The New Intensionalism[1]

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1. Introduction

From the beginning of the linguistic turn in this century to the present, philosophical discussions of language have consistently assumed that intensionalism, the doctrine that expressions of natural language have sense as well as reference, can only be Fregean intensionalism. In earlier papers (Katz 1986 and 1990a), I argued that this widespread assumption is false because there is another form of intensionalism fundamentally different from Frege's, and, further, that the failure to recognize such an alternative has led to the acceptance of criticisms of the intensionalist position which, in fact, are only criticisms of Fregean intensionalism. Since then I have come to think that the assumption is false for a different and deeper reason, namely, that the systematic semantics that Frege developed and that Carnap refurbished is not intensionalism at all. In this paper, I want to explain why I now think this. In the process, I hope to provide a new perspective on the linguistic turn in twentieth century philosophy and a new conception of the relation between the analytic and the necessary and a priori.

2. The old intensionalism

Almost everyone takes Frege to be the father of twentieth century intensionalism. Yet he had little interest in senses for their own sake and what interest he had in them was instrumental, deriving from the service they could render to his theory of reference and his logicist program. Senses were useful to Frege in solving problems that came up in his logical and mathematical investigations. Senses provided him (1952, pp. 56-57) with a solution to the problem arising from the *Begriffsschrift's* treatment of identity: the difference in informativeness between sentences of the form "$N = N$" and true sentences of the form "$N = M$" can be explained as the difference between the analytic and the synthetic. Senses provided him (1952, pp. 64-67) with a solution to the problem that oblique contexts

[1] I want to thank Arthur Collins, Russell Dale, Paul Horwich, David Pitt, Riccardo Repetti, R.M. Sainsbury, Robert Tragesser, and my audiences at the CUNY Graduate Center, Tufts University, Ohio State University, and Oxford University. This paper is dedicated to Sid Morgenbesser, its staunch friend from the beginning.

raise for compositionality of reference and the substitution of coreferentials: the reference of expressions in such contexts can be their customary sense.

Given the usefulness of senses, on the one hand, and the high standard of rigor that Frege demanded in his investigations, on the other, something had to be done about the state of the traditional theory of meaning, especially about the concept of analyticity, which figures so centrally in his logicist program. In particular, the defects Frege spotted in Kant's treatment of the concept convinced him that it was in need of extensive reconstruction. Given Frege's conviction that his new logic provided the proper foundations for arithmetic, what better foundations could there be for analyticity and semantics generally than those the new logic might provide? Indeed, given the role of analyticity in his logicist program, no other foundations would do. Thus, the old intensionalism, as I will call Frege's, Carnap's, and similar positions, developed within, and as an adjunct to, Frege's logic and logicist program.

With this instrumental interest in senses and semantic concepts, it is no surprise to find Frege (1952, p. 57) defining sense as mode of referential determination and defining analyticity (1953, p. 4) as the property of being a consequence of laws of logic plus definitions without assumptions from a special science. In the present context, the significant thing about these definitions is that they present the basic concepts of the theory of sense as principally referential or logical concepts. Sense becomes explainable only in terms of the prior notions of reference and reference fixing; analyticity becomes a species of logical truth.

When one stops to think about it, there is something paradoxical about this aspect of Frege's position. Although a sharp separation between sense and reference is considered to be one of its celebrated features, Frege's actual definitions of sense concepts base them on concepts in the theory of reference, and this, even if it falls short of completely turning sense concepts into referential concepts, so intertwines them that it is unclear what talk about a sharp separation can really mean. This paradoxical feature of Frege's position makes it desirable to look more closely at its foundations, particularly at the treatment of analyticity and its consequences.

Prior to Frege, Locke (1924, pp. 306-308) distinguished two kinds of analytic propositions, which he called "trifling propositions": identity propositions, in which "we affirm the said term of itself" (e.g., "Roses are roses") and predicative propositions, in which "a part of the complex idea is predicated of the name of the whole" (e.g., "Roses are flowers"). Either sentence "trifles with words", whereas a non-trifling sentence, such as a mathematical sentence, states "a real truth and conveys with it instructive real knowledge". Correspondingly, Locke distinguished two kinds of "necessary consequences", analytic entailments, where validity rests on the conclusion being a part of the premise, and synthetic entailments, where it does not.

Kant (1951, p. 14) gave two accounts of analyticity. One, that an analytic judgment is one whose subject concept contains its predicate concept, is essentially Locke's account of a trifling proposition. The other, that an analytic judgement is

one whose denial is a logical contradiction, is quite different from Locke's account and erodes his distinction between two kinds of "necessary consequences". These two accounts of Kant's set the stage for Frege's elimination of the traditional "concept-containment" notion of analyticity in favour of the "logical-containment" notion.

Frege (1953, p. 101) was in no doubt about the fundamental difference between the two notions of containment, as is clear from his "beams in a house" and "plant in the seed" analogies. Concept containment, as the former analogy suggests, is *literal* containment. The senses of "man" and "unmarried" are actual parts of, hence, are literally contained in, the sense of "bachelor". Logical containment, as the latter analogy suggests, is not literal containment. It is a metaphor for a quite different relation. As Wittgenstein (1974, p. 248) points out, it is absurd to suppose that a simple proposition literally contains the infinitely many disjunctions in which it appears as a disjunct.

Nor was Frege in any doubt about which notion of analyticity he preferred. Kant's concept-containment notion of analyticity was unsuitable for his logicist program because *inter alia* the notion is expressed as a psychological criterion, it restricts analyticity to identity and subject-predicate sentences, and it is exceedingly weak—or, as Frege (1953, p. 101) put it, "unfruitful"—in comparison to definition in logic and mathematics. In contrast, the logical-containment notion has none of these defects, and, with an appropriate systematization of logic, seems entirely suitable for logicism. Not surprisingly, then, Frege abandoned the traditional notion and defined analyticity in a way which makes it a species of logical truth.

This definition amounts to a second logicist thesis. The first is that mathematics is logic; the second is that semantics is also logic. Unlike the first, the second thesis was neither explicitly formulated as a reductionist claim nor supported by rigorous general argument. And also unlike the first, it largely escaped critical examination and has become the basis of influential positions in twentieth century Anglo-American philosophy.

3. Trouble for Frege's second logicist thesis

Trouble soon arose for Frege's second logicist thesis—though not so soon, so dramatically, or so clearly focused on its source as Russell's paradox. The trouble came to light in the course of Wittgenstein's attempt in the *Tractatus* to use a logical semantics derived from the work of Frege and Russell to establish that the rules of natural language assign no sense to metaphysical sentences. Since the success of such an attempt depends on the adequacy of its semantics to account for the inferential powers of the significant sentences of natural language generally, Wittgenstein's argument that metaphysics transcends the limits of language put the logical conception of semantic structure to the test of natural language.

The test raised doubts about the adequacy of the conception. The conception entails that atomic sentences have no inferential powers (beyond the powers they have as unanalyzed propositions), but sentences like (1) and (2) seem to falsify this entailment.

(1) The spot is blue

(2) The spot is red

The sentences certainly appear to be atomic, but, nonetheless, they are incompatible. In the *Tractatus*, Wittgenstein says both that they contradict each other and that the contradiction is logical:

> As there is only a *logical* necessity, so there is only a *logical* impossibility. For two colours, e.g., to be at one place in the visual field, is impossible, for it is excluded by the logical structure of colour...
>
> (It is clear that the logical product of two elementary propositions can neither be a tautology nor a contradiction. The assertion that a point in the visual field has two different colours at the same time is a contradiction.) (Wittgenstein 1922, 6.375 and 6.3751)

Wittgenstein's position seems flatly inconsistent. If, *ex hypothesi*, impossibility is only logical impossibility, and, as a consequence, elementary propositions cannot contradict one another, how can the logical product of two such propositions, one asserting that a point has one colour and the other asserting that it has another colour, be a contradiction? Wittgenstein seems to be faced with having to acknowledge that the logical semantics underlying the *Tractatus* cannot capture the necessary incompatibility of (1) and (2), and yet having to insist that they do contradict one another.

Tractatus 4.211 seems to provide an escape hatch: "It is a sign of an elementary proposition, that no elementary proposition can contradict it". This suggests that (1) and (2) do not express elementary propositions. But one would think that such sentences express elementary propositions if anything does. It is also a sign of an elementary proposition that, from a grammatical point of view, the logical formula which is the most natural candidate for giving the logical form of a sentence does not assign it a compound logical structure. Since the most natural candidate for giving the logical form of (1) and (2) does not assign them a compound logical structure, if we use 4.211 to deny that they express elementary propositions and to explain their incompatibility on the basis of a compound logical structure, how are we ever to grammatically identify sentences that express elementary propositions?

