

PREDICATION AND LOGIC OF LANGUAGE (I)

Introduction

This essay is part of a larger project on the logic of language. In what follows we focus specifically on the nature of predication as this shapes logical form. It is clear in different traditions of logical theory and philosophy of language that the concept of predication is fundamental in understanding the nature of thought, rational form, the nature of judgment, discourse and the grammar of reality. The space of predication is the rational space in which language and discourse proceeds; in which meaning and human understanding functions; in which the grammars of experience and existence co-arise. And it is clear that the space of predication is a focal point for understanding a range of primary and mutually implicated concepts such as naming, reference, sense, predicability, categories, proposition, assertion, quantification, truth, tense, modality, existential import, and other important features in the logic of discourse. So, a proper understanding of predication is vital for gaining clarity on logical form, rationality, ontology, and the logic of language.

In the unfolding dialectics of "western" logical theory we have reached an exciting and creative horizon. With the publication of the highly original and seminal book—*The Logic of Natural Language* by Fred Sommers (Oxford, 1982) the analysis of predication and logical form has reached a critical moment. Sommers presents a general model of predication for natural

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language and argues that all propositions exhibit a common and generic predicative form. Sommers extends and revises and builds upon the classical Aristotelian paradigm of predication and argues that intrinsic to this paradigm is a generic model of predication for all thoughts or propositions. The prior attempts to clearly analyze and explicate the general form of predication for all propositions, and thus provide a simplified and coherent general logic for language had not been accomplished over the centuries. And it is clear that the classical subject-predicate model of thought persisted since the innovations of Aristotle and profoundly influenced the evolution of thought. Leibniz dreamt of a universal calculus in the subject-predicate logic and apparently believed that a universal grammar of thought could be developed in which all propositions would be shown to be subject-predicate in form. It is clear that the subject-predicate logic of Aristotle was the basis of Kant's analysis of the categories as they derived from his explication of the forms of judgment.

Despite its long and venerable history, the classical predicative model of thought which was the core of Aristotle's logic was virtually set aside with the dramatic innovations of Frege, Russell, Whitehead, Wittgenstein, and others. Frege opened the way to a different paradigm of logical form which essentially rejected the Aristotelian model. He replaced the subject-predicate model of thought with a functional model of predication which was the basis for a new general analysis of thought and a powerful calculus for reasoning. These dramatic innovations in birthing of a new science of logic sparked the modern analytical revolution in philosophy, and as this movement grew in momentum a new consensus emerged in which the classical paradigm of predication and logical form was virtually regarded as mistaken or obsolete.

Sommers' discoveries are especially remarkable since he presents a simple, elegant and powerful general calculus for the logic of natural language which confirms the intuition that thought essentially exhibits a generic model of predication. If Sommers is right, then the case for classical paradigm of logical form and analysis of thought is reopened and we now have a general instrument for the analysis of thought in natural language that is a serious alternative to the Fregean and post-Fregean models of mathematical logic. Indeed, Sommers presents his discoveries in dialectical critique of contemporary post-Fregean approaches to the logic of language and argues for the superior theoretical powers of the generic model of predication and its effective calculus of terms.¹

The present essay attempts further to open the way for a radical reconsideration of the nature of predication, logical form and the logic of language. We attempt here to move to an adequate understanding of predication and logical form by bringing the two major paradigms of logic into mutual critique. We attempt to clarify the generic model of predication introduced by Sommers. We suggest that achieving clarity concerning the generic predicative form of thought places logical theory and philosophy of language in a new light.

Most significantly, if Sommers' revival and extensions of the classical Aristotelian model of thought is valid, as I believe it is, then we are faced with the possibility that there are at least two major alternative narratives of the grammar of thought. And if both the Fregean and Aristotelian paradigms of logical form are simultaneously applicable to the logic of natural language, then this raises intriguing questions concerning the ultimate nature of logical form and the nature of thought itself. If, for example, both paradigms adequately represent logical form, and the two paradigms appear to be complementary and perhaps

even mutually incompatible on certain fundamental points, then we may well wonder whether there is a fundamental bi-polarization in the analysis of logical form itself. If this be so, then obviously this raises fundamental issues concerning the nature of rationality, logical form, and the nature of discourse.

