\|s = T \equiv \|(D, l, v)\|s = F$$

To evaluate the right-hand side, we need T5.(b). But T5.(b) as it stands does not tell us how to decide the value of "ϕab" when "b" does not denote. One obvious amendment would be to add to T6.(b) the clause

$$\text{or if } \langle s^*(t_1) \ldots s^*(t_n) = \Lambda\rangle \in S^2(\overline{P^n})$$

But then what we have is Frege's stipulation for empty singular terms, that they all denote Λ, which we have rejected as being artificial for natural languages.

Another possible solution is to change T5.(b) and T5.(c) into

T5. (b)' $\| P^n(t_1 \ldots t_n)\|s = F$ if <u>either</u>
$\langle s^*(t_1) \ldots s^*(t_n)\rangle \in S^2(\overline{P^n})$ <u>or</u>
if $s^*(t_i)$ is defined and $s^*(t_j)$ is
undefined or $s^*(t_j)$ is defined and
$s^*(t_i)$ is undefined

(c)' $\| P^n(t_1 \ldots t_n) \| s = u$ if <u>either</u>

$\langle s^*(t_1) \ldots s^*(t_n) \rangle \notin S^1(\overline{P^n}) \cup S^2(\overline{P^n})$ <u>or</u>

$\langle s^*(t_1) \ldots s^*(t_n) \rangle$ are all undefined.

So $\| (D, 1, v) \| s = f$ by T5.(b) since $s^*(\overline{1})$ is defined but $s^*(\overline{v})$ is undefined. This is in the spirit of partial interpretation.

But now look at the form of T5.(c)' itself which, like T5.(b)', contains an empty term. According to our pretheoretic classification they fall under type 3, which means that the value is u. But surely the semantical theory itself has to be advanced as T, not as u.

Frege's solution faces the same predicament if we try to rephrase $s^*(t_n) = \Lambda$ to avoid unnatural consequences that follow from it. For instance, we might imagine we could read $s^*(\overline{\text{Vulcan}}) = \Lambda$ not as

Vulcan refers to the null class

but as

Vulcan does not refer to anything

Then the difficulty is that, this sentence, like all other sentences specifying the reference of empty terms, falls into the type 3 above, the sentences with the value u. But again the theory of truth must be committed to its own sentences being <u>true</u>. They are axioms of the theory. If, on the other hand, we interpret $s^*(\overline{\text{Vulcan}}) = \Lambda$ as " 'Vulcan' refers to Λ" (as we are forced by what we have already accepted regarding s* and 'refer'), then the sentence says that Leverrier discovered the null set. He didn't. (Perhaps Schroeder did.)

There is no immediate solution to this dilemma: axioms of truth theory stipulating the reference of empty terms either come out u or, on the Fregean option, give completely wrong interpretations.

We might try to avoid this result by insisting that the stipulations regarding sentences with empty names should not apply to the sentences of the truth theory. The logic of the truth theory itself, it might be said, is bivalent. But we cannot take this way out.

Since the language for which the theory of truth is given is the same as the language <u>in</u> which the theory is stated - or could be - it is an evasion of the obligations which bind any semantic theory to have a group of stipulations applying to one part of the language (English) and not to another part (English again) which uses exactly the same expressive devices. (Cp. Davidson "Semantics of Natural Languages" op.cit.) The requirement that object language and meta-language should not be mismatched is violated if we allow the gap into the object language and not into the metalanguage. The language <u>in</u> which truth definition is given is bivalent if and only if the language itself is. Kripke comments that the logic of the language stating the truth definition is bivalent. He says this without further elaboration.(129)

These difficulties do not seem to be accidental difficulties and they arise not at the limit of understanding (as the paradoxes do) but in connexion with what is central and elementary. Obviously we must go back to the other class of theories without truth value gaps. The sole survivor was Burge.

CHAPTER XIII

THEORIES WITHOUT TRUTH VALUE GAPS (Resumed) : BURGE'S "TRUTH AND SINGULAR TERMS"

Burge's theory, now the sole survivor, may be seen as arising out of the defeats he sees in Grandy's theory.(130) The differences are important particularly with regard to such identities as Zeus = Zeus or Jove = Vulcan (both of which Burge accounts false, on the ground that for truth the objective existence of the designata is required). But the similarities are more important than the dissimilarities.

Burge's theory is given in the form of a theory of truth for a language containing non-denoting singular terms accommodated expricitly as such. The theory is based on free first order quantification theory. If we have non-denoting singular terms in the language, then identity theory requires that we modify the operations of instantiation and generalization.(131) For given "(x)(x=x)", we derive "Pegasus = Pegasus" by unrestricted universal instantiation. By unrestricted existential generalization we should then arrive at $(\exists y)(y = \text{Pegasus})$ which is clearly false. It follows that we must either alter the identity theory or restrict the operations of instantiation and generalization. Changing the identity theory, we remark, might not be enough for if $xRx \supset xRx$ is valid then existential generalization would make $(\exists y)(yRy \supset yRy)$ valid, which, as Mostowski and Scott have pointed out, prevents the class of valid formulas being closed under modus ponens.(132)

Burge's treatment of identity seems preferable to the previous accounts. In Burge's theory the laws of reflexivity and substitutivity are:[133]

(A3) $\vdash (x)(x=x)$

(A4) $\vdash t_1=t_2 \rightarrow (A(x/t_1) \leftrightarrow A(x/t_2))$

Sentences such as "Pegasus = Pegasus" or "the present king of France = the present king of France", are false in Burge's system. Burge's reasons for advancing (A3) rather than the stronger axiom schema, t=t adopted by, for instance, Grandy and van Fraassen, are that, while self-identity is a property of objects and all objects have it, sentences expressing identity are true or false only by virtue of the relation that the identity predicate and singular terms bear to the world. "Pegasus" bears no such relation. "Philosophical questions regarding identity seem bound to the notions of existence and object".[134]

Burge treats sentences such as "Pegasus is an animal" as false, and treats "It is not the case that Pegasus is an animal" as true. All atomic sentences containing empty names are false for Burge. They cannot be true because basic predications (atomic predications enumerated as such in the theory) have to be true, if at all, of objects. When there are no such objects as are purported to be designated, then no predication of them can be true.[135] Burge makes room to regard the negation of an atomic sentence with an empty name or names as true rather then truth valueless because in his theory operations such as negation are seen as working on simpler sentences as wholes. Burge maintains that negation never serves to form complex comments upon or complex attributions to purported objects. Negation is treated as a sentential operator. Construed so, as a stoic operation on the whole, negation will form from any significant sentence which is not true a true sentence.

This certainly does justice to our feeling that it is true that Leverrier did not find Vulcan.

The best way of showing how this much is achieved is to show the derivation within Burge's system of the T sentence

True ($\overline{\text{Leverrier discovered}}$ (Vulcan) iff
Leverrier discovered Vulcan.

We are given as a definition of truth: "Tr $(\overline{A})$ = df$(\alpha)(\alpha$satisfies $\overline{A})$". So the sentence we need to prove is

$$s\ sat(\overline{D\ l\ v}) \leftrightarrow D\ l\ v$$

where "D l v" abbreviates "Leverrier discovered Vulcan".

(1) $s\ sat(\overline{D\ l\ v})$

(2) $s^*(\overline{l}) = l$

Now by T.5: s sat $\overline{\text{Discovered (t,t')}}$ iff Discovered $(s^*(t), s^*(t'))$. Therefore $D(s^*(\overline{l}), s^*(\overline{v}))$. Therefore

(3) $D(l, s^*(\overline{v}))$

Now by Burge's T3.(a) (see page 317) we have

(4) $(x)(x = \text{Vulcan} \leftrightarrow x = S^*(\overline{\text{Vulcan}})$

We now use (A.8) $(x)(x=t_1 \leftrightarrow x=t_2) \rightarrow A(y/t_1) \leftrightarrow A(y/t_2))$ where x is not free in t_1 or t_2, in order to detach on the basis of (4).

(5) $A(y/\text{Vulcan}) \equiv A(y/s^*(\overline{\text{Vulcan}}))$.

Take "D l(y)" as Ay, and we have

(6) $D\ l\ v \equiv D\ l\ s^*(\overline{\text{Vulcan}})$.

So by (3) and <u>modus ponens</u> we have

(7) D(1 v)

Therefore

(8) $s\ sat(\overline{D\ 1\ v}) \leftrightarrow D\ 1\ v.$

So much for the virtues. The difficulty is that Burge admits that his account of negation is incomplete. (He alludes here to Grice's scope distinction for proper names.) Burge sees that it will be difficult to prevent negation from operating on all open sentences whatsoever.(135) He remarks that the question is "tricky". It is indeed - if Burge's theory is not to lose its very distinctive feature.

Consider sentences such as

$$(x)(god\ x \rightarrow -\ (mortal\ x)).$$

Those sentences which essentially involve the operations of negation upon an open sentence are inexpressible in the language Burge describes. This will impoverish its expressive resources. Second note that sometimes in natural language, it is not clear whether negation is implicitly present or not in certain predicates. For instance "single" and "not married" and "married" and "not single" appear to be equivalent predicate pairs. But if predicate negation is not allowed one cannot be explained in terms of the other by means of an equivalence $(x)(Mx \equiv - Sx)$. A related point is that of the role of atomic predicates in Burge's theory. Burge's method of assigning truth values depends on being able to distinguish atomic predicates or sentences from others. But there is some difficulty in distinguishing atomic predicates in natural language and hence some difficulty in evaluating sentences in accordance with Burge's method.