Wittgenstein can, of course, argue that the surface grammar of (1) and (2) is misleading and that the sentences have an underlying logical structure which is compound. But, in this case, he has to provide some conception of analysis to guide us once we leave the syntactically marked territory of surface grammar in search of recondite underlying logical structures. However, the *Tractatus* contains no such conception. Moreover, this does not appear to be an oversight. Wittgenstein seems to acknowledge that once we go in search of the underlying logical forms, we enter an uncharted realm, looking for something whose char-

acterization provides no clue to finding it. He seems to concede as much when he says in 4.002 that the form of thoughts cannot be inferred from "the external form of the clothes" in which language disguises them.

Returning to this problem, Wittgenstein (1929, pp. 162-171) seems to recognize the hopelessness of explaining such inferences within the framework of the *Tractatus*, conceding that sentences like (1) and (2) express atomic propositions and adding, unhelpfully, that "Atomic propositions, though they cannot contradict, may exclude each other". But very soon Wittgenstein came to see clearly that the problem that sentences like (1) and (2) raise for the *Tractatus* cannot be dealt within its semantics. In the work which was published as his *Philosophische Bemerkungen*, Wittgenstein (1975) suggests that the problem of colour incompatibility arises from the fact that degree qualities form a system where the application of one quality excludes that of every other. This new approach abandons the *Tractatus*' notion of an elementary proposition and with that central notion many of the significant features of the book's semantics. Nonetheless, the basic trouble still remains, since the new approach provides no alternative notion of the structure of sentences like (1) and (2) and gives no content to the notion of a relation of necessary exclusion which is not logical incompatibility.

As is well-known, Wittgenstein finally came to adopt the radical solution of entirely abandoning the conception of semantics in the *Tractatus* as a way to understand meaning in natural language. No doubt other factors played some role in this fundamental change in Wittgenstein's thinking, but his ultimate conclusion that not all necessary propositions can be accounted for as tautologies and denials of tautologies surely played a pivotal role in the transition to the new doctrines of the *Philosophical Investigations*.

4.The general problem

To fully appreciate the problem, we have to have a clear conception of its generality and its nature. First, it is a special case of a general problem about the semantics of logically atomic sentences. As Wittgenstein recognized, sentences like (3) and entailments like (4) pose the same problem for Tractarian semantics as the incompatibility of (1) and (2).

(3) Bachelors are unmarried (Red is a colour, Squares are rectangles)

(4a) John is a bachelor

(4b) John is unmarried

Wittgenstein (1922, 5.134) says, "From an elementary proposition no other can be inferred", but (4b) can be inferred from (4a). Since (3) and (4) have the same claim to being atomic as (1) and (2), if, as Wittgenstein supposes in the *Tractatus*, there is only logical necessity, then there can no more be analytically necessary atomic sentences and analytically necessary inferences involving atomic sentences than there can be necessary incompatibilities between atomic sentences.

The problem is thus not a particular one about incompatibility, but a general one about all inferential properties of logically atomic sentences. Moreover, the problem encompasses non-inferential sense properties and relations as well. Although I will not try to establish this claim here, it should be clear from two considerations. One is that non-inferential sense properties, such as redundancy, e.g., "unmarried bachelor", antonymy, e.g., "bachelor" and "spinster", and synonymy, e.g., "sister" and "female sibling", pose essentially the same explanatory problem. The other is that non-inferential properties like redundancy obviously arise from the same semantic structures as inferential properties and relations like analyticity and analytic entailment.

Second, the problem requires that the proof-theoretic and the model-theoretic sides of its solution coordinate. Either the proof-theoretic side represents the members of pairs of sentences like (1) and (2) and (4a) and (4b) as atomic in which case there is no formal basis for ascribing necessary inferential relations to the sentences on the model-theoretic side, or the proof-theoretic side represents the sentences as having structure in which case it has to be shown on the model-theoretic side how the necessity of their inferential relations depends on their structure. It is this feature of the problem which is neglected in the *Philosophische Bemerkungen.*

5.The impasse and the standard ways out

The problem not only played a pivotal role in the development of Wittgenstein's philosophy, it played a pivotal role in the development of twentieth century Anglo-American philosophy as a whole. Since the other two major philosophical approaches within the linguistic turn, the Fregean approach and the Russellian approach, also subscribed to what I am calling the second logicist thesis, it constituted an impasse for them too and thus required those approaches to take a new direction. The present form of the Fregean, Wittgensteinian, and Russellian approaches can be largely understood as a response to this impasse. Each approach was based on a distinct proposal for a way out of the impasse, and each was the work of one of the major philosophers of the century, namely, the later Wittgenstein, Carnap, or Quine. Finally, each such proposal gave rise to a program within which a substantial portion of subsequent Anglo-American philosophy has been done.

Wittgenstein's way out was the radical one of breaking with the formal tradition initiated by the work of Frege and Russell. Wittgenstein rejects Frege's approach wholesale: his notion of sense, his grammatical form/logical form distinction, his model of logical calculi, and his ideal of a logically perfect language. Wittgenstein replaces it with one that locates sense in the public use of language, eschews formal exactness, explanation, and theory, and emphasizes the description of ordinary linguistic practice. Formal logic is no longer seen as the right way to account even for the logical powers of compound sentences in natural lan-

guage. The *Philosophical Investigations* offers a uniform treatment of the logical powers of sentences as deriving from the rules governing their use in ordinary language.

Carnap's and Quine's ways out of the impasse continue the formal tradition of Frege and Russell, but, coming out of different branches of this tradition and diagnosing the impasse differently, Carnap and Quine continue it along very different lines. Carnap saw the failure of logical formalism to treat atomic sentences as due to an arbitrary distinction between logical and extra-logical vocabulary, which puts the logical aspects of extra-logical words beyond the reach of logical apparatus. Carnap's (1965a, pp. 222-229) way out was to turn extra-logical vocabulary into logical vocabulary by providing extra-logical words with so-called "meaning postulates". Meaning postulates axiomatize the inferential powers of extra-logical words in the same way that logical postulates axiomatize the inferential powers of logical words.

Being modelled on standard logical postulates, meaning postulates express nothing more than the extensional correlates of inferential properties and relations. For example, the meaning postulate "$(\forall x)(x$ is a bachelor $\rightarrow x$ is unmarried)", like a logical postulate, simply constrains the admissible models on which sentences and deductions are evaluated. Thus, despite their name, "meaning postulates" have no more to do with meaning than do logical, mathematical, metaphysical, or any other postulates which express limitations on the possible. Moreover, in defining analytic propositions in terms of a set of postulates expanded to include appropriate meaning postulates, Carnap revises Frege's definition of analyticity to provide a uniform formalization of Fregean analyticity, removing Frege's none too clear reference to definition and handling analytic and contradictory atomic sentences without denying that "there is only a *logical* necessity" and "only a *logical* impossibility". With Carnap's definition, the last trace of Lockean concept containment disappears from the old intensionalism, and with it the last vestige of Locke's distinction between semantic and other "necessary consequences".

Where Carnap saw the impasse as due to an inadequacy in Frege's intensionalism, Quine saw it as due to intensionalism itself. Quine's way out was to reject the intensionalist notion of sense. But, unlike Wittgenstein, he does so without rejecting the earlier logical, particularly, the Russellian, tradition. On the basis of arguments intended to show that meaning, analyticity, and synonymy are not objective scientific concepts, Quine claimed that the extra-logical vocabulary of a language does not give rise to genuine logical properties and relations, and, hence, that the theory of reference is theory enough for logic. Problems like those for which Frege introduced senses were turned over to the enterprise of regimenting sentences of a natural language into logical notation. Moreover, the Carnapian criticism that the distinction between the logical and extra-logical vocabulary is arbitrary can now be answered. Quine's arguments against meaning draw a principled distinction between the two vocabularies: the extra-logical but not the logical vocabulary is subject to indeterminacy of translation.

6. The possibility of another way out

Wittgenstein's, Carnap's, and Quine's ways out of the impasse, different as they are, have something important in common. All three are based on the assumption that there is a single source for the inferential powers of all sentences, which is logical structure (in the philosopher's favoured sense of the term). If this assumption is correct, it is hard to see how there could be a way out that is not a variant of Wittgenstein's, Carnap's, or Quine's. But is it correct? It is not impossible to imagine it incorrect. It might be that a linguistic structure distinct from logical structure is responsible for the fact that there is no counterexample to inferences like that from (4a) to (4b). The falsehood of the first logicist thesis shows that logic has no monopoly on validity. If there are valid inferences in mathematics that are non-logical, why couldn't there be valid inferences in language that are non-logical? Doesn't Descartes' discussion of the *cogito* present it as an example of a valid non-logical inference? (See Katz,1988a).