This essay is presented in four parts—three sections preceded by a general introduction. The introductory section gives a summary overview and historical narrative on the issue surrounding predication and the attempt to discern the generic model of predication. Section one is on "Sense, Truth and Predication" and attempts to open the way and set the philosophical context for explicating the generic concept of predication. Section two focuses on "A Formal Analysis of Predication" and presents the generic-formal model of predication in a preliminary way. And section three, "A Predicative Analysis of General Propositions" applies the generic model in a new clarified understanding of the predicative form of general propositions.

Historical Background

The failure to uncover predication in its generic form is due to the fact that predication has been identified and confused with closely related (and not closely related) concepts such as assertion (affirmation/denial of a predicate of a subject), judgment, reference, truth (satisfaction—an expression being true or false of some object), denotation, attribution, description, subject-predicate relation, substance-attribute relation, etc. These and other notions have been superimposed upon the notion in one way or another in previous accounts. Explication and presentation of the concept of predication in its essentially intensional-generic form involves careful excavation of the concept from the layers of superimposed notions which have kept it concealed. Thus, a major portion of the first part is concerned with

disentangling predication from these other notions. Only then does the generic-formal concept of predication emerge.

The concept of predication is equally foundational for both the classical Aristotelian logical theory and the contemporary Fregean logical framework. Both accounts failed to uncover the intensional-generic concept of predication, but for different reasons. On the one hand, the Aristotelian account was explicitly intensional (i.e., concerned with sense formation and the categorial principles governing sense) and *purported* generality in the sense that is assumed (but did not demonstrate) that all *statements* were predicative (subject-predicate) in logical form. But this account failed because predication was confused with assertibility (predicability with assertibility) i.e., the *affirmation* or *denial* of a predicate of a subject. The Aristotelian account failed to distinguish in a clear and systematic way between a *proposition* (in the special Fregean sense in which represents the sense-content of a statement or assertion-judgment) and a statement (judgment, assertion). Predication is concerned with the sense-content (sense-structure) of *propositions* — this constitutes its essentially intensional feature. Thus, although the Aristotelian account *aimed* at an intensional and general treatment of predication it failed to explicate predication in a purely intensional way, since it focused on judgment or assertibility of statements. At the same time it failed to *generalize* the concept of predication. That is, syllogistic logic was developed for general statements and certain other statement-forms, such as compound statements, were not successfully included in the subject-predicate logic. But it was still assumed in the Aristotelian framework that *all statements* were subject-predicate in logical form. Partly responsible for this failure in generality was the dominance of the subject-predicate paradigm. The concept of predication was modelled on the subject-predicate relation, and this in turn was connected

with the substance-attribute (metaphysical) relation. This paradigm of predication was an obstacle when it came to the logical analysis of relational statements and such compound forms as hypothetical and disjunctive statements. The generic concept of predication *transcends* both the subject-predicate relation and the substance-attribute relation. Predication is a relation between constituents of *propositions*, or *terms*, and terms must not be confused with *linguistic* expressions. It will be shown later that the subject-predicate paradigm of predication has been largely responsible for distortion of the *generic* concept of predication. It was harmless enough in the logical analysis of general-categorical statements as well as singular statements, but it hindered, rather than helped, in the analysis of the logical form (sense-structure) of relational and compound statements. It is best to drop all talk of subject and predicate in theory of predication, and instead speak more neutrally of *terms*, or of *prior* and *posterior* positions (rather than subjects and predicates). To drop all talk of subjects and predicates is not to abandon predication. As we shall see in a moment, Frege did just this, yet predication was central to his logical theory. The generic concept of predication does not entail that all propositions are subject-predicate in form; it means simply that they are predicative. Thus, despite intentions, the Aristotelian account failed to discover the purely intensional concept of predication.