The following example should illustrate the difficulty involved in assigning truth values in the way Burge states. Take "single" as a basic predicate. Then according to Burge

(1) Zeus is single

is false and

(2) Zeus is not single

is therefore true. Now it seems clear that "single" and "married" are contraries: "single" is equivalent with "not married" and "not single" is equivalent with "married". Employing these equivalences we get

(1)' Zeus is not married.

(1)' should be equivalent to (1). But on Burge's theory they have different truth values, since (1)' is a negation of something which should be false by Burge's theory. Similarly Burge's theory gives the value "false" to

(2)' Zeus is married.

But (2)' should be equivalent to (2), which, according to Burge, is true. (1)' and (2)' violate Burge's stipulation that atomic sentences with empty names are false and their negations are true.

This is not all. Depending on which predicate is taken as basic we would have to assign opposite truth values to the same sentences. (1) and (2), and (1)' and (2)' each has the opposite truth value depending on whether "single" or "married" is taken as basic. For some predicates this amounts to making it an arbitrary matter whether certain natural language sentences are true or not. That is not a way of taking empty names seriously. We conclude that, since it is not always determinate which predicates are basic, we cannot apply to natural language Burge's method of assigning truth values which depends on distinguishing basic predications from other attributions.

There is a related worry which questions Burge's rationale of singling out atomic predicates. "Zeus = Zeus" is false according to Burge because it is required for its truth that a certain relation have in its extension an actual pair $\langle$ Zeus, Zeus $\rangle$. Now take "Zeus = Zeus $\rightarrow$ Zeus = Zeus". This sentence is true for Burge because it can be evaluated as $F \rightarrow F$. But using the standard λ conversion we can arrive at the following from it:

$$(\lambda x)(x=x \rightarrow x=x)(\text{Zeus}).$$

This sentence must be true. Since $\phi y \equiv (\lambda x)(\phi x)(y)$ it is equivalent to the first sentence. But there is a difficulty in regarding the λ version as true if we take Burge's explanations seriously. How can this property, $(\lambda x)(x=x \rightarrow x=x)$ hold of Zeus if Zeus does not exist? This question simply copies Burge's own question about "Zeus = Zeus". So one might say that either the λ version is not equivalent or Burge's disthinction of atomic and non-atomic predicates betrays his motivation. If there was reason to require existence for "Zeus = Zeus" then one might argue that there was a reason to require it for "Zeus = Zeus $\rightarrow$ Zeus = Zeus".

Let us return to the problem of negation. Take the sentence

(3) Zeus is not a mortal person.

If we are given

(4) The class of gods is the same as the class of things which are not mortal

and we translate (3) as

(5) Zeus $\in \hat{y}$ (not a mortal person y)

then by intersubstitution we have

(6) Zeus $\in \hat{x}$ (god x)

which has as its predicate translation, "Zeus is a god". But this is false according to Burge. So if we follow Burge's method of evaluation a true sentence (3) implies a false sentence.

Obviously Burge would say that the whole problem here depends on the placing of the "not" within the class abstract and reading (3) in a way tantamount to a predicate negation. But this is not enough. Something must be done about the gap in the Powers of expression in Burge's language.

Suppose now that Burge did attempt to make the distinction between predicate negation and sentence negation. In order to maintain his valuations within the extended system, Burge needs to distinguish $-(\Phi a)$ or $-((\lambda z)(\phi z),(a))$ and $(Neg(\lambda z)(\phi z))(a)$.[136] Syntactically we can distinguish these. We read "Socrates is not a god" in the first way as the negation of zero place predicate "Socrates is a god". (λz)(Socrates is a god) is taken as the property that nothing has, for "Socrates is a god" is false. "Socrates is not a god" is then seen as "Not (λz)(Socrates is a god)(Λ)" where the property which nothing has is predicated of an arbitrary object, say the null set. Obviously then we can give distinguishable semantics. But the two negations will still have deductive relations with one another. In the standard semantics the negations of all properties, zero place, one-place ..., are given a unitary account by this axiom[137]

$$(s)(s \text{ sat } \overline{(\text{Not}(\lambda x_i)(A))(t)} \text{ iff } s\frac{i}{s^*(t)} \text{ not sat } (A).$$

Applying this axiom to "Zeus is not a mortal person", for the sentence negation we have,

$$s \text{ sat } \overline{(\text{Not } (\lambda x_4)(\text{Zeus a Mortal person}))(\Lambda)} \text{ iff}$$
$$s\frac{4}{s^*(\overline{\Lambda})} \text{ not sat } \overline{(\text{Zeus a mortal person})}.$$

Since no sequence satisfies "Zeus is a mortal person" $s\frac{4}{s^*(\overline{\Lambda})}$ does not satisfy it. So clearly the right hand side of the biconditional is true. By the obvious axiom "s sat not $\overline{\phi}$ $\equiv$ s not sat $\overline{\phi}$", the negation mentioned on the left hand side is also true.

So far everything is all right. Predicate negation is, however, problematic. We have

$$s \text{ sat } \overline{(\text{Not } (\lambda x_4)(\text{Mortal person } x_4))(\text{Zeus})} \text{ iff}$$
$$s\frac{4}{s^*(\overline{\text{Zeus}})} \text{ not sat } \overline{(\text{Mortal person } x_4)}.$$

The right hand side of this biconditional is true on Burge's principles for there is no sequence with Zeus in its fourth place. "$s\frac{4}{s^*(\overline{\text{Zeus}})}$" therefore stands for nothing, by virtue of Burge's semantics for empty temrs. So the denial should be, for Burge, true. But Burge is in no position to allow "Zeus is not-mortal" to be true. Application of the predicate "not-mortal" to Zeus should be false according to Burge's view on the matter. It is no straightforward matter to alter the semantics for "not" as predicate and sentence negations. The point does not depend on our particular way of stating the connexion between the two negations. It corresponds only to the fact that given a sentence of the stoically negated form "not ϕ(a)", we can abstract upon the subject place to get the open sentence "not ϕ(x)" with a variable which can be bound from outside. So long as this is possible (and is needed to express what we need to express), the two negations cannot be deductively divorced. Nor can the particular linkages which the orthodox theory implies to be breached within any theory of truth which burge shows us how to conceive.

To show that, as matters still stand, the two negations are deductively linked, we only need to establish the general equivalence

$$(s)(s \text{ sat } (\overline{\text{Not}(\lambda x_4 \text{ Zeus is mortal}), (\Lambda)})$$
$$\equiv (s)(s \text{ sat } (\overline{\text{Not}(\lambda x_4(\text{Mortal } x_4)), (\text{Zeus})})).$$

Here is a quick informal proof (a proof from left to right, but since only equivalences are used in the actual proof, it will work equally from right to left).

(1) $s \text{ sat } (\overline{\text{Not}(\lambda x_4(\text{Zeus is Mortal}), (\Lambda)})$

(2) $s\frac{4}{s^*(\overline{\Lambda})}$ not sat $\overline{\text{Zeus is Mortal}}$

(using the axiom: $(s)(s \text{ sat}(\overline{\text{Not } \lambda x_i A)(t)}) \equiv s\frac{i}{s^*(t)}$ not sat $\overline{A}$).

(3) $(s)(s \text{ sat } \overline{\text{Zeus is Mortal}} \equiv s \text{ sat } (\overline{\lambda x_4(\text{Mortal } x_4)(\text{Zeus})})$

(4) $s\frac{4}{s^*(\overline{\Lambda})}$ not sat $(\overline{\lambda x_4(\text{Mortal } x_4), (\text{Zeus})})$

(5) $s\frac{4}{s^*(\overline{\Lambda})}$ sat $(\overline{\text{Not}(\lambda x_4(\text{Mortal } x_4), (\text{Zeus})})$

(using the axiom: s not sat $\overline{\phi} \equiv$ s sat $\overline{\text{not}\,\phi}$.)

(6) $s \text{ sat } (\overline{\text{Not}(\lambda x_4(\text{Mortal } x_4)), (\text{Zeus})})$

(since the quoted sentence is closed.)

(7) $s \text{ sat } (\overline{\text{Not}(\lambda x_4(\text{Zeus is Mortal})(\Lambda)})$

$s \text{ sat } (\overline{\text{Not}(\lambda x_4(\text{Mortal } x_4), (\text{Zeus})})$

To summarize, Burge's treatment of negation requires that we be able to separate predicate negation from sentence negation. But some reformulation which he does not show us the way to invent for a language of ordinary expressive power is needed. I do not see how to achieve this reformulation.

Burge's theory still has definite advantages. It assigns the right truth values to some sentences with empty names about which we have a reasonably clear intuition. Existential statements receive the correct evaluation "Pegasus exists" is evaluated as false and "Pegasus does not exist" as true. Another group of sentences, eg. "Leverrier discovered Vulcan" and "Leverrier did not discover Vulcan" are given the right truth value, false and true.