Of course, if the old intensionalism were the only intensionalism, this possibility could be dismissed out of hand. If senses are modes of referential determination, and analytic truth and analytic entailment species of logical truth and logical entailment, then logical structure would be the source of necessary incompatibilities like (1) and (2), necessary truths like (3), and necessary inferences like that from (4a) to (4b). Hence, the possibility of a new way out of the impasse depends on the possibility of a new intensionalism in which sense structure is an intrinsic aspect of the grammar of sentences, independent of truth and reference.

7. Quine's and Putnam's contributions to intensionalism

Quine and Putnam, renowned for their anti-intensionalism, have, in fact, made a fundamental contribution to the cause of intensionalism. They refuted the old intensionalism, and thereby opened the way for a new and better form of intensionalism. Unfortunately, this contribution has gone unrecognized due to the widespread belief that, except for minor improvements, the old intensionalism is the best intensionalists can do. But, if we suspend this belief for a moment, we can see what their arguments do and do not do, and, in this way, discover the lines along which a new intensionalism can develop.

Quine's contribution was to refute Carnap's (1965a, pp. 222-229) explication of analyticity, and, in so doing, block the most explicit and sophisticated account of analyticity as a purely logical concept. Quine (1953, pp. 33-34) argued that, in using particular words of a language, meaning postulates fail to explicate analyticity for sentences and languages generally; that is, they do not define it for variable "*S*" and "*L*". Quine (1953, p. 33) also argued that, although meaning postulates tell us which sentences count as analytic, they don't tell us what analyticity is. The former criticism shows that Carnap's approach fails to provide the

necessary language-neutral notions of analyticity and synonymy. The latter shows that Carnap's approach provides no insight into the concept of analyticity itself, and, insofar as such insight is required for a principled way of deciding which sentences are analytic, the criticism shows that Carnap provides no principled way of deciding which sentences are analytic.

While Quine refuted Carnap's attempt to complete Frege's formalization of analyticity and synonymy, Putnam (1962b, 1970, and 1975) refuted the basic Fregean conceptions of those notions. Putnam's arguments strike at the very heart of Fregean intensionalism, Frege's notion of sense. On this notion, the sense of an expression is a criterion which determines whether or not something belongs to the extension of the expression. This means that the old intensionalism not only holds (i) that there exist analyticities, say typified by "Cats are animals", and synonymy relations, say typified by "cat" and "feline animal", but also (ii) that sense determines reference. Given *both* (i) and (ii), it is impossible for utterances of "cat" which are literal in meaning to apply to non-animals. But Putnam shows that such utterances can apply to robots, and, hence, to non-animals.

Although such cases are counterexamples to Fregean intensionalism, they are not counterexamples to intensionalism *per se* because not all forms of intensionalism hold (ii). (i) is essential to all forms of intensionalism, since it guarentees the linguistic phenomena necessary for the introduction of senses. But (ii) is only essential to Fregean intensionalism because only Fregean intensionalism defines sense in a way that commits it to (ii). To see that there are versions of intensionalism with no commitment to (ii), and, hence, to show that Putnam has not refuted intensionalism, it suffices to note that a form of intensionalism which defines sense as what synonymous expressions have in common in virtue of which they are synonymous—say, certain distributional patterns, mental phenomena, or abstract objects—carries no commitment to (ii). (See Katz (1975, p. 98 and 1990, pp. 144-155) for further discussion.)

Quine's criticisms of meaning postulates show that analyticity cannot be explained within logic, but a further argument is required to show that analyticity cannot be explained outside of logic. Thus, we turn to Quine's argument against the possibility of explaining the concept in linguistics. For, Quine rightly saw that, if an intensionalist position were to be developed outside of logic, linguistics had to be the place.

Quine also rightly saw that he would have to exploit some intrinsic feature of the methodology of linguistics to construct an argument against the possibility of explaining analyticity in linguistics. To obtain such a feature, Quine (1953, pp. 47-64) relied on the then prevailing conception of linguistic methodology, that of the Bloomfieldian theory of taxonomic grammar, to provide him with a paradigm for explaining linguistic concepts. On this paradigm, the acceptability of a linguistic concept depends on there being substitution procedures which operationally define it in terms of concepts outside its family. Quine then proceeded to establish the conditional (C).

(C) If substitution procedures are the proper basis for explaining concepts in linguistics, then one cannot make objective sense of the concepts in the theory of meaning.

He showed that there are no substitution procedures for concepts in the theory of meaning because any attempt to provide them is circular.

By itself (C) is not enough. Quine's argument against the possibility of explaining analyticity in linguistics requires that he have grounds for detaching its consequent. Quine put his faith in Bloomfieldian theory to provide such grounds. But this faith was misplaced. Chomsky's new theory of generative grammar replaced the taxonomic standard of operational definition in terms of substitution procedures with the more liberal generative standard of theoretical definition within grammars. In grammars conceived of as hypothetico-deductive systems, there is nothing circular about axiomatically defining the members of a family of linguistic concepts with respect to one another, since the axiomatically expressed relations among the members reveal their interconnections. There is nothing arbitrary either, since the axioms can be judged in terms of whether their consequences are confirmed by the linguistic facts. Because he cannot detach the consequent in (C), Quine's argument against a linguistic explication of analyticity fails.[2]

8. The new intensionalism and the new way out

The limitations of Putnam's and Quine's criticisms which prevent them from applying beyond Frege's and Carnap's intensionalism point the way to a new intensionalism. Putnam's criticism does not apply to a theory of meaning which rejects (ii). Quine's criticism does not address explanations of meaning based on theoretical definition. Together these limitations suggest that concepts in the traditional theory of meaning can be explained in an acceptable way within linguistics providing they are defined within a hypothetico-deductive semantic theory based on a non-Fregean conception of sense.

Such a semantic theory was developed during the sixties and early seventies within generative linguistics. (See Katz 1972 and Katz 1980.) This theory, which I will refer to as "ST", was based on the non-Fregean definition of sense in (D).

(D) Sense is the aspect of the grammatical structure of expressions and sentences responsible for properties and relations like meaningfulness, am-

[2] See Katz (1988b, pp. 227-252) for full discussion. In his response (Quine 1990, pp. 198-199), Quine says that he has no argument against such an approach to the theory of meaning, although he is personally sceptical about its prospects for success. This sudden liberalism is in stark contrast both to the uncompromising stance of his influential anti-intensionalist writings and to the way those writings have always been understood. Imagine how different the history of Anglo-American philosophy would have been had Quine's scepticism, from the beginning, been taken as nothing more than a personal opinion about the prospects for theories of meaning. For further commentary, see Katz (1990b, pp. 199-202).

biguity, synonymy, antonymy, redundancy, analyticity, and analytic entailment.

The use of concepts like "having a sense", "having more than one sense", "having the same sense", etc. to define the notion of sense is a virtuous circularity like the use of notions like "logical consequence", "logical equivalence", "logical consistency", etc. to define logical form. This is because (D) is a theoretical definition. In using concepts belonging to the same family as the definiendum, (D) specifies the part of grammatical structure which is sense structure. This general specification of sense is fleshed out in the process of mutually adjusting definitions of sense properties and relations to representations of sense structure in the process of accounting for instances of such properties and relations of expressions and sentences in the language.

Since (D) defines sense exclusively in terms of the intrinsic grammatical structure of sentences, it completely severs the connection between sense and reference. (D) says that sense properties and relations are grammatical properties and relations, leaving their connection to referential properties and relations for a further theory about the relation of language to the world. This takes the first step in realizing the possibility adumbrated in §6. Given (D), it is no longer absurd to say, as it is on Frege's definition of sense, that the structures responsible for synonymy, antonymy, analyticity, etc. fall outside of logic. With (D), to say those structures fall outside logic is just to say that expressions and sentences have such properties and relations in virtue of features entirely internal to their grammatical structure.

(D) thus creates the possibility of a new way out of the impasse. But to fully realize this possibility, not only must sense structure be independent of logical structure, it must actually explain the inferential powers of logically atomic sentences like (1)-(4). ST shows how autonomous sense structures can explain such inferential powers on the basis of the hypothesis that, in addition to a compositional sense structure, sentences have *decompositional sense structure*; that is to say, syntactically simple words like "red", "blue", "bachelor", "sister", and "square" in sentences like (1)-(4) have a semantically complex sense structure. The explanation is, then, that elements and relations in the complex sense structure of syntactic simples are the source of the sense properties and relations of the sentences.