On the other hand, Frege transcended some of the limitations of the Aristotelian account of predication only to introduce distortions of his own. Frege, who was a mathematician interested in the foundations of mathematics, found the classical logic which derived from Aristotle quite unsuited to the task of mathematical analysis. He (almost single-handedly) forged a new organon in his *Begriffsschrift* (1879) which started modern logic on its present course. Frege's logical theory was a radical

break with traditional logic. He moved *potentially* closer to the general concept of predication when he rightly abandoned the subject-predicate paradigm for predicative structure. He replaced that paradigm with a different one—the function-argument (Fx) paradigm, which was suggested to him from mathematical discourse. On this new model predication consists of the application (juxtaposition) of a function (or predicate), which is essentially “incomplete” to an argument (individual object, or ordered sequence of objects, or individual variables, depending on whether the predicate-function was absolute or relative). This new model opened the way to a new generality in logical theory—the theory of quantification.⁹ The functional model for predication provided a common paradigm with which to analyze the logical structure of singular, relational and general statements.

Besides this important theoretical advance Frege was brilliant in his distinction between propositional content and judgment/assertion. More than any other previous (and perhaps subsequent) thinker he was powerful in his critique of psychologism in logical theory. Part of his motivation for the rejection of the subject-predicate paradigm was based upon his insight that logical theory (theory of logical form) is primarily concerned with conceptual (sense) content (the proposition), whereas the subject-predicate relation (distinction) was, he thought, primarily grammatical and rhetorical in import. For Frege predication was the structure of *propositions* (in his special clarified sense). This recognition was *potentially* a major advance toward the generic concept of predication. I say “potentially” because, as I shall claim in a moment, Frege restricted predication to logically singular propositions (including relational propositions). He did not treat *all* propositions predicatively, only atomic or elementary propositions are predicative on his view.

Another related possible advantage of the Fregean account was his now classical distinction between *sense and reference*. This distinction was fundamental to his logical theory, and it parallels the distinction between proposition (conceptual content) and judgment (assertion/statement). The proposition constitutes sense-content, and in judgment a movement is made beyond the proposition (sense) to the truth (truth-value) or reference of a declarative sentence. The *sense* of a declarative sentence is the proposition, and the *reference* is the truth-value (which is discerned in judgment). Again, ostensibly, predication is the structure of *propositions*, not just judgment or assertion. That is, predication is concerned with sense structure. This important distinction should have opened the way to the purely intensional conception (analysis) of predication. But it didn't.

Despite its (potential) advantages of abandoning the subject-predicate paradigm (and the important breakthrough to *one* form of generality connected with the functional model) and the clear-headed distinction between proposition and judgment/assertion, together with the related distinction between sense and reference, the Fregean account failed to discern the generic-intensional concept of predication. For, in the Fregean theory, predication turns out to be *neither intensional nor generic*. Not generic, since only elementary (atomic) propositions are predicative, and this means that predication is logically singular; not intensional, since Frege's analysis of propositions is dominated and shaped by an interest on truth-conditions rather than sense-conditions. And this leads to an extensionalist conception of predication.

The Fregean theory assumes that predication is logically singular. For in breaking with the classical framework for logic it proposed the radical thesis that general propositions (despite grammatical appearances) are *not* subject-predicate in *logical*

structure, and are in fact not predicative at all. One of the major advances claimed for the Fregean theory is the "recognition" that the logical structure of singular and general propositions differ radically. The former are predicative, but the latter are complex in logical structure, involving quantification (quantifiers) applied to a compound propositional function (which are analyzed by means of propositional connectives). For example, a statement of the form:

"All Humans are Mortal"

is not, as the classical theory held, subject-predicate in structure, but rather really asserts:

"For every object in the universe, if a given object is human, then it is mortal".

which is rendered symbolically as :

$(x) (Hx \supset Mx)$

Thus, general statements are really (it is claimed) quantificational in logical structure, involving application of a quantifier to a compound propositional function. The latter involves propositional connectives, i.e., logical signs which connect *whole propositions* (rather than terms), while syncategorematic particles such as "is", "isn't", "not", etc are taken to be essentially predicative (sub-atomic) functions. This means that quantificational logic (general logic) presupposes the primacy of propositional logic, and here is another radical break with the classical theory. For, in the Aristotelian theory it was assumed that syllogistic logic, the logic of terms, was primary logic (rather than the later developed propositional logic, which dealt with external relations between propositions). The classical orientation was reversed in the Fregean theory of logic.