CHAPTER XIV

THE GENERAL DIFFICULTIES ABOUT EMPTY REFERENCE

Burge's theory was the most hopeful, and it vindicates my statements about the separateness of the problems of fictional names like "Pegasus" and non-fictional names like Leverrier's "Vulcan". But the time has come to review the whole problem. Do we need to embark on the intricacies of sorting out negation in Burge's system?

We shall now attempt to summarize our conclusions and to arrive at some generalizations about the problems of empty reference. The matter is confusing because of the very diverse motivations different people have had for taking in empty names. What are the intuitions we ought to want to capture by an account of empty reference? The most fundamental issue seems to be this: How can sentences with empty names be true, when there is nothing in the world for them to be true about? There are various answers that form the basis of different strategies: such sentences are true because they are really about some other entities than actual objects, or they are neither true nor false. Trying to see under what circumstances sentences with empty names could be true means searching for a theory of truth for a language containing empty names. This is why all the extant theories we have examined were formulated (or reformulated here) within the framework of formal semantics. In the standard formal semantics no allowances for empty names are made. One would expect there to be at least as many different ways of revising the formal semantics as there are different motivations behind each strategy. But in practice there are even more, and this makes one suspicious.

There are two alternatives concerning the phenomena of empty reference: either admit empty names straightforwardly or alternatively somehow exclude them from normal occurrence in contexts which are given a normal semantical description. We have explored at length the first alternative to see whether the phenomena of empty reference could be given a coherent account within any extension of the standard semantics. We shall come to the second alternative in the last chapter.

Once we have admitted empty names we have two choices: treat them as not really empty or treat them as empty. We have seen that the reductionist approaches were unsatisfactory. As the result of reducing empty names to non-empty names, by assigning arbitrary references, Λ or $*$ or $*_1 \ldots *_n$, Frege, Scott and Grandy were led to some implausible consequences. In Scott's account identity statements involving empty names were not evaluated in any natural manner; and in Grandy's the effects of assigning $*_1 \ldots *_n$ to empty names were not fully acknowledged. The worst problem is one which affects all reductive account of empty singular terms. In order to have a stipulation assigning reference to empty terms we first have to admit that there are terms which lack reference. Then we stipulate that these terms have Λ or $*$ or $*_1 \ldots *_n$ as their reference. Empty terms are treated as simultaneously empty and non-empty.

The natural move in attempting to eliminate the defects of the reductionist strategy is to require that empty names be treated as empty (Requirement I). If we treat them as such, then there are three different ways of evaluating sentences containing them. First, "ϕe", where "e" is an empty name, can be true, second it can be false, or third it can be neither true nor false.

In fact there is already another obvious requirement lurking here. It seems that if there is to be any point at all in what we have been attempting, then some extensional sentences with empty names should be treated as true and some as false (Requirement II). (Sentences such as "Vulcan does not exist", "Leverrier did not discover Vulcan" are clearly true. And sentences such as "Vulcan exists", "Leverier discovered Vulcan" are clearly false.)

The difficulty, however, is to make room for any of the possibilities true, false, truth-valueless. The outlook is not very promising to make 'ϕ(e)' true. If we have the standard way of interpreting names, then as Burge says "ϕ(e)" cannot be evaluated as true. But if we modify the standard way of interpretation, for instance in the way Lambert and van Fraassen or Meyer and Lambert suggest, then we are in effect treating empty names as empty and non-empty simultaneously. Furthermore, what Lambert and van Fraassen describe as true in the story or Meyer and Lambert label as "nominal truth", is only truth to the words and not truth to the facts. It is only pseudo truth. The requirement we need to add to our set then is that a theory of truth for a language with empty names explain the notion of truth that is pretheoretically given and not introduce a novel notion of truth (Requirement III).

In the second case where "ϕe" is required to be evaluated as false, the rationale is that since "e" cannot be evaluated, to predicate "ϕ" of "e" cannot be evaluated as true. The presupposition is that since there is no object the predication must be false. Only Burge's theory gives us a natural or orderly way to such an evaluation. His theory reminds us to include amongst our requirement Tarski's criterion of material adequacy for a definition of truth; or some plausible alternative (Requirement IV).

In the third case, where "ϕe" is regarded as truth valueless, the justification is that since "e" cannot be interpreted, "ϕ e" cannot be evaluated. Then we have a bifurcation which arises out of Dummett's discussion of the conflict between the equivalence $T\ulcorner p \urcorner \equiv p$ and the admission of truth value gaps.

First, if we reject the equivalence as in van Fraassen's method of supervaluation we lose the law of excluded middle and end up with two notions of truth, one for the object language and another for the metalanguage.

Second, if we follow a Kripkean theory of truth and retain the equivalence, the incompatability may be resolved by saying that when P lacks a truth value $T\ulcorner p \urcorner$ lacks a truth value. In order to preserve $T\ulcorner p \urcorner \equiv p$ and evaluate P as truth valueless, we then need to appeal to the principle that the truth value of a compound is a function of the truth values of the components. When a component term lacks reference, we say that the sentence is truth valueless. It is capricious and unreasonable on the Kripkean approach not to apply this requirement to the whole of our language. But we have seen that a theory with truth value gaps has in the truth definition a clause regarding the evaluation of sentences with empty names which itself contains an empty term. Then the truth theory itself has a sentence which is neither true nor false. But a truth theory cannot afford to have a truth valuaeless sentence as one of its axioms. The truth theory has to be true. This highlights the requirement that the semantical description of any linguistic device should be applicable to all its occurrences including its occurrences, if any, within the language of semantical description (Requirement V).

There is one more requirement which it scarcely seems necessary to add - namely that the law of non-contradiction should not be violated. (Requirement VI). Because of their affinity with the contemporary views of free logic, Meinong's views might seem to be worth reconsidering. According to Meinong there is a widespread "prejudice in favour of the actual" among philosophers causing them to overlook the fact that "the totality of what exists ... is infinitely smaller in comparison with the objects of knowledge."(138) In Lambert and van Fraassen's terms Meinong's statement can be explained quite simply: a singular term t, "the golden mountain", for example, need not refer to an actual object in order to occur in a true statement.(139) Similarly, being-thus-and-so (Sosein) Meinong said is independent of being (Sein). Meinong did however defend one logical principle. This was the view that in general we must accept "The thing which is F, is F". But as Russell pointed out we can derive self-contradictory sentences even from accepting such an innocuous principle.(140) An example of this is: "The thing which is round and not round is round and also not round." Meinong held that non-existent entities need not be constricted by the law of non-contradiction; but if this does not count as a difficulty in the realm of Sosein, what would?

How do we account for the fact that all the theories we have examined fail to meet the various plain requirements? The fact that no theory has obviously met all the requirements, and only one has the slightest promise, does not prove that they are inconsistent, or that they cannot be satisfied.

There is no outright inconsistency in the requirements. But how do we establish that except by producing a theory which satisfies them collectively? No attempt to provide such a theory has yet succeeded. Why is that? Should we be looking for a theory of this sort at all?

CHAPTER XV

AN ALTERNATIVE PROPOSAL

The time has arrived to look in another direction and suggest a different sort of approach which requires no modification of the standard semantics to accommodate empty reference. Let us start with a reassessment of the standard semantics. What do we require of a semantical theory? We have followed Davidson's view that to give the theory of meaning for a language is to give the theory of truth. So we require a semantical theory to provide an effective method for stating the truth conditions for every sentence of the language which has a meaning. The only aspect of the language we are concerned with here is the truth-saying aspect - the aspect in which sentences are presented to one as true. Now fictional statements (class IV of our Chapter IV above), if these may be disposed of first, are not - when we think of them from outside the context of the story itself - even put forward as conditions for truth.(141) It is an absurd misunderstanding, when we look at stories from outside the story-telling context, to think of the sentences in stories as having truth values. From outside that context we may be interested in whether someone gets the story right or not. His account of the plot, if he mentions the story, but doesn't tell the story, must be true to the story. But "truth to the story" is not truth. The requirement we make is not very different from the requirement that the man who repeats the plot to us should give us correct statements of the form "The story tells that ...". And there is less problem about these contexts, because the vacuous names are then in an opaque position. (We shall come to this sort of occurrence later on in the chapter).

What then about the sentences of stories taken *within* the story-telling context? Taken there why should not these sentences have meaning in just the same way in which an ordinary statement has meaning? Surely, while we are *within* the context of the story, these statements imitate or simulate ordinary historical statements. It must be wrong to give them a different account. If we want semantics, then we should give them the ordinary sort of semantics, and then add *outside* the semantic theory that all this is fiction, and that outside the relevant fiction there is no identifiable particular horse whose name could have its sense fixed by the stipulation:

$$s^*(\overline{\text{Pegasus}}) = \text{Pegasus}.$$

It is a consequence of this that the semantics themselves for fictional statement must be offered in the same sort of spirit as the fictional narrative itself. It is as *if the* sentences of narrative had *normal* semantics - which is quite different from the narrative *actually* having *peculiar* semantics.