We are committed to the hypothesis that syntactic simples can, and usually do, have complex sense structure if we find examples in natural language of expressions where the explanation of their sense properties or relations must refer to their decompositional structure. (D) makes the explanation of sense properties and relations depend on representations of sense structure. So, if their explanation has to refer to elements and relations in decompositional sense structure, then, since previously recognized levels of grammatical structure do not represent such structure, we have to posit decompositional sense structure. The required examples are readily at hand. To explain the redundancy of "unmarried bachelor", we need to say that the sense of the modifier "unmarried" is already contained in the

sense of the head "bachelor", but this requires us to say that the syntactic simple "bachelor" has a complex sense. To explain the synonymy of "spinster" and "woman who never married", we need to say that the sense of "spinster" is identical with a sense composed of the senses of "woman", "never", and "married", but this requires us to say that the syntactic simple "spinster" has a complex sense. To explain that "rectangle" is the superordinate of "square", we need to say that "square" has a sense in which the sense of "rectangle" occurs but "rectangle" does not have a sense in which the sense of "square" occurs, but this requires us to say that "square" has a complex sense. To explain the antonymy of "sighted" and "blind", we need to say that "blind" has a sense involving the senses of "without" and "sight", but this requires us to say that "blind" has a complex sense.[3]

I now want to explain how the decompositional hypothesis can account for the inferential powers of sentences like (3) and (4). A decompositional account of their inferential powers locates the source of the analyticity of (3) and the analytic entailment (4) in the decompositional sense structure of "bachelor" and "unmarried". Such an account reconstructs the Lockean and Kantian notion of analytic propositions as ones that add "nothing through the predicate to the concept of the subject, but merely break... it up into those constituent concepts that have all along been thought in it" (Kant 1929, p. 48). There is, as I shall argue, nothing fundamentally wrong with the traditional notion. The cloud it has been under ever since Frege criticized it is undeserved. Given half a chance, the notion stands up quite well to Frege's criticisms.

Frege often criticized the intrusion of psychology into logic. Ayer (1946, pp. 71-78) used the criticism to motivate rejecting the Kantian definition of analyticity which sanctions the synthetic a priori knowledge that metaphysics purports to explain. What is remarkable about this application of Frege's psychologism criticism is that it should have been used at all when it is so easy to answer. We can simply drop Kant's psychological talk about what one introspects in thinking through a proposition, and define Kantian analyticity directly in terms of the structure of the concepts themselves. That is to say, we can define concept con-

[3] For a fuller explanation, see, for example, Katz (1972, pp. 157-171). But this explanation, brief as it is, suffices to show that Fodor's (1981, pp. 332-333) claim that decompositional representation was introduced to explain the necessity of analytic truths is entirely wrongheaded. Assuming this claim, Fodor then objects to decompositional representations on the grounds that the necessity of analytic truths might be explained in other ways, in particular, using meaning postulates as Carnap does. This objection disappears once we recognize that the actual reason for introducing decompositional representation is to explain sense properties and relations like ambiguity, synonymy, antonymy, redundancy, analyticity, etc., and that the explanation of referential properties like necessary truth is explicitly taken to fall outside the scope of decompositional semantics. A related objection to decompositional semantics in Fodor, Fodor and Garrett (1975) and in Fodor, Garrett, Walter, and Parks (1980) collapses with the recognition that a decompositional explanation of the inferential powers of logically atomic sentences locates the source of their validity in sense structure rather than logical structure. The objection in those papers assumes, curiously, that their explanation must be based on first-order logical structure. For further discussion, see Katz (1988, pp. 190-191) and Pitt (in preparation).

tainment as a condition on the sense structure of sentences, independently of anything psychological.

Frege's criticism (1953, pp. 99-101) that concept containment defines analyticity too narrowly to do justice to logic and mathematics is also a bad one. There is no reason why concept-containment analyticity has to do justice to them. Frege's reason was logicism, but, even if it had not failed, there would be no argument here against concept-containment analyticity. Whatever the needs for a broad notion of analyticity, they do not obviate the need for a narrow one. No argument has been presented to show that we do not need a narrow notion to explicate sense properties and relations of expressions in natural language like redundancy and analyticity. Frege's logical notion of containment is too broad to capture the class of redundant expressions and trifling sentences. Benacerraf (1981, p. 34, fn. 6) makes what I take to be a related objection to Frege's criticism when he says that it is "a bit of a *petitio principii* on Frege's part".

There are three other criticisms of the concept-containment definition of analyticity. Frege (1953, p. 100) is sceptical that we can speak of the containment of a predicate concept when "the subject is an individual object", but, as long as the *subject* in particular judgments has a sense, there is no problem. He is also sceptical about whether we can speak of containment when the judgment is existential. This is a reasonable doubt, but it can be dealt with, as in Katz (1988a, pp. 98-177). Finally, Frege's criticism (1972, pp. 112-113) of the subject-predicate analysis of sentences reveals a serious incompleteness in traditional definitions of analyticity, namely, their failure to capture relational analytic sentences.

Frege saw subject-predicate analysis as an inherent feature of natural languages, and, from his standpoint, as another of their imperfections. He probably also saw this feature as related to the narrowness of concept-containment analyticity responsible for substantive logical and mathematical truths falling outside its scope. But the incompleteness can be patched up without abandoning concept-containment analyticity. The crude subject-predicate analysis which Frege criticized is not an inherent feature of natural languages, only a feature of unsophisticated thinking about them. In fact, the failure to capture relational analytic sentences is nothing more than a case of simply overlooking trifling sentences like (5)-(7).

(5) Jill walks with those with whom Jill strolls

(6) Jack kills those Jack murders

(7) One sells books to those who buy them

These sentences, unlike typical logical and mathematical truths, exhibit literal, "beams in the house", containment just as much as analytic subject-predicate sentences like (3).

The only difference between analytic sentences involving two-place and three-place predicates like (5)-(7) and standard subject-predicate analytic sentences is that, in the former, some term besides the subject is the containing term. Perhaps because they concentrated on subject-predicate propositions, where there is only one term, philosophers like Locke and Kant failed to see that the analyticity of

those propositions is only a special case of analyticity generally. To cover relational analytic propositions, the correct generalization is that there is some term in the proposition which contains the full content of the proposition, i.e., its predicate(s) and each of the other terms.

We can formulate a simplified form of this generalization (Katz 1972, pp. 174-177) as follows. Let S be a sense of a simple sentence consisting of an n-place predicate P with terms $T_1,\ldots,T_n$ occupying its argument places. Then, the generalization is the following:

(A) S is analytic (and the sentence expressing S is analytic on one of its senses) in case there is a term of S, T_i, consisting of an m-place predicate Q ($m \geq n$) with terms occupying its argument places such that P is contained in Q and that, for each term T_j of $T_1,\ldots,T_{i-1},T_{i+1},\ldots,T_n$ in P, T_j is contained in the term which occupies the argument place in Q corresponding to the argument place occupied by T_j in P.

Given even the crudest decompositional representation of the sense of "bachelor" on which its components are the sense of "unmarried" and "man", (A) marks (3) as analytic. Further, given decompositional representations on which "stroll" has the complex sense of "walk idly and leisurely", the predicate "stroll" contains the predicate "walk" (and the term "Jill" is contained in the term "Jill") and, hence, (A) marks (5) is analytic.

Since decompositional analysis can account for the source of the inferential powers of logically elementary sentences in a novel way, the new intensionalism provides a new way out of the impasse that Wittgenstein reached in the *Tractatus*. We also can diagnose the impasse in his early philosophy. Having no conception of analysis on which syntactically simple words in sentences like (1)-(4) can have complex sense structure, Tractarian semantics had no access to the structure which actually determines the inferential powers of those sentences. Tractarian semantics is like chemistry prior to the period of the atomic theory; decompositional semantics is like chemistry afterwards.

9. *Quine's criticisms of Carnap revisited*

The fact that Carnap's meaning postulates succumb so easily to Quine's criticisms ought to be a tip-off that Carnapian semantics is not intensionalist. Meaning postulates do not define analyticity for variable "*S*" and "*L*" and do not tell us what property is attributed to sentences marked analytic because, as noted in §5, they say nothing about meanings. Compare them to definitions like (A). (A) is not vulnerable to the former criticism because, since its variables range over all of the sentences of any natural language, it makes no use of lexical items from particular natural languages. (A) thus defines analyticity for variable "*S*" and "*L*" because it is formulated within a linguistic theory where a semantic theory can posit the existence, and describe the structure, of senses which are, in Quine's terminology (1960, p. 76), linguistically neutral meanings. Since the grammar of a

natural language correlates representations of sentences with representations of linguistically neutral meanings, (A) can be formulated as a condition on representations of such meanings.