This new orientation must be stressed here since it is responsible for the *extensionalist* (rather than the *intensionalist*) approach to predication. For propositional logic (primary logic for Frege) is admittedly extensional in the sense that the formative (logical) signs are taken to be essentially truth-functional. From the logical point of view the sense content (sense-functions) does not enter in the logical analysis of compound propositions, only truth values or reference makes a difference. This extensionality (pre-occupation with truth-value and reference, rather than sense) penetrates down to the sub-atomic level and pervades the concept of predication itself. Despite his clear distinction between propositional (sense-) content and judgment/assertion, Frege's theory of logical form is controlled by a concern for truth-structure, and hence assertive form, rather than sense structure and predicative form. It will be shown, particularly in section three, that the extensionality which dominates Fregean logic leads to an extensional conception of predication, and the latter is essentially connected with the dogma of singular predication. The Fregean conception of predication, which is shared in one way or another by such diverse theorists as Quine, Geach, Strawson, and Searle³, is extensional and singular.

The extensionalist conception of predication is more clearly evident in such followers of Frege as Quine and Geach. It is the view that predication consists in a relation between a *predicate expression* (e. g. 'F-', if an absolute predicate) and the *object referred to* by the logical subject (which is a singular expression). The relation is that of *being true or false of* the object, i e., the truth-relation of satisfaction. It will be shown that the extensionalist concept of predication is problematic, as is the related assumption that predication is logically singular (the singular dogma). The extensionalist thesis is the view that

predication consists in a relation between *an expression* (predicate) and *an object*. It is questionable because it confuses predication—which is essentially a sense relation between propositional constituents (terms)—with the notions of reference and satisfaction (true or false of). For neither expressions (predicates) nor objects (referents) are constituents of propositions (predications), which, by the way, Frege explicitly recognized. And the relation between an expression and an object (satisfaction) is not the same as the intensional (sense) relation between terms.

But the extensionalist conception of predication is mistaken on another count, namely, its attendant assumption that predication is logically singular. This latter assumption—the singular dogma—is essentially connected with the extensionalist thesis.

These distortions in the concept of predication, we shall see, are due to a failure to be thoroughly Fregean, i.e., to follow through consistently of Frege's crucial distinction between proposition and judgment/assertion. Apparently Frege did not realize how radical the sense-reference distinction really was (this is developed in section 1). It did not fully emerge that sense-functions must be distinguished from truth-functions, and that there may be a disparity in logical form between sense structure and truth-structure. Theory of sense-formation is not the same as theory of judgmental form or assertibility. The former is concerned with *intelligibility or sense-conditions*, while the latter is concerned with assertibility or truth-conditions. Thus, it is surprising that the Fregean account of predication, which initially linked predication with proposition (sense), and which, in one sense at least, moved towards generality in the theory of propositions, nevertheless ended with an account of predication that was neither generic nor intensional.⁴

Sommers' Calculus of Terms

An important advance towards the generic concept of predication comes with the publication of Sommers' paper— "The Calculus of Terms" (*Mind*, 1970). Sommers breaks new ground in this highly innovative and yet classical treatment of predication. The classical Aristotelian theory of predication has been dismissed by contemporary Fregeans for now well known reasons. Sommers mentions some of these at the beginning of this paper :

- 1) The failure of classical logic to develop a calculus of propositions.
- 2) The inevitable failure of classical logic to provide schemata for inferences involving polyadic statements (i. e. relations).
- 3) The classical doctrine that all inference is basically syllogistic.
- 4) The classical doctrine that all statements—including relational and compound statements—are subject-predicate in form.