This is a disappointment perhaps after the logicians' cleverness. But, strangely enough, Frege seems to have thought something similar to what I have just claimed. Frege writes:

> Es muss von jedem Gegenstand bestimmt sein, ob er unter den Begriff falle oder nicht; ein Begriffswort, welches dieser Anforderung an seine Bedeutung nicht genügt, ist bedeutungslos. Dahin gehört auch z.B. das Wort „μῶλυ" (Homers Od.X,305), obwohl ja einige Merkmale angegeben sind. Darum braucht jene Stelle noch nicht sinlos zu sein, ebensowenig wie andere, in denen der Name „Nausikaa" vorkommt, der warscheinlich nichts bedeutet oder benennt. Aber er tut so, als benenne er ein Mädchen, und damit sichert er sich einen Sinn. Und der Dichtung genügt der Sinn, der Gedanke, auch ohne Bedeutung, ohne Wahrheitswert, aber nicht der Wissenschaft.[142]

What this amounts to is that in Homer's Odyssey, it is as if the Greek word "moly" has and extension. And the name "Nausicaa" behaves as if it named a girl. In this, Frege seems to say, lies its sense. It is enough that it be as if "Nausicaa" has a reference for it to have a sense or the sense in the story. This is close to the formal semantical approach we have pursued in Chapter V however different that was from the theory usually ascribed to Frege. And it is also in agreement with what I have just claimed about fiction.(143) To say that a whole story is fiction, however, and that a whole set of sentences has only been offerred as if possessed of truth conditions also involves saying that Pegasus does not exist, there is no concealed oratio obliqua here and we are outside the story. So I have not explained that sentence yet. We are forced to take seriously existential statements with empty names. But perhaps Kripke's account(144) ("Pegasus does not exist ≡ there is no true proposition possible to the effect that Pegasus exists.") or some other theory will suffice. Existential statements are universally regarded as a problem. I am not directly concerned with them because they are a problem of their own. But this is not saying anything which makes the problem insoluble. (It is a problem which everybody drawn to Kripke's sort of answer has that there is difficulty in saying exactly to what effect there is no true proposition. We have to half-embrace the story to say what particular true proposition is not exemplified, because once outside the story we can't identify Pegasus - though we can describe the story from outside.)

This leads on to occurrences of empty names within oratio obliqua - e.g. reports of the false beliefs of others. Just as with stories we have to embrace the world of the story, so perhaps, in interpreting mistaken persons faithfully to what they mean we have to some extent to impersonate them.

Davidson analyzes

Galileo said the earth moves

as

Galileo said something of which I hereby make myself a same-sayer:

The earth moves.

The second sentence "The earth moves" is mentioned because it is referred to by the first sentence (in the "hereby" pointing forwards), and it is also used. One may say, without falsifying Davidson, that in the second sentence the man reporting Galileo imitates or impersonates Galileo. The same holds for direct quotation. The whole theory assimilates indirect speech to direct speech. And it fits very well with what I have found myself needing for different reasons from Davidson to say about vacuous names in reported speech. Perhaps there is an echo here of something people say about the impossibility of a scientifically objective anthropology - that all understanding and interpretation involves a measure of identification or einfühlung.(146)

This brings us now to the most troublesome class of sentences containing empty names, e.g. "Leverrier discovered Vulcan" and "Leverrier did not discover Vulcan". Surely they are not meaningless, even though we cannot say which thing Vulcan is, or even say which thing Vulcan would have been - though we can imagine roughly what it would have been like if things had permitted us to say which thing Vulcan was - especially if we are prepared to "put ourselves in Leverrier's shoes". (But with a straightforward non-fictional non-opaque context we have got everything we can out of this identification possibility.)

The trouble is that we want to say that "Leverrier discovered Vulcan" is false and that "Leverrier did not discover Vulcan" is true.

That was the virtue of Burge's theory. We did not say that that theory was wrong, we only questioned its completability. Pending its actual completion perhaps it is possible to ask whether Burge has achieved by the theory as it stands very much more than we could achieve by saying (1) that "Leverrier discovered Vulcan" is not true, with an explanation, in terms of Leverrier's beliefs, why it is interesting that it is not true even though, as things are, the sentence has missed having truth grounds and (2) that "Leverrier did not discover Vulcan" means the same as "it is not true that Leverrier discovered Vulcan", which means the same as " 'Leverrier discovered Vulcan' is not true" - which could be offerred with the same explanation as (1). This is not to say that "Vulcan" is not a name in these sentences. "Vulcan" is a sign cut out for the role of naming things. But actually it has failed to name anything. So any transparent sentence with "Vulcan" in it will lack definite truth grounds unless it can be reinterpreted a little.

(2) offers a metalinguistic reading of the problem sentence. But someone will complain that we feel that "not" does not really mean the same as "it is not true that". I think that one reason for that feeling is the availability of a non-metalinguistic sentence which, if we know anything about Leverrier, we can frame "It is not the case that Leverrier discovered the planet which disturbs the perihelion of Mercury". The definite description here will have what Russell called secondary occurrence. I stress that we are not falling back here into the description theory, because we are not offering this sentence as equivalent to "Leverrier did not discover Vulcan". I am saying that, because this descriptive sentence is one we naturally think of, and can easily frame, we get the illusion that "Leverrier did not discover Vulcan" is a non-metalinguistic truth.

I make these proposals in the belief that the only true sentences there are which contain empty proper names in extensional position are negative ones. Any adherent of Burge's system will share this belief for atomic predications. But, he will ask, what about complex predications? Does my theory disregard all complexity and simply make the general stipulation U?

Consider the complex sentence

"If Leverrier discovered Vulcan then Leverrier discovered Vulcan"

We evaluate this as U because of the presence of "Vulcan". Burge will break it down and give it the evaluation

$F \supset F.$

That means it will be true for Burge. So there do exist, for Burge, true statements with empty names in extensional position, provided the predication is non-atomic. For us on the other hand, by the ruling so far suggested, the whole sentence is not-true (and not false either), because of the vacuity of "Vulcan".

It is a fair complaint that even if atomic sentences with empty names are strictly truth-groundless this does not justify a "blanket" stipulation U for all compound sentences involving such components. So instead of treating sentences with empty names within them in extensional position as automatically not true, we could propose the rule that a sentence with empty names be broken down into the shortest constitutent clauses or components capable of being evaluated. But I still believe U is in fact the right evaluation for

"If Leverrier discovered Vulcan then Leverrier discovered Vulcan",

and I can say this not in virtue of a blanket stipulation but in virtue of the fact that it is evaluated

(not-true) $\supset$ (not-true)

or, using Kleene's notation (cp. Ch. IX),

$U \supset U.$

If we use either the weak or the strong tables of Kleene this is U [146A],
though it is worth noting that an 'irregular' table (Lukasiewicz, see Kleene op. cit. p. 335) gives

T

On my approach, which makes empty atomic sentences U because truth-groundless, we still have to make a decision between all these tables. The reason why I should defend the ruling U for the particular sentence recently quoted is that the ruling T has the effect of putting into the actual (as opposed to the <u>als ob</u> language, or the language we must use to impersonate others) a true sentence with a term which has no <u>actual</u> meaning. (The term has no actual meaning, even though we may have to proceed as if it had a meaning when we tell stories or give the content of the beliefs of deluded people. But that is not what we are concerned about here.) We may bring out the difference between the weak and the strong tables and the nature of the decision which someone following my general approach would have to make if we look at another example. Consider

"If Leverrier discovered Vulcan then Leverrier was an astronomer",

i.e. the case of $U \supset T$, which is evaluated by strong tables as T and by weak tables as U. Surely, it may be objected, this should be <u>true</u>. I could accommodate that decision on my approach, by adopting the strong tables. But if it is true - I'm not sure that it is - then it is true, not because of the meaningfulness of the antecedent of the conditional, but for the same reasons as

"If the mome rath outgrabe then Leverrier was an astronomer"

is true - if it is true -, which is also to be evaluated

$U \supset T$.

To assign T to this would be to say that a sentence in the form "......$\supset T$" is relatively insensitive to what meaningless stuff is inserted into the antecedent. That is just what it would come to for me to choose the strong tables. I should not be saying that the sentence "If Leverrier discovered Vulcan then Leverrier was an astronomer" was true because we can truly predicate of Vulcan the property

$$(\lambda x)(\text{Leverrier discovered } x \supset \text{Leverrier was an astronomer}).$$

For on my theory "Vulcan" is not a semantically determinate name which we could use for such a purpose. It has not actually been given the sense which it would have had if Leverrier had discovered some planet he searched for when he wanted to explain the disturbance of the perihelion of Mercury.

The case of U ⊃ T shows then that my general approach leaves something to be decided about compounds where one component has in its argument place an empty name. The decision to call the compound U corresponds to a preference for Kleene's weak tables, which never assign anything but U to a wff with a U component. As the concluding remarks about convention T will make clear, the doctrines of this chapter put us in a better position than the abandoned theory of Chapter XII did to adopt the weak tables if they seem to be the best way of accommodating clauses without determinate truth grounds. We are free to choose the most "natural".

Truth functional compounds are not the only place where we have to make a decision. What about

> "If Leverrier has discovered Vulcan he would have been a more famous astronomer"?