(A) is also not vulnerable to the latter criticism. In decompositional semantics, we can generalize from representations of the concept-containment relations in sentences like (3) and (5)-(7) to provide an account of the common formal property of analytic propositions. To provide an account of the common formal property of analytic entailment in sentences like (4), we require a generalization saying that the predicate of the entailing proposition contains that of the entailed proposition and also that each of the terms of the entailing proposition contains its corresponding term in the entailed proposition (Katz 1972, pp. 174-177). Under the interpretive principles of ST, these formal properties represent forms of redundancy. Analyticity is redundant predication: the predicational structure of an analytic sentence is a part of the sense content of its term structure. Correspondingly, analytic entailment is redundant entailment: the sense of the conclusion is part of the sense of the premiss.

Since it is its ability to refer to the decompositionally buried sense structure that enables ST to express the common property of analytic sentences as redundant predication, it is the inability of the meaning postulate approach to refer to decompositionally buried sense structure that prevents it from meeting Quine's demand to provide an account of their common property. In relying exclusively on apparatus for expressing conditions on the extensional structure of lexical items, Carnap has no apparatus for referring to the components in the senses of syntactic simples in natural languages, and, hence, cannot make use of the containment relations to provide an account of the property of analyticity.[4]

Since the other sense properties and relations depend on decompositional sense structure every bit as much as analyticity, the failure of meaning postulates in the case of analyticity ought to be symptomatic of a general failure of meaning postulates to explain sense properties and relations. That this is so can be seen from examples where the failure in the case of analyticity repeats itself in the case of other sense properties and relations. Consider synonymy. It is evident that sentences like (4a) and (8) are not synonymous, since (8) but not (4a) is redundant:

(8) John is an unmarried bachelor

Since redundancy is a sense property and synonymy the identity relation for the domain of meaning, the two sentences cannot be synonymous, for each has a sense property the other does not have. True enough, (4a) and (8) analyti-

[4] Carnap cannot even provide an appropriately chosen extension for the "tendentious" symbol "analytic". Note also that the extension of Carnapian meaning postulates provided by Richard Montague's "analysis trees" or David Lewis's "semantically interpreted phrase markers" is of no help to the Carnapian approach in meeting Quine's criticism. These devices founder on the same problem of having no access to the structure of senses of syntactic simples as do meaning postulates. See Katz and Katz (1977).

cally entail each other, but mutual analytic entailment is weaker than synonymy.[5]

Consider antonymy. The antonymy pairs in (9) differ from those in (10)

(9) blind/having sight, orphaned/having a living parent, amorphous/having definite form

(10) red/blue, happy/sad, odd/even

in that they are privation/possession relations: the sense of the first term expresses a lack of the feature possession of which is expressed in the sense of the second. But, in so far as the meaning postulate approach accounts for the antonym pairs in both (9) and (10) on the basis of postulates of the form "$(\forall x)(F(x) \rightarrow \neg G(x))$", it cannot explicate the fact that the pairs in (9) are privation/possession relations while those in (10) are not. Given nothing more than an assignment of the same extensional structure to the antonym pairs in both cases, there is no means of accounting for the fact that the pairs in (9), but not those in (10), are asymmetrical with respect to negation—one member of the former pairs, e.g., "blind", but not "having sight", being a privation term, is inherently negative but otherwise the same in content as the other term. To distinguish the privation/possession antonyms like (9) from antonyms like (10) and to predict which member of the pairs in (9) is a privation term, it is necessary to refer to decompositional sense structure.

The inexpressibility of the asymmetry is particularly clear when it is necessary, as it is in cases like the last pairs in (9) and (10), to represent the antonyms with a biconditional. The equivalence of "$(\forall x)(\neg F(x) \leftrightarrow G(x))$" and "$(\forall x)(F(x) \leftrightarrow \neg G(x))$" thus leads to the false claim that antonyms of both kinds are symmetrical with respect to negation.

The other principal aspect of Carnap's semantics (1965b, §40), Carnapian intensions—functions from possible worlds to extensions in them—are, if anything, even more clearly extensional apparatus. This explains Lewis's purportedly paradoxical result that descriptions of a language in terms of Carnapian intensions are no stronger than extensionalist descriptions (1974, pp. 49-61). Since, as Lewis himself makes clear (1986), the notion of a possible world does not have to be unpacked in terms of senses, there is, in fact, nothing paradoxical, or even surprising, about this result: descriptions which are nominally intensionalist but really extensionalist are no stronger than extensionalist descriptions.

Genuine intensional descriptions in the sense of the new intensionalism cannot be translated in the way Lewis translates intensional descriptions in the Carnapian sense. Lewis's argument for the equivalence is achieved on the basis of

[5] The sentences "John is a bachelor who is unmarried" and "John is a bachelor who is self-identical" are nonsynonymous but they are provably equivalent in a meaning postulate system. It might be replied to this example that the equivalence of synonymous expressions should not depend on logical postulates in the way the equivalence of these sentences does, i.e., meaning postulates should play a parallel role for each sentence in arriving at the equivalence. But this reply rests on a distinction without a difference, since the *raison d'être* of the meaning postulate approach is to remove just such a difference in kinds of postulates.

extensional descriptions which make use of a class of names whose extensions are the intensions used in Carnapian intensionalist descriptions. It is a condition of Lewis's argument that his intensionalist and extensionalist both accept unactualized possibilia, and this condition is met. But, of course, the corresponding condition of joint acceptance of *bona fide* senses for the parallel argument would not be met, since the philosophical point of intensions in the sense of Lewis's Carnapian intensionalism is to secure an ontology without *bona fide* senses. The situation here would be analogous to trying to make Lewis's (1974) argument work in the case of an extensionalism like Quine's where there are no unactualized possibilia.

10. Frege's semantics revisited

We can conclude that Carnap's semantics is not intensionalist in the traditional sense. It only seems so because of a verbal sleight of hand whereby logical postulates are called "meaning postulates" and "referential rules" are called "intensions". But the same conclusion cannot be drawn about Frege's semantics. It seems plausible at this point to suppose that Fregean semantics is the unmitigated intensionalism it has always been taken to be, but that, in explicating its account of analyticity on the basis of meaning postulates, Carnap replaced an intensionalist notion of definition with what we have seen is not intensionalist at all. In this section, I want to explain why I think that, even without Carnap's help, Frege's systematic semantics is not intensionalist.

Let me begin by making clear that I am not denying either Frege's greatness as a philosopher of language and logic in the modern sense of term or the obvious fact that he has shed enormous light not only on the logical structure of natural language but also on its sense structure. Frege's senses, which, as I shall argue below, are not senses in natural language and which were introduced specifically to solve technical problems in his *Begriffsschrift*, are nonetheless discussed in terms of examples from natural language which we readily understand on the basis of sense in natural language, and which, so understood, deepen our knowledge of its sense structure. But Frege was notoriously dismissive—often scornful—of natural language for its alleged imperfections, turning his back on it as unsuitable for rational inquiry. This is quite familiar. What is less noted but more significant in the present context is the extent to which Frege's systematic semantics is incompatible with an intensionalist stance on natural language.

Consider two examples. Frege held that the grammar of a natural language is a product of "our human thinking and changes as it changes" (1967, p. 13). He also regarded ambiguity as one of the imperfections of natural language (1952, p. 70). From these views it follows that senses in natural languages, the things which ambiguous expressions have two or more of, are, as effects of psychological processes, concrete psychological objects. But senses, in connection with Frege's perfect language and the thoughts to which laws of logic apply, are abstract objects. Thus, Frege seems committed to contradictory views.

Since Frege defines senses as the determiners of reference, if the information content of a word—what fluent speakers grasp as their basis for deciding what its referent is—fails to determine its reference, then the word fails to have a sense. Frege himself acknowledges this in expressing scepticism about whether the sentence "Are we still Christians?" has a sense:

> Has the question "are we still Christians?" really got a sense, if it is indeterminate whom the predicate "Christians" can truly be asserted of and who must be refused it? (Frege 1952, p. 159)

How can a word have something which makes its application completely determinate when its application is indeterminate? Furthermore, we cannot soften the blow by supposing that a word like "Christian" has something we might think of as a partial sense, that is, a sense corresponding to the area where it is determinate to whom the predicate applies. Frege's definition of sense makes no provision for senses of predicates that do not refer to Fregean concepts, and, as Russell pointed out (1923, p. 88), not only are there indeterminate cases in the application of words, but the area of indeterminateness is itself indeterminate. Furthermore, the word "Christian" is hardly a marginal case. Since vagueness is a very widespread, and perhaps even an ubiquitous, feature of natural language, there will be few, if any, senses in natural languages. Thus, Frege's definition of sense together with the facts about the vagueness of words in natural language, which he is far from denying, lead to a view that at best gives considerable aid and comfort to extensionalism and at worst is extensionalism.

Given such incompatibilities, let us put aside the aspects of Frege's writings which concern natural language in order to focus on his systematic semantics. Admittedly, this is to read Frege contrary to the customary practice of trying to make all of a philosopher's corpus fit together. The problem with an inflexible commitment to that interpretive practice is that, besides the Charybdis of failing to do justice to the full vision of a single minded philosopher, there is also the Scylla of failing to do justice to one or the other vision of a philosopher who is of two minds. Since Frege was of one mind in connection with natural language and of another in connection with "the theoretical structure of demonstrative science and... a perfect language" (1952, p. 58), we need to depart from the customary interpretive practice and ask whether the systematic semantics he devised is intensionalist.

From the perspective of this question, it is unclear whether Fregean senses differ essentially from Carnapian intensions. Carnap's intensions are modes of referential determination which satisfy Frege's two general constraints on senses. An expression may have a Carnapian intension without referring to anything (in a possible world), but not conversely, and two expressions having the same reference (in a possible world) can have different Carnapian intensions, but not conversely. Carnapian intensions are also objective and graspable to the same extent that Fregean senses are. But, as Frege fails to provide further explicit constraints on senses, in particular identity conditions on them, we are left with the possibility of both an intensionalist and extensionalist conception of sense. Thus, we have

to look at what Frege implicitly says about the identity condition on senses in his systematic semantics to decide between the remaining conceptions.

Church explores two possibilities for identity conditions on senses, one which allows expressions to differ in sense even if a statement of their identity is necessary or logically valid and another which does not (1951, pp. 3-24). Church considers both of these possibilities, but the stronger notion of sameness of sense on which the former rests is not explained, and it is clear that he thinks the latter is Frege's true position. Church writes,

> Frege would agree that intensional logic also must ultimately receive treatment by the logistic method. And it is the purpose of this paper to make a tentative beginning toward such a treatment, along the lines of Frege's doctrine. (1951, p. 3)

If, as Church supposes, the identity conditions in Frege's systematic semantics for the senses associated with two expressions "E" and "E'" are simply the necessity or logical validity of "$E = E'$", then Fregean senses can be counted as Carnapian intensions, and the conclusion we have drawn about Carnap's semantics can be drawn about Frege's.

Do Frege's systematic works bear Church out? In the *Grundgesetze*, the sentences "Two squared is equal to four" and "Two plus two is equal to four" are recognized to be nonsynonymous (1967, p. 6 and p. 35). This might be taken to suggest that the identity conditions for Fregean senses are stronger than in Church's preferred possibility. But, in themselves, such examples do not suggest that those conditions are the same as genuine natural language synonymy. Such examples are rare and receive no theoretical discussion to indicate their relevance to Frege's systematic semantics. The mention of such examples need represent no more than lip service to features of sense in natural language which will not be allowed to contaminate the uniformly extensional interpretation of the *Grundgesetze*.

To determine whether Frege's systematic semantics is intensionalist or not, we have to turn to Frege's account of analyticity, which is the heart of his systematic semantics and the soul of his logicism. The sameness relation of the definitions in proofs of analytic propositions will be the identity condition for senses in Frege's systematic semantics. If this condition is the necessity or logical validity of the definition and if natural language has another, finer-grained, relation, then that will count as just another of its imperfections. Nonsynonymous expressions with necessarily the same referent will take their place alongside "apparent proper names having no referent" (Frege 1952, p. 70).

Let us begin with some background about Fregean analyticity. Frege's putting of his plant-in-the-seed notion of analyticity in place of Kant's beams-in-the-house notion represented a fundamental shift in philosophical thinking about analyticity. The shift was from a conception of analyticity based on the content of judgments to one based on their justification in terms of the principles constituting the form of reason, i.e., the principles without which no thinking at all is possible. Frege's analytic/synthetic distinction is not the traditional one between

judgments with literal containment which are explicative and judgments without such a containment which are ampliative. Rather, his distinction is one between judgments whose truth depends solely on the most general laws of thinking and those whose truth depends on principles from "the sphere of some special science". Given the nature of this conceptual shift and the logicist motivation behind it, it is clear that the relation of sameness for definitions in proofs of analytic propositions will not be the maximally fine-grained relation of synonymy in natural language.

It is thus no surprise that, in telling us about the kind of equivalence that is involved in definitions appropriate for his notion of analyticity, Frege starts by rejecting definitions based on synonymy (1953, p. 101). Synonymy is maximally fine-grained. The relata of synonymy relations have identical sense structure: the senses of synonymous expressions must be constructed out of exactly the same senses and in the very same way. If there is any difference whatever in sense structure, i.e., if one sense contains a component or relation among components that the other sense lacks, there is no synonymy. Since definitions based on synonymy are ones in which the definiendum and definiens contain one another, they leave no room for novelty and, hence, constitute a throwback to Kant's beams-in-the-house containment.

It is exactly for this reason that Frege scorns Kantian definitions as "of all ways of forming concepts,... the least fruitful" because "nothing essentially new emerges in [that definitional] process" (1953, p. 101). In the same discussion, he even ridicules them as "simply taking out of the box again what we have just put into it". He states categorically that

> Definitions show their worth by proving fruitful. Those that could just as well be omitted and leave no link missing in the chain of our proofs should be rejected as completely worthless. (Frege 1953, p. 81, also 1979, pp. 33-34)

Frege is thus quite clear that adherence to synonymy would prevent us from equating expressions with different content and, hence, would deny us the opportunity to extend our knowledge—as in the case of Cantor's definition of number—whenever and wherever the light of reason shows us the benefit of doing so. The more we depart from synonymy, i.e., the less fine-grained the equivalence relation we choose, the larger the role for general laws of thinking to play. Hence, for the logicist purposes for which Frege constructed his systematic semantics, definition based on the maximally fine-grained relation of synonymy would be counter-productive. What is clearly needed, as Frege explicitly says, is a type of definition which is fruitful in giving rise to novelty in the course of proof:

> ... the more fruitful type of definition is a matter of drawing boundary lines that were not previously given at all. What we shall be able to infer from it, cannot be inspected in advance... The conclusions we draw from it extend our knowledge, and ought therefore, on Kant's view, to be regarded as synthetic; and yet they can be proved by merely logical means, and are thus analytic. (Frege 1953: pp. 100-101)

Given that definitions in Fregean analyticity are to be fruitful, it follows that they do not preserve natural language sense, and Frege explicitly confirms this (1977, p. 317), and even goes so far as to lump preserving the senses of words together with preserving the ideas they evoke. But how much do such definitions allow us to extend our knowledge? Benacerraf claims that they do not preserve reference (1981, pp. 28-30). If he is right, the Fregean definitional relation is even more coarse-grained than the relation of necessary coextensiveness. However, there is some reason to doubt his claim, since Frege also says that mathematical definitions have to preserve reference (1977, p. 317). But the issue does not matter here. On Benacerraf's claim, Frege's definitional relation is not only further from natural language synonymy than on Church's preferred possibility; it goes so far that the question of whether Frege's systematics semantics is intensionalist does not arise. If, contra Benacerraf, reference cannot change, then systematic considerations can provide a rational basis for deciding among competing definitions. But if reference as well as sense can change, Frege's notion of definition is a will-o'-the-wisp: there is no longer a systematic semantics to be or not be intensionalist.

Let us sum up. Frege's conceptual shift to a plant-in-the-seed notion of analyticity encompasses the definitions as well as the general logical laws in proofs of analyticity. The shift thus relocates analyticity from the domain of language to that of logical theory, and, as a consequence, the scope of analyticity is no longer fixed by the static constraints of sense structure but by the dynamic process of theory construction. Frege's definitional relation offers us the possibility of deductively extending knowledge up to the limit of his analytic/synthetic distinction, that is, up to the point beyond which further novelty would outstrip the power of the general principles of thinking and require principles from "the sphere of some special sciences". The grounds for definitions are now the grounds for the logical theory as a whole on Frege's conception of its nature and application.