Certainly that seems to say something worth saying. It seems to be true but it is dubious that any evaluation procedure available to me could make it (non-vacuously) true - obscure though counterfactuals are. But I think the sentence says whatever it says via an obvious reinterpretation which is available, namely:

> "If Leverrier had discovered a planet answering to the specifications he gave for the name 'Vulcan', then he would have been a more famous astronomer".

This latter sentence makes straightforward sense and I believe it gives the whole content of the first sentence which purports to mention Vulcan itself. That is what we take the first sentence, which my theory would have to call strictly truth-groundless, to mean. The reinterpretation, which has truth-grounds, props up the truth-groundless sentence like a crutch.

The mention here of the Kleene three-valued tables could cause confusion. There are two different approaches to empty reference which argue for extensional sentences with empty names' being truth-valueless, and therefore two different uses to which Kleene's tables could be put. One approach, see Chapter XII, sees the truth-valuelessness as perfectly all right, neither as a symptom of meaninglessness nor as undermining the meaningfulness of empty names. The other approach the present chapter, sees the truth-valuelessness of sentences and clauses containing empty names as caused by their lack of determinate sense and it uses informal methods in the first instance to characterize sympathetically what is going on when strictly truth-groundless sentences are uttered. This second approach only resorts to such things as the Kleene tables to codify these informal insights. My position is not the first but the second of these. Let q be a sentence with an empty name n in it. The first approach says q is in the <u>semantically determinate</u> part of the <u>language</u>. It may assign the truth value U because of the emptiness of n. Convention T forces upon the Chapter XII theorist, for reasons mentioned in Chapter XI, the strong Kleene table.

The second approach, which I have adopted, says q is not in the semantically determinate part of the language. It assigns U because q is not semantically determinate. The second approach then has to decide how tolerant complex sentences of the language are to be of semantically indeterminate components. The choice of weak tables is the decision that they are intolerant. The strong tables are more tolerant. But there are in fact a large number of different three-valued logics to choose between.

The second approach enjoys this freedom because it does not face one problem the first faces. Consider the putative T-sentence

"True 'Leverrier discovered Vulcan' ≡ Leverrier discovered Vulcan"

The right hand side on my interpretation is evaluated <u>not true</u> (≠ false). But the left hand side predicates truth of that very sentence, and is therefore on my view false. Therefore I cannot put forward this T-sentence as a truth. It is F ≡ U which is U (on either weak or strong tables). A Kripkean theory which wanted "Leverrier discovered Vulcan" inside the semantically determinate part of the language has to arrange matters for the left hand side to be U. So we have U ≡ U. It will then have to arrange matters for this to count as T. Provided that we have U ≡ U this is feasible. (Though the strong tables will not do the job by themselves. There is here a loose end in Kripke's theory of the liar paradox. See my reservations on p. 99. The point is that paradoxical sentences are not denied T-equivalences. See p. 88. An adaptation of Lukasiewicz tables might be needed.)

On my theory all this is both unnecessary and undesirable. It is undesirable because we want "It is not true that Leverrier discovered Vulcan" to be evaluated as true (see point (2) of p. 122). We saw that only in that way can we do justice by our metalinguistic reinterpretation to the apparent truth of "Leverrier did not discover Vulcan". It would wreck our theory to evaluate "True 'Leverrier discovered Vulcan'" as U. It is also unnecessary - because we escape the difficulty about the T sentence by denying that "Leverrier discovered Vulcan" is in the semantically determinate part of object language <u>or</u> metalanguage. Given this denial we are under no obligation to put forward or subscribe to any T-equivalence for it. That would involve us in using in a serious way, in order to assert a truth, a sentence which was not semantically determinate.

We can summarize the final position we arrived at in the thesis as follows. For intensional predicates with <u>apparent</u> direct objects, we have adopted Quine's strategy to eliminate the direct object and paraphrase then in terms of propositional attitudes and propositional objects. For sentences with empty terms in opaque contexts, e.g. indirect speech and fiction, we adopt Frege's account of "als ob" and Davidson's solution for indirect discourse. That is half the problem. But there are empty names in extensional contexts which these two strategies leave unresolved: existential statements and sentences with empty names and extensional predicates. Existential statements such as "Vulcan exists" are a universal problem needing to be accommodated regardless of any other issues concerning empty phenomena. We leave the problem aside. For sentences such as "Leverrier discovered Vulcan" and their negation, we give a metalinguistic treatment. The truth "Leverrier did not discover Vulcan" is reinterpreted as the assertion that "Leverrier discovered Vulcan" is not true and it is evaluated as true. "Leverrier discovered Vulcan" is neither true nor false. Therefore it is not true. "Not true" is not equivalent to "false", but all that was needed was that "Leverrier discovered Vulcan" should not be true.

The metalanguage we use is two-valued. The semantically determinate object language is also two-valued. We put the sentences without a determinate truth value outside the part of the language for which the truth theory is given.

EXTRA NOTE

(146 A). Kleene's strong tables for ⊃

	P	T	F	U
Q	T	T	F	U
	F	T	T	T
	U	T	U	U

Kleene's weak tables for ⊃

	P	T	F	U
Q	T	T	F	U
	F	T	T	U
	U	U	U	U

APPENDIX I

SMILEY'S "SENSE WITHOUT DENOTATION"[147]

Smiley has proposed a theory in which empty singular terms and general terms and truth value gaps are admitted. The distinguishing characteristic of Smiley's theory regarding empty terms is that, unlike the theories of Frege, Scott and Grandy, it is not a reductive account which assigns arbitrary extension to empty terms. Empty singular terms are not assigned a special denotation and assimilated to non-empty terms. Smiley states his aim as follows.

> My purpose here is to outline a theory of formal logic in which the features that cause the difficulty - incompletely defined properties and functions, bearer-less names, unrestricted formation of definite descriptions - can be explicitly accommodated. This is done by adopting the standard definitions of logical truth and logical consequence to take in the possibility of terms without denotation and sentences without truth-values.[148]

The aim in giving such an account corresponds to ours:

> The whole point of the logic here proposed is to allow different and even incompatible theories to be formulated simultaneously in one and the same language. In particular we can all draw on a common vocabulary of names without being committed to some all-inclusive ontology.[149]

There is another point on which Smiley's view is attractive. Smiley remarks that the standard rules for the assignment of values to formulas do not assign values to formulas containing empty terms. But it seems that "for some relevant sentences, there is in principle no problem at all about attributing truth or falsity (and indeed in some cases one particular attribution is inescapable)".[150] Some cases considered by Smiley that are particularly relevant to our problem are: "Pegasus does not exist" and "It is not true that the king of France is bald". Such sentences do seem to deserve a definite truth value. We also have sentences with empty names that seem to lack a determinate truth value. Examples are: "Vulcan is a planet", "Vulcan disturbs the perihelion of Mercury". Smiley would regard them as truth values. Smiley observes that there are two orthodox approaches, Russell's and Frege's, to the problem of evaluating sentences with empty names but does not elaborate on their shortcomings. We might say that Russell's account which excludes all constants from the vocabulary would not be suitable for any system which is intended to be applied to natural languages. As for Frege's account which has a rule stipulating that every term shall have a denotation and every sentence shall have a truth value, we have said that it is arbitrary. The assignment of truth value to sentences cannot be a result of stipulation.

Smiley follows the standard procedure of formulating the semantics for a language by using the notion of interpretation. In Smiley's formulation, a particular interpretation involves the choice of some non-empty domain of individuals and assignment of values to terms and sentences.[151] The rules for assigning values to terms and sentences are the standard ones. But in effect, we are given a semantics with truth value gaps. In the actual rules, there are no special clauses for empty terms or sentences ontaining them, and only two truth values T and F are assigned to sentences. But Smiley interprets his rule 3 (given below), which assigns values to sentences, in such a way that without explicitly stating the presence of truth value gaps, the failure of the rule to apply in some cases leads to admitting truth value gaps. The rule is:

3. If the values assigned to the predicate **F** and the terms **a_1 ... a_n**, are the function F and the individuals a_1 ... a_n respectively, then the value of the sentence **Fa_1 ... Fa_n** shall be $F(a_1 \ldots a_n)$ which is a truth value.(152)

The clauses for the usual connectives and quantifiers are also stated without a special provision of truth value gaps. But again as the result of these rules failing to assign truth values to some sentences, truth value gaps are present in the system Smiley outlines. The usual connectives are called "primary connectives" by Smiley, to be distinguished from "secondary connectives" which Smiley introduces to accommodate cases for which primary connectives are not adequate. Smiley points out that admitting truth value gaps does not solve all the problems about sentences with empty terms. There are sentences with empty terms to which one particular attribution is inescapable. Examples of these are: "Pegasus does not exist", "It is not true that the king of France is bald". Smiley's proposal is to bring the sentences containing empty terms that lack a truth value and that have a truth value under one formal system by introducing into the metalanguage an additional singularly connective "t". "t" may be rendered "it is true that" and is governed by the following rule:

Rule: The value of the sentence t A shall be T if the value of the sentence A is T; otherwise it shall be F.(153)

Smiley emphasizes that unlike the rules given for the usual connectives this is not a verbal rendering of any two-valued truth table: the "otherwise" clause provides for the case where no entry under A can be made on a table. The value of t A shall be F not only when the value of A is F but also when A has no truth value. This shows that $T\ulcorner p\urcorner \equiv p$ is rejected, for when P lacks a truth value, $T\ulcorner p\urcorner$ does not lack a truth value but has the value F. We shall return to this issue.