As we have seen, Frege's definitional relation can, for the sake of theory, flout sameness of sense in natural language, but must, for the sake of being substantive, respect sameness of reference. Given the conception and application of Frege's logical theory, the definitional relation in Fregean analyticity is the relation in Church's second alternative, that is, the necessary or logical validity of "$E = E'$". Definitions appearing in proofs of analytic propositions are, in effect, Carnapian meaning postulates expressing necessary sameness of reference.[6]

This definitional relation and Frege's conception of sense fit nicely together in Frege's systematic semantics for a perfect language. On the one hand, the defini-

[6] Some have taken Frege's discussion of "analytic definition" (1979, pp. 207f) to rescind the earlier fruitfulness requirement on definitions in the *Grundlagen*. But that discussion concerns definition in an entirely different sense—if we may even call it definition considering Frege himself preferred not to call it that (1979, p. 210). I think that the fruitfulness requirement is not rescinded, but rather that Frege no longer refers to the definitions on which it was imposed or to analyticity for the obvious reason that, by this time, Frege has lost all faith in his solution to Russell's paradox.

tional relation completes the conception of sense by providing an explicit basis for saying when the condition something must satisfy to be the referent of "*E*" is the same as the condition something must satisfy to be the referent of "*E′*". On the other hand, senses with such identity conditions insure that there are no features of linguistic meaning to distinguish expressions which are provably coreferential on the basis of the definitions in the system. Here we have an insurance policy against different linguistic meanings with necessarily the same referent, surely an imperfection on a par with having a linguistic meaning without having a referent. This fills out the Fregean paradigm of the imperfections of natural language.

There is no uniform semantic vision in Frege's writings. On the one hand, there is the systematic semantics designed for an artificial language in which problems like those he raised about oblique contexts cannot arise because, judging from the *Grundgesetze*, it would be wholly extensional. If they could arise, there would be no solution, since Carnapian intensions do not enable us to explain the fallacy in inferences like that from (11) to (12):

(11) Mary believes the number of her sisters is two

(12) Mary believes the number of her sisters is the even prime

On the other hand, there is the body of Fregean insights about senses in natural language. Such insights, though they do not suffice to provide acceptable intensionalist solutions to problems like those concerning oblique contexts, nonetheless, point us in the direction of a semantics based on the maximally fine-grained notion of synonymy which can provide them. (See Katz 1986 and 1990a.) The failure to appreciate the difference between these two semantic visions is, I believe, the reason those who have tried to construct a semantic theory of natural languages within the Frege/Carnap tradition are unable to solve such Fregean problems.

It is as if there were *two* Freges. One is the author of a systematic semantics shaped by logicism, the would-be creator of a perfect artificial language, and the trenchant critic of the "imperfections" in natural languages. The other is the sensitive observer of senses in natural language who nevertheless exhibited no interest in taking them as an object of theoretical study in themselves. We are indebted to the former Frege for the central ideas underlying modern logic and for realism in the foundations for logic and mathematics. We are indebted to the latter Frege for many fecund ideas about sense in natural language. But when we are thinking about the debt we owe to the latter, we must bear in mind that the former's attitude toward natural language would make a mockery of our gratitude.

11. Guilt by association

Every notion of analyticity has become suspect as a result of dubious uses to which the broad Frege/Carnap notion has been put. One prominent example was

Schlick and other logical positivists attempt to show that the synthetic a priori truths which metaphysics tries to explain are merely empty analytic truths (1949, p. 285). Analyticity came to be seen as a source of bad philosophy in encouraging an a priorism inimical to good science. The lesson that Quine drew from discussions of the possibility of revising the law of excluded middle in quantum mechanics was that no statement is entirely immune from revision on the basis of experience (1953, pp. 42-46). Quine, Putnam, and others issued a call for the abandonment of any notion of analyticity not relativized to the prevailing scientific framework.[7]

This call overdoes it. The problems for philosophy and science do not arise from analyticity in the narrow sense of the new intensionalism, in spite of its being unrelativized. They arise from analyticity in the broad sense. Analyticity in the narrow sense determines a narrow notion of concept on which concepts are senses of expressions in the language, whereas analyticity in the broad sense determines a broad notion of concept on which concepts are conceptions of the nature of the referent(s) of expressions (Katz 1972, pp. 450-452). Conflation of these notions encouraged philosophers like Schlick to suppose that they had at their disposal concepts which encompass an extensive range of philosophical, logical, and mathematical conceptions, but which require only the limited justification appropriate to linguistic truths. The source of the dubious philosophical uses of analyticity is thus not absolutism, but the above conflation which makes it seem reasonable to think substantive extra-linguistic concepts can be brought under a linguistic umbrella.

In distinguishing the narrow, linguistic notion of analyticity from the broad, theoretical one, the new intensionalism blocks that conflation. No propositions with the philosophical, logical, or mathematical content of broad concepts can be justified on a linguistic basis appropriate to narrow concepts, that is, as explaining sense properties and relations like those in (D). Furthermore, no unacceptable constraints on the development of science of the sort which were alleged to flow from the broad, theoretical notion of analyticity can be laid at the doorstep of the narrow, linguistic notion. No constraints of the sort involved in examples such as the status of excluded middle in quantum mechanics could flow from trifling propositions (Katz 1967, pp. 36-52). The only constraints underlying them are those theory neutral ones flowing from the sense structure of natural languages (Katz 1979, pp. 327-365). Thus, the call to reject all absolute versions of the analytic/synthetic distinction was a call to throw the baby out with the bath water.

[7] Putnam's distinction does not have absolute form (1962, pp. 392-393). His criterion that the analyzed term not be a law-cluster word relativizes analyticity in his sense to the laws of science at a particular time. Thus, contrary to what he says, Putnam does not "sympathize with those... who stress the implausibility, the tremendous implausibility, of Quine's thesis—the thesis that the distinction which certainly seems to exist does not in fact exist at all" (Putnam 1962, p. 359). For Putnam, Quine's thesis is tremendously plausible, since it is the thesis that there is no absolute a priori/a posteriori distinction.

12. Analyticity, a priority, and necessity

Analyticity has been prized, especially among rationalists, because it seems to provide an easy route to the a priori. But, as Benacerraf has observed, whether it does provide one depends on the particular notion of analyticity in question:

> ... once the class of propositions has been enlarged [by Frege] beyond the subject-predicate propositions to which Kant limited his attention, the easy route to the a priori from the analytic is no longer available. Benacerraf (1981, p. 25)

As is clear from the fact that (A) captures relational analytic sentences like (5)-(7), it is not the extension of analyticity beyond subject-predicate propositions that makes things harder, but, rather, the replacement of the traditional concept-containment notion of analyticity with Frege's logical notion. Apart from this, Benacerraf's point is cogent: with Frege's explication of analyticity, we no longer have anything like the "easy route" to a priori knowledge which Kantian analyticity promises. Indeed, Benacerraf's point is strengthened by my argument in this paper that there is no route from analyticity in natural language to a priori knowledge in logic and mathematics. No route exists because logical and mathematical truth is synthetic.

What about linguistic truth? The present section attempts to show that there is a route from analyticity to the a priori, and to tie up two loose ends from the previous sections: the question of the relation of the analytic to the a priori arising from the discussion in the last section, and the question of the relation of the analytic to the necessary left over from the discussion in §8. The former can be put as (Q1) and the latter as (Q2).

(Q1) Given that our narrow notion of analyticity does not involve an a priorism inimical to science, does it involve a priorism at all?

(Q2) Given that necessity is essentially involved in the impasse arising in the *Tractatus*, what relation can analyticity in our narrow sense have to necessity?

We can say there is a route from concept-containment analyticity to a priori necessary truths if we can establish that, given a priori knowledge that a sentence is analytic in this sense, we can know a priori that the proposition it expresses is necessarily true. What makes (Q1) and (Q2) interesting is that the new intensionalism itself seems to provide grounds for thinking that there is no such route.

A priority and necessity both apply to truths, but, as we have seen, the new intensionalism's sharp separation of sense and reference creates a cleavage between analyticity and truth. Analyticity is not the referential property of truth by virtue of meaning. Analyticity is a matter of a sentence having a sense with a certain internal structure, while truth is a matter of the facts in the domain of the language being as the sense of a sentence says they are. Truth in the case of analytic propositions is no less correspondence to the facts than in the case of synthetic propositions. The popular equation of analyticity with linguistic truth is a myth. Certification of analyticity is not automatically certification of truth, and so

determining independent of experience that a sentence is analytic is not determining independent of experience that it is true. Therefore, it looks as if the new intensionalism contributes nothing to our understanding of a priori knowledge or to our understanding of the relation between analyticity and necessary truth.

But all we have actually conceded is that a priori knowledge of a metalinguistic truth asserting that a sentence is analytic does not in and of itself amount to a priori knowledge of the truth that the sentence expresses. This does not, however, show that there is no route from the analytic to the a priori. It only shows that there is no *purely grammatical* route. Going beyond the purely grammatical does not put the case of linguistic truth on a par with that of logical and mathematical truth, it only complicates the route.