The connective 't' is used to define "secondary connectives" as follows:(154)

$$\boldsymbol{\sim} A \quad = \quad df \ \sim tA$$

$$A \ \boldsymbol{\vee} \ B \quad = \quad df \ \ tA \vee tB$$

$$A \ \boldsymbol{\&} \ B \quad = \quad df \ \ tA \ \& \ tB$$

$$A \ \boldsymbol{\supset} \ B \quad = \quad df \ \ tA \supset tB$$

$$A \ \boldsymbol{\equiv} \ B \quad = \quad df \ \ tA \equiv tB$$

An occurrence of a term a in a sentence A is "primary" if it does not lie within the scope of any occurrence of the connective "t"; otherwise a's occurrence is "secondary". This distinction enables us to mark out a boundary line, among sentences containing empty names, between those that will fail to have a truth value and those that will have one nevertheless: if the term has a primary occurrence in A, and a is assigned no value, then A has no truth-value. Unless "we are willing to assert that a particular name has a bearer we cannot use that name as a name (i.e in a primary occurrence)..."(155) The consequence of this would be that "Vulcan is a planet", "Vulcan = Vulcan" and all other sentences with empty names and without the truth operator are truth-valueless.(156) And the sentences that contain the truth operator as the main operator are always assigned a truth value. The sentences whose only connectives are secondary never lack a truth value: the secondary connectives (even when sentences without truth values are admitted) behave exactly as do the connectives in the orthodox treatment.

With regard to the secondary connectives truth value gaps are not admitted.

Here we may want to ask how does Smiley know that there is a function t with this remarkable property?

Now we can compare the primary connectives and secondary connectives. We have seen that in regard to the primary connectives truth value gaps are admitted and in regard to the secondary connectives truth value gaps and $T\ulcorner p \urcorner \equiv p$ are not admitted. This justifies our classification of Smiley's theory as a hybrid between the account that rejects both truth value gaps and the schema $T\ulcorner p \urcorner \equiv p$ and the account that rejects $T\ulcorner p \urcorner \equiv p$ and retains truth value gaps.

The most important contrast between primary and secondary connectives is

> the contrast between the primary negation sign '$\sim$' (which might be rendered by a simple 'not' as in "the king of France is not bald"), and the secondary negation-sign '$\boldsymbol{\sim}$' (which should be rendered 'it is not true that ...' as in "it is not true that the king of France is bald."). A and $\sim$ A are contraries, in that they cannot simultaneously take value T; on the other hand A and $\boldsymbol{\sim}$ A are contradictories, for always one and only one of them has value T.(156)

Smiley has given two kinds of negations: the primary negation might perhaps be seen as predicate negation and the secondary negation as sentence negation. The value of such a distinction would be that we can distinguish, for instance, "Vulcan is not a planet" from "It is not true that Vulcan is a planet". With Frege we might say that we cannot affirm or deny that a predicate applies to a term when the term lacks reference. So "Vulcan is not a planet" does not have a truth value. And to say that is to admit, that "It is not true that Vulcan is a planet" is true. Smiley applies the epithets "internal" and "external" to negation expressed by "~" and "∼", and explains their function as follows.

> ... someone who uses the first to deny a proposition belonging to some theory, myth, etc., is committed to the theory's ontology to just the same extent as if he upheld the original proposition - he as it were makes his denial within the theory. In contrast someone who wishes not so much to contradict a particular assertion as to reject the ontology behind it must use the second mode of negation.[157]

There are attractive things here - especially in the remark last quoted - insights which almost any sensible theory would want to secure for itself. I hope some of these are accessible to my own informal account. But there are objections to Smiley's theory taken as a whole. It seems evident that Smiley has not given one system of logic but two distinct systems: one for primary connectives and another for secondary connectives. It would seem that to apply his view, we must find a lot of ambiguity - how do we resolve the ambiguities he requires? We shall attempt to show why these two connectives with radically different semantics cannot be given a uniform interpretation in one system of logic.

First, in regard to the primary connectives, as we have seen above, the logic is three-valued. As Smiley points out, the law of excluded middle A v ~A is not valid.[158] With respect to the secondary connectives, we have two-valued logic: t A v ∼ t A is valid and truth value gaps are not admitted. This incongruence between the two kinds of connectives cannot be smoothed over. Smiley remarks that his theory can be reconciled with the standard two-valued interpretation by assimilating "neither T nor F" as F.[159] But this would not make the three-valued logic into a two-valued one; the essential characteristic of the primary connectives is that they are given an interpretation which has truth value gaps. This fact does not change by our labeling truth value gaps as F or T.

Second, for the primary connectives free logic is not adopted but for the secondary connectives, it is. (As remarked this makes one wonder how we interpret any actual connective.) Smiley states that in his theory the existential generalization $A(a) \vdash (\exists x)\ A(x)$ goes through only with $(\exists x)(x=a)$, added as a further premise.(160) This is what many empty name theorists have wanted. But Smiley's claim is not completely accurate, for when A(a) has only primary connectives, we do have "$A(a) \vdash$ a exists" according to Smiley's treatment of primary occurrences of terms,(161) and then $A(a) \vdash (\exists x)\ A(x)$ is forthcoming without a further premise. So for primary connectives free logic is not adopted and the "advantage" disappears. It only remains for secondary connective contexts.

The secondary connectives in Smiley's system are primary connectives with "t" added on to them, then. A natural thing to say then is that the secondary connectives belong to a metalanguage, and the primary connectives to an object language; and there is a mismatch of the kind we have often pointed to between the object language and the metalanguage. If Smiley's system is to be applied to a natural language, say English, which is both our object language and our metalanguage, this mismatch is a serious defect. What Smiley has tried to bring about by the injection of "t" we have suggested should be brought about by less formal means.

APPENDIX II

TRUTH VALUE GAPS

In set theory and proposition theory there are deep reasons for admitting truth value gaps and predicates with partial interpretation. One of the most natural ways of treating the set theoretical paradoxes and semantical paradoxes seems to be to regard them as lacking a definite truth value. The traditional approach to the paradoxes of set theory and the paradoxes of theory of propositions has been to say that they are essentially different and require separate solutions. It is far beyond the scope of this thesis to discuss the question whether there can be a universal theory that provides a solution to both kinds of paradoxes within a single theory. C. Parsons has pointed out the similarity between Russell's paradox and the paradox of the liar and argued that semantical paradoxes should be treated in a way that stresses their analogies with set theoretical paradoxes.[162] J.F. Thomson has made similar claims.[163] The purpose of this Appendix is to supplement the account given in our Chapter XI on Kripke by bringing forward certain set theoretical arguments for truth value gaps. I have found such theories for proper names unsatisfactory; but it seems important to face the very strong general arguments there are for truth value gaps.

There are two ways a subject - predicate sentence "Pa" might fail to have a truth value.[164] (1) The predicate "P" is true or false of each object there is but "Pa" has not truth value because 'a' has no denotation. (2) The singular term "a" denotes a (unique) object α but α is an object of which the predicate "P" is neither true nor false. It can be argued from the philosophy of set theory that such situations are inevitable. The following argument suggests that (2) is inevitable and directly leads to (1).

(a) Experience shows that Zermelo - Fraenkel (ZF) or von Neumann - Bernays - Gödel (NBG) set theory is the proper response to the paradoxes of naive set theory.[156]

(b) It is of the essence of ZF & NBG (and simple type theory) that there is no set of all sets and hence there is no set of absolutely everything.

(c) Let L be a language. To interpret L we need a (usually non-empty, but that does not matter) domain D and a function I which assigns each constant of L a member of D (or at most one member of D if we allow partial I), and each n-adic predicate letter of L, a set or order n-tuples of members of D (or a disjoint pair of subsets of D^n, the set of all ordered n-tuples of members of D, as extension and anti-extension in D). The crucial point here is that in order to be sure that all subsets of D^n exist to provide extensions of an n-adic predicate letter of L, D must be a set. By (b), not everything can be a member of D.

(d) It follows that for any language L and any interpretation I of L in any domain D and any (monadic) predicate 'P' of L, there must be an object not in D and hence not in the domain of things of which I says P is true or false. This then is a case in which we have an α which is the denotation of no singular term a of L under I and of which no monadic predicate of L is either true or false under I.

(e) One could view (d) as saying that a situation occupying "the" middle ground between (1) and (2) is inevitable. But the best way to read (d) seems to be that it is impossible to interpret any language L so that any (monadic) predicate is either true or false of absolutely everything, even if for any object α any language L, and any constant a of L, there is an interpretation I of L in which a denotes α : this says that type (2) situations must be the norm. The point can be put this way: either no set has a complement (à la ZF) or the complement of a set is not a set (à la NBG). For model theory (or generalized truth theory), both the extension and anti-extension must exist and be sets. So in either case, no predicate can be interpreted (i.e. handled in generalized truth theory) so as to be either true or false of absolutely everything i.e., the anti-extension of F is not the complement of $\{x \mid Fx\}$, assuming F has an extension.

(f) Such type-(2) situations make type-(1) situations inevitable. Suppose that each (monadic) predicate of L must have a negation (in L); then for any interpretation I of L, one of them has no extension. Suppose that for each 1-place open sentence Sx of L, the term "$\{x|Sx\}$" (= "the set of all x such that Sx") must be an expression of L. Then it follows that for each interpretation I of L, there is a singular term of L which has no denotation under I.

(g) To establish that (2) situations force (1) situations, let "a" be a vacuous singular term. In a (2)-situation there is a predicate such that "Pa" has no truth value. If we can form the predicate "is a truth value of 'Pa' ", subject to reasonable assumptions neither $\{t\}$ nor $\{f\}$ can be included in either its extension or antiextension, so it has only a partial interpretation - which is a (1) situation.

(h) In a way the thrust of the argument (a) - (g) is that ultimately the distinction between (1) and (2) must break down. That is, we have to expect predicates for which there are objects (in fact, most objects) of which the predicate is neither true nor false (as it were, "satisfaction" must be a partial predicate, if the satisfiers and satisfieds must both make up sets, which they must) and consequently we must expect singular terms without denotations.

(j) All this shows that type (1) and (2) situations are inevitable. This means that the vacuous singular terms are inevitable and the problems of vacuous singular terms are not trivial at all. But this says nothing about how such problems must be solved, only that they must be.

The argument can be applied to proposition theory. Clearly in natural language we have predicates with partial interpretations - indeed most predicates have only partial interpretations. Since we have the definite description operator "the", we can form singular terms without denotation, given a partial predicate and a wrong sortal term for that predicate. We cannot dismiss such singular terms without dismissing most of the predicates in the language.

For set theory, the thesis that predicates with partial interpretation forces us to admit empty singular terms holds for all singular terms, names and definite descriptions. In set theory, the distinction between names and definite descriptions does not have much value, since there are no proper names of the ordinary kind. But in natural languages the difference between the two cannot be ignored. Given the description operator ("the" and any predicate we can form a definite description. Proper names cannot however be formed in this way. If I am right in arguing that the only tenable theory of proper names is to fix their sense via their reference in clauses of the form

$$s^*(n) = b,$$

and that these clauses must be put forward as <u>true</u>, not indeterminate, then this is another reason (besides those normally given) for distinguishing very strictly between the problems of empty names and empty descriptions.

NOTES

Chapter I

1 It is not perfectly clear that we can help ourselves to such sentences as "El Dorado = The city paved with gold" as true identities. But let us bracket this problem till later, when we discuss sentences containing empty terms in extensional contexts. The failure of intersubstitution can be illustrated for designation of existents too.

2 In "On Sense and Reference" in Translations from the Philosophical Writings of Gottlob Frege. Max Black and P.T. Geach (eds.)

3 Introduction to Mathematical Logic, p.8, n.8.

4 Meaning and Necessity, pp.129-133.

5 In "On Saying That". Synthese, vol.19 (1968), pp.130-146.

6 "Semantics for Propositional Attitudes" in Philosophical Logic, J.W. Davis et al. (eds.), p.26, p.30.

7 Hintikka appears to subscribe to such a view. See "Existential suppositions and and Uniqueness suppositions" in Models for Modalities, p.54, n.9. He states: "the question of the validity of the substitutivity of identity is largely independent of those changes in the quantifier ... which determine the failure of existential generalization".

Chapter II

8 "Quantifiers and Propositional Attitudes" in Reference and Modality, Linsky (ed.)

9 ibid., p.102

10 "Reference and Modality" in Reference and Modality, p.23

11 A purported application of $(\exists x)(Fx \& Gx) \vdash (\exists x)(Fx) \& (\exists x)(Gx)$. Given that something has both F and G, it follows that something has F and something has G.

12 ibid., p.109

13 See Chapter I.

14 "On Saying That", op.cit.

Chapter III

15 Kripke's Shearman Lectures 1974, London.

16 I am not able to remember what unpacking Kripke used of "worship". I have phrased his argument as an objection to my own.

17 In case this argument makes Kripke seem to have been involved in absurdity I must repeat, this argument of his is only known to me by my notes of the Shearman Lectures 1974 and the memories of people who attended the Shearman Lectures confirm this. The analysis he was considering may have been worse or better than mine.

18 "Advice on Model Logic" in Philosophical Problems in Logic, K. Lambert (ed.)

19 Here I have been referred by classical scholars to Catullus "odi et amo" poem.

20 cp. Jane Howarth "On thinking of what one fears", Proceedings of Aristotlean Society, 1975-6.

21 The figure of Beatrice, A study in Dante by Charles Williams, Faber & Faber Ltd., London.
The Vision of Dante, trans. by H.F. Carry, U.O.P 1921

22 See The Vision of Dante, p.XIV

23 Word and Object, p.149

Chapter IV

24 This is the notion of reference discussed in Strawson's "On Referring", Mind vol.59 (1950) and Donnellan's "Reference and Definite Descriptions", Philosophical Review, vol.75, 1966 pp.282-304.

25 "Naming and Necessity" p.343, n.3. Semantics of Natural Language, D. Davidson and G. Harman (eds.)

26 Any implications or Gricean implicatures associated with the word "purport" may be taken as cancelled here. We cancel the suggestion of mendacity and the suggestion that Leverrier knew better. Purporting is doing exactly what one would be doing if the entity existed - only it does not exist. One of the connotations of "purport" we want to cancel here is that given in Websters Seventh New Collegiate Dictionary:

> "to purport is to have the often specious appearance of being or intending or claiming (something implied or inferred)".

Chapter V

27 Introduction to Mathematical Logic.

28 See p.187 of "The Concept of Truth in Formalized Languages" in Logic, Semantics, Metamathematics, trans. Woodger.

29 cp. Evans and McDowell's Introductory Essay to Truth and Meaning, Evans & McDowell (eds.) Oxford, 1976.

30 See "Radical Interpretation", Dialectica, 1973. See also "Reply to McFoster" in G. Evans & J. McDowell (eds.) Truth and Meaning: Essays in Semantics. Davidson's theory of radical translation does not refute Quine's objections to translations. It accommodates them by an as yet to be measured degree of indeterminacy of interpretation.

31 p.165, n.2, Logic, Semantics, Metamathematics.

32 Mendelson's account of the denotation function s* is presupposed here. Introduction to Mathematical Logic, pp.49-53.

33 "Truth and Meaning", Synthese, vol.17, 1967, p.310.

34 "Semantics for natural languages", in Linguaggi nella Societa e nella Tecnica, Milan 1970, pp.177-188.

35 cp. the paper read at Birkbeck College, University of London, in 1975 by J. McDowell, "On the sense and reference of proper names".

36 cp. David Wiggins "Identity Statements" in Analytical Philosophy: Second Series, R.J. Butler (ed.), p.66. It is not certain what Dummett's interpretation of Frege's notion of sense as the criterion of identification for the reference answers the above objection (Frege, Philosophy of Language, Chapter 5, Appendix). Introducing the notion of identification might add yet another difficulty to the theory. Benson Mates notes that to identify a as b contexts are ablique and hence not accessible to the logical operations of quantification class abstraction or substitution of identicals. ("On the semantics of proper names", in Ut Videam Contribution to understanding of linguistics, p.203) It is clear that the "as -" position is oblique, given that we are frequently mistaken about identification. We shall not pursue Dummett's defense for Frege's theory of sense here.

37 Saul Kripke "Naming and Necessity", Lectures I and II in Semantics of Natural Language, D. Davidson & G. Harman (eds.)
David Wiggins "Sentence sense, word sense and difference of word sense" in Semantics, Steinberg and Jacobvitz (eds.), p.17

38 The description theory would be in the same difficulties if it sought to evaluate description directly by extending the s* to give values to such expressions as s*("$\imath x \phi x$") where "$\imath x \phi x$" may be empty.

Chapter VI

39 "The Perils of Pauline" in Logic Matters, p.153

40 ibid., pp.157-8.

41 ibid., p.160.

42 op.cit., p.163.

43 Kripke also puts forward this so-called "causal theory of naming" in "Naming and Necessity", op.cit.

44 "Perils of Pauline", op.cit., p.163

45 See Chapter I.

46 Philosophical Logic, "Truth", pp.52-3. Dummett's discussion is directed against Frege's way of treating empty names in "Sense and Reference". But Dummett's point is valid for all accounts that admit truth value gaps.

47 ibid., p.52

48 ibid., p.53. Note that in the continuation of this passage there is an anticipation of the features of Kripke's theory expounded below.