Dummett observes that Frege's definition of sense limits him to saying that referential properties and relations are "primarily ascribed" to expressions, not senses (1984, pp. 213-214). Given the referential nature of Fregean analyticity, it, like Carnapian analyticity, fails to provide a language-neutral characterization of the notion. This failure is *inter alia* serious trouble for Frege's application of the notion to logical and mathematical thoughts. Be this as it may, the new intensionalism's definition of sense frees us from this limitation. We can say that sense properties and relations can correlate directly with referential properties and relations. Of course, the statements expressing such correlations are not principles of the theory of sense, but either principles of the theory of reference, or perhaps bridge principles linking the two theories. Since nothing thus far precludes our determining these principles a priori, an a priori route is still open to us.

The question of what referential property or relation to correlate with a sense property or relation can depend on controversial philosophical issues. The selection of a referential correlate for analyticity depends on the issue of presupposition. If we side with those who think that propositions sometimes have presuppositions, i.e., conditions whose satisfaction is necessary and sufficient for them to be true or false, we could choose "necessarily secured against falsehood" as the referential correlate for analyticity. If we side with those who think propositions are true or false unconditionally, we would prefer "necessarily true". If we choose "necessarily secured against falsehood", we are saying that the truth conditions of an analytic proposition are automatically satisfied once its terms take on reference. An analytic proposition cannot be false—though it may not be true because one or another of its terms lacks reference.

The new intensionalism's sharp separation of sense and reference further complicates the question of determining a referential correlate for analyticity. Given appropriate assumptions about existential import, that separation allows an analytic sentence like (13) to be assigned the value "False".

(13) Some dragons are dragons.

This possibility may sound *prima facie* impossible, but it isn't. It only seems so after decades in which, under the influence of the old intensionalism, we have become accustomed to thinking of analyticity as *truth* in virtue of meaning. If, however, analyticity is understood as a pure sense property, then, since it is pos-

sible to construe (13) as asserting the existence of dragons, it is possible to assign "False" to an analytic sentence like (13).

Although this possibility appears to undermine the prospects for a route from analyticity to a priori extra-linguistic knowledge, it does not. The appearance comes from not separating the question of whether there is such a route from the question of whether the route exists in the case of every analytic proposition, which is to say, whether there is a single referential correlate for all analytic propositions. It is open to the theory of referential correlates to assign different subsets of analytic propositions different referential correlates. If there is at least one subset of analytic propositions to which, a priori, we can assign the referential correlate "necessarily true", then there is a route. On the basis of this correlate an answer to (Q1) is immediate and an answer to (Q2) almost so.

To obtain such a set of analytic propositions, we have to find sentences for which there is no dependency of truth on what actually exists. One such set are sentences containing clauses that suspend existential import. Another are generic sentences which are essentially non-existential (Katz 1972, p. 178, especially fn. 28). The analytic sentences belonging to these sets are typified by (14) and (15), respectively:

(14) Witches, if there are any, are female

(15) A witch is female

Let us refer to the senses of such sentences as "analytic*". It seems intuitively clear that we know (14) and (15) to be true and that our knowledge is a priori, since, there being no witches, the truth of (14) and (15) is not something we can know on the basis of observation. The next question is whether we can assign "necessarily true" as the referential correlate for analytic* propositions.

The following is a brief argument that we can, that is, that we know a priori that analytic* propositions are necessarily true. We know a priori, from our understanding of such propositions, that they have truth conditions parallel to the truth conditions of corresponding analytic propositions with existential import. We also know a priori that the propositions with existential import are true just in case their terms refer to actual objects and their predicate applies to (the quantificationally right number of) those objects. Thus, analytic* propositions are true just in case the objects to which their terms would refer if there were appropriate objects are such that their predicate applies to (the quantificationally right number of) those objects.[8] Since we know a priori that analytic* propositions are analytic, we know a priori that any objects to which a term applies will have been picked out on the basis of those objects having all the attributes which the proposition predicates of the referents of that term. Thus, we know a priori that the truth conditions of an analytic* proposition must be satisfied in every possible world, and, hence, we know a priori that it is necessarily true.

[8] In worlds where there the extensions of the terms are null, we may construe the satisfaction of such truth conditions either in terms of supposed objects of some sort or else in terms of proximal worlds where the extensions have members. This can be left open here.

The answer to (Q1) is that the narrow notion of analyticity, and, hence, the new intensionalism, involves a limited form of a priorism. The answer to (Q2) is that the theory of sense in the new intensionalism, ST, says nothing about referential properties like necessity, but the new intensionalism itself has a contribution to make to our understanding of the relation between sense and reference in general, and to the relation between necessity and analyticity in particular. On the basis of this contribution, it impugns Wittgenstein's claim that "there is only *logical* necessity": sense structure, in addition to logical structure, can be a source of truth in all possible worlds.

It might seem as if establishing a route from so narrow a type of analyticity to so restricted a range of a priori necessary truth does not succeed in accomplishing much of philosophical importance. But, if nothing else, establishing its existence, in and of itself, refutes Quine's influential empiricism which claims that we have no a priori knowledge of necessary connection (Quine 1953, pp. 42-46). Even a priori knowledge of necessary connection restricted to semantic connections between homespun properties like "being a bachelor" and "being unmarried" or "being a witch" and "being female" refutes an empiricism which claims that *all* our knowledge is based on experience, i.e., ultimately a posteriori, and that *all* of it is revisable in terms of experience, i.e., contingent.

13. Conclusion

The old intensionalism is intensionalism in name only. Without theorizing about senses in natural languages, it cannot capture the sense properties and relations of their expressions and sentences, and, as a consequence, its way out of the impasse, though not the same as Quine's, is also extensionalist. In its contemporary form, the old intensionalism exploits modal logic and Carnapian intensions to explain the contingent coreferentiality of expressions like "creature with a heart" and "creature with a kidney" as extensional differences in possible worlds other than the actual one. But, as Quine observed (1953, pp. 20-24), the notion of unactualized possibilia in such explanations depends on the full-blooded intensionalist notion of sense, which he then went on to show is unavailable with Carnap's semantic apparatus. A decompositional sense theory like ST can put Quine's doubts about possible worlds semantics to rest because it can characterize the mutual independence of state-descriptions for languages with extralogical synonym-pairs; the only basis on which current versions of the old intensionalism can put them to rest is to embrace the actualization of possibilia in modal realism. The significance of Lewis's (1986) modal realism in the present context is that it overcomes those doubts without either collapsing the old intensionalism's way out into Quine's or adopting semantic apparatus which makes a full-blooded intensionalist notion of sense available but which sacrifices extensionalism. Thus, the pressure of Quine's doubts brings the extensionalist character of the old intensionalism into the open.

A genuine intensionalist way out of the impasse comes only when we have a semantics which—to put it in the Quinean idiom—quantifies over maximally fine-grained senses. Only then do we *explain* the inferential powers of logically atomic sentences without sacrificing any aspect of the phenomena. The essential step in obtaining such an explanation is to replace Frege's definition of sense with (D). This step permits us to exhibit the complex sense structure of syntactically simple words and then identify that structure as the grammatical source of the inferential powers of logically atomic sentences. This new way out of the impasse has definite advantages over Wittgenstein's, Carnap's, and Quine's. Unlike Wittgenstein's, it does not abandon formalism or theory in semantics. Unlike both Wittgenstein's and Quine's, it does not sacrifice necessity. Unlike Quine's way out, it does not take the concepts of the theory of meaning to make no objective sense or jettison the notion of a priori knowledge. Finally, unlike Carnap's, it does not drop the idea of a principled logical/extra-logical distinction or expand the realm of the semantic past the point where the property of analyticity can be explained and to the point where dubious philosophical uses of a broad notion of analyticity are encouraged.

In cutting the connection between linguistic semantics and logic, the new intensionalism separates linguistically-based necessary truth from other forms of necessary truth, thereby vindicating Locke's distinction between two kinds of "necessary consequences". The new intensionalism is thus an attempt to resurrect and renovate pre-Fregean forms of intensionalism like Locke's. Frege criticized their beams-in-the-house notion of analyticity as too unfruitful to be of much philosophical or scientific use (1953, p. 101). More recently, Lewis has employed a variant of this criticism against ST, claiming that "a semantic theory that leaves out such central semantic notions as truth and reference" is "unsatisfactory" (1969, p. 171); see also Lewis (1972, p. 169); this criticism has been echoed by a number of philosophers (see Katz 1991, pp. 211-215). But, as must by now be boringly clear, the criticism completely misses the point: the theory of reference is intentionally left out of ST in order to obtain a satisfactory theory of *sense*. Only by separating sense from reference can we develop a genuine intensionalist position and thereby address the tasks in linguistics and philosophy requiring tools designed to expose the semantic beams in the house of language.

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