Chapter VII

49 Grundgesetze der Arithmetik, vol.1, § 28.

50 "Function and Concept", in Translations from the Philosophical Writings of Gottlob Frege, p.33

51 Grundgesetze der Arithmetik, vol.1, p.19, § 11.

52 Translations from the Philosophical Writings of Gottlob Frege, p.63, p.100

53 It is clear that Frege wanted a different treatment for fictional names. For serious empty names he requires that there should be a stipulation for assigning the reference. (ibid. pp.32-33). For fiction on the other hand, Frege considers it no disadvantage to have empty names. It is "a matter of no concern to us whether the name 'Odysseus' for instance has reference so long as we accept the poem as a work of art". (ibid. p.63) "It would be desirable to have a special term for signs having only sense" (ibid. p.63, note).

Chapter VIII

54 B. Russell, Philosopher of the century, R. Schoenman (ed.) pp.181-200.

55 ibid., p.183.

56 Lambert and Meyer's terminology for theories which allow the domain to be empty. "Universally Free Logic and Standard Quantification Theory". The Journal of Symbolic Logic, vol.33, no.1, 1968, pp.8-26.

57 From a Logical Point of View, p.16.

58 Mathematical Logic, p.147.

59 "On the Rules of Proof in the Pure Functional Calculus of the First Order". The Journal of Symbolic Logic, vol.16, 1951, pp.107-111.

60 op.cit.,pp.183-4.

61 ibid., p.184

62 ibid., p.186

63 ibid., p.187. This concern in regarding such contexts is with the elimination of definite descriptions. Beut we shall not discuss this. We shall focus on evaluating such contexts.

64 ibid., pp.184-185. The symbolism reads: s satisfies $\alpha R \beta$ in A iff the value of α at s in A, and the value of β at s in A are in R.

65 ibid., p.188

66 ibid., p.186

67 in Linguaggi nella Societa e nella Tecnica, Milan 1970, pp.177-188.

Chapter IX

68 Journal of Philosophical Logic 1 (1972), pp.137-55.

69 ibid., p.140

70 ibid., p.131

71 ibid., p.139

72 ibid., p.155, n.6.

73 It is worth pointing out that in standard set theory (Zermelo - Frankel or von Neumann - Bernays - Gödel), if the domain is a set, then we know there is a non-empty disjoint set to serve as another outer domain; this is an important change from Frege. Frege hoped for universal domain which would rule out Scott's or Grandy's theories.

74 ibid., p.155, n.7. Although Grandy does not state this explicitly the clauses in the model theory, (h_o) and (c_o) show this.

75 ibid., p.143

76 ibid., p.141

77 See also caluses (b) and (b) and (c_n), p.144

78 ibid., p.144

79 ibid., p.147

80 The notation reads as follows. T3 says that for all sequences and for all terms $s_1 \ldots s_n$, the value of $(f^n(s_1 \ldots s_n)) = f^n(\alpha(\underline{s}_1) \ldots \alpha(s_n))$. And T4 says that for all sequences α, for all variables v, and for all wffs A, the value of $(\underline{\imath vA})$ is the x which is D and there is a sequence β which differs from α except that it assigns x to v and β satisfied A.

81 ibid., p.152. Grandy's note 11: "This definition [(h$_n$)) For each f_i^n, (f_i^o) is a function with domain $(D \cup D^*)^n$ and range included in $D \cup D^*)$ permits functions applied to arguments in D* to have values in D. This may or may not be desirable. I have been unable to find an example where it is clearly plausible, but also know of no general argument against the possibility. Two plausability examples are 'the father of John's only son', when John has two sons, and 'the square of the first element of $\langle x,y \rangle$' when applied to $\langle 3$, Pegasus $\rangle$."

82 "Truth and Singular Terms", Nous, vol.8 (1974), pp.318-9

83 op.cit., p.142

84 ibid, p.152

Chapter X

85 The Journal of Philosophy, vol.23, no.17, 1966, pp.481-495.

86 Derivation and Counterexample, p.179

87 ibid., p.205

88 ibid., p.199

89 ibid., p.115

90 ibid., pp.90, 91, 97, 98
See T. Smiley, "Sense Without Denotation", Analysis (1960), pp.125-35.

91 op.cit., p.140

92 ibid., p.137

93 ibid., p.136, $(t_2/t_1.A)$ means A rewritten putting t_2 for t_1.

94 "Nondesignating singular terms", Philosophical Review, vol.68 (1959), pp.129-136.

95 See Kripke's remarks on identity and schmidentity in "Naming and Necessity", Lecture II., op.cit.
and see Frege's opening remarks in "On Sense and Reference".

96 op.cit., p.179

97 ibid., p.180

98 ibid., pp.180-1

99 ibid., p.193

100 ibid., p.100

101 R.C. Meyer and K. Lambert, "Universally free logic and standard quantification theory", The Journal of Symbolic Logic, vol.33, no.1, 1968, pp.8-26.

102 ibid., p.23

103 "Singular Terms, Truth-value Gaps and Free Logic", op.cit.

104 ibid., pp.83-4

105 ibid., p.487

106 ibid., p.220

107 "Singular Terms, Truth-value Gaps and Free Logic", op.cit., p.494.

108 C. Parsons, "The Liar Paradox", Journal of Philosophical Logic vol.3, 1974, pp.381-412.

109 ibid., p.383

110 ibid., p.384

111 "Outline of a theory of truth", Journal of Philosophy, 1976, pp.690-716.

Chapter XI

112 ibid., p.714

113 ibid., p.699, n.16

114 ibid., p.699

115 "On Referring", Mind vol.59, 1950, pp.320-44. Of course essentially the same view is found in Frege's "Sense and Reference".

116 op.cit., p.694

117 ibid., p.696

118 ibid., p.697

119 It is not clear how Kripke would regard such an extension of his theory of truth to languages containing empty names. Kripke's theory contains no singular terms (empty or non-empty). Kripke has stated elsewhere that whether sentences with empty names are treated as truth valueless or false is a matter of convention ("Semantical Considerations on Modal Logic" in Reference and Modality, Linsky (ed.), p.66). But we are regarding Kripke's theory of truth as a general theory for languages that contain sentences without determinate truth values. As such it could be extended to languages with empty names.

120 S.C. Kleene Introduction to Metamathematics (New York, Van Nostrand 1952), sec.64, pp.332-340.

121 op.cit., p.698

Chapter XII

122 Translations from the Philosophical Writings of Gottlob Frege, p.62.

123 The logic is free and not universally free, since the domain is not empty. From the point of application to natural language, universally free logic is not useful.

124 Overlining continues as a device for forming names of expressions.

125 op.cit., pp.700-1, n.18

126 Introduction to Metamathematics, p.335.

127 ibid., p.333

128 ibid., p.335

129 "Outline of theory of truth", op.cit., p.714, n,34

Chapter XIII

130 Nous (8), 1974, pp.309-325.

131 ibid., p.311

132 See Chapter Chapter VIII.

133 op.cit., p.312

134 ibid., p.323

135 ibid., p.313

136 For the notation see D. Wiggins "De Re 'must': a note on the logical form of essentialist claims", in Truth and meaning, essays in semantics, G. Evans and J. McDowell (eds.), pp.285-312.

137 See D. Wiggins, op.cit., p.300 and the articles by J. Wallace cited there. The overlining is again a quotation device.

Chapter XIV

138 Realism and the Background of Phenomenology, R. Chisholm (ed.) p.70.

139 Derivation and Counterexample, An Introduction to Philosophical Logic, p.153

140 The Russell - Meyinong debate is in Mind (1904-1905).

141 Stories may contain the names of real entities and some of their sentences may, if we press for that, be evaluated for truth. Baker Street, in the Sherlock Holmes stories, is in London. This, if someone asks, is true. But (except that it might disturb the reader if Conan Doyle had violated matters of fact like this), it is completely irrelevant. Nobody who is interested in the story as such should be interested in this evaluation.

142 Nachgelassene Schriften, p.133

143 Kripke also makes much of the pretending element in fiction and to that extent he agrees with Frege and us (Schearman Lectures (1974)). But I have tried to dispense with Kripke's ontology of fictional characters, because it is difficult to understand how one can move from "It is pretended that there is a winged horse" to "There is a pretended winged horse".

144 Shearman Lectures, 144.

145 "On Saying that", Synthese, vol.19 (1968), pp.130-146.

146 See Davidson, "Radical Interpretation", Dialectica, vol.27, no.3-4, pp.313-328.

Appendix I

147 Analysis, vol.20, 1960, pp.125-135

148 ibid, p.125

149 ibid., p.132

150 ibid., p.128

151 ibid., p.126

152 ibid., p.126

153 ibid., p.128

154 ibid., p.128

155 ibid., p.132

156 ibid., p.129

157 ibid., p.131

158 ibid., p.129

159 ibid., p.139

160 ibid., p.132

161 ibid., p.130, p.132

Appendix II

162 Charles Parsons, Journal of Philosophical Logic, vol.3, 1974, pp.381-412; p.381; p.390

163 Analytic Philosophy, first series, R.J. Butler (ed.) "On some Paradoxes", pp.104-119.

164 Smiley in 'Sense without Denotation' makes the same observation.

165 See, e.g. George Boolos, "The Iterative Conception of set". The Journal of Philosophy, vol.22, 1971, pp.215-231; K. Gödel, "What is Cantor's Continuum Problem", reprinted in Putnam & Benacerraf, pp.262-3; J. Schoenfield, Mathematical Logic, chapter 9, opening remarks.

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