Clearly the Aristotelian logic was deficient where (1) is concerned; it failed to develop a calculus of propositions. According to the Fregean view this deficiency reflects a fundamental misunderstanding on Aristotle's part of *primary logic*. For, according to Frege, propositional logic, and not syllogistic (the logic of terms) is primary logic. General logic (quantification theory or predicate logic) which corresponds to the classical logic of terms, presupposes propositional logic. This means, on the Fregean view, that Aristotelian syllogistic is a mere fragment of general quantificational logic. Hence, neither primary logic nor general logic was developed in syllogistic theory.

The charge, then, is not that classical logic *happened* not to have developed a propositional logic (calculus), but rather that *in principle* it could not have succeeded, since it was crippled by the

assumption that all statements (including compound statements) were of the subject-predicate form. Neither, on this view, are relational statements subject-predicate in form. Still another gross deficiency of the classical approach, according to Fregeans, was its inevitable failure to give a satisfactory account on the logic of relations (which, of course, is especially important in mathematical discourse).

Furthermore, according to the Fregean critique, the Aristotelian logic fundamentally misunderstood the nature of its own greatest achievement—the syllogistic theory of general statements. The dominance of the subject-predicate paradigm was (at least in part) responsible not only for failure to adequately understand the logical form of compound and relational statements, but (perhaps even worse) for failure to understand the logical form of general statements as well. For, as pointed out earlier, on the Fregean theory general statements are not of the subject-predicate form either. And this "discovery" of Frege was one of his greatest contributions, according to his followers. For example Russell says :

"The first serious advance in real logic since the time of the Greeks was made independently by Peano and Frege—both mathematicians. Traditional logic regarded the two propositions 'Socrates is mortal' and 'All men are mortal' as being of the same form. The philosophical importance of logic may be illustrated by the fact that this confusion, which is still committed by most writers, obscured not only the whole study of the form of judgment and inference, but also the relation of things to their qualities, of concrete existence to abstract concepts, and to the world of platonic ideas... Peano and Frege, who pointed out the error, did so for technical reasons .. but the philosophical advance which they made possible is impossible to exaggerate." ("Logic

as the Essence of Philosophy" in *Our Knowledge of the External World* ")

Frege and his followers have claimed repeatedly that the classical logic is inimical to clear thought and genuine logic understanding. Russell,⁵ again, is a good example of this. He says in one place that the Aristotelian system is "as definitely antiquated as the Ptolemaic astronomy". He goes on:

"This makes it difficult to do historical justice to Aristotle. His present-day influence is so inimical to clear thinking that it is hard to remember how great an advance he made upon his predecessors (including Plato), or how admirable his logical work would still seem if it had been a stage in a continual progress, instead of being (as in fact is was) a dead end, followed by over two thousand years of stagnation". (Aristotle's Logic". *History of Western Philosophy*)

The Aristotelian logic is regarded as being *inherently* inadequate (a dead end), not merely deficient in not having developed certain important aspects of logic. For, it is assumed (claimed) that even in principle the Aristotelian Framework *cannot* provide an adequate logical theory of relational and compound statements, etc.; and that it cannot in principle provide a general calculus for logical inference. Frege and Russell claimed⁶ that Leibniz, who attempted to develop a universal "characteristic" (logical language) for philosophy failed to do so because he was still under the influence of the subject-predicate logic. Frege thought that he had discovered a general logical calculus (conceptual notation) of the type that Leibniz was seeking precisely because he abandoned the subject-predicate logic.

In the light of this attitude towards the classical logic it should appear odd (even perverse) for me to suggest that Sommers'

work on theory of predication is an important advance towards the intensional-generic concept of predication. For Sommers' research on predication is rooted in the Aristotelian framework, and his "calculus of terms" is a natural development and extension of this subject-predicate framework. In his paper Sommers challenges each of the four main charges (listed above) levelled against the classical theory. He sketches the general calculus of terms which is based upon the assumption that all statements are subject-predicate in logical form. He attempts to show not only that the general statements are subject-predicate in *logical* form, but that the common model of the calculus applies to the logical analysis of relational *and* compound statement-forms as well. The result is that the calculus of terms shows that term logic is at once *primary and general*. All statement forms are analyzed logically as being subject-predicate in form, and all inference turns upon common basic syllogistic principles. Sommers argues in turn against each of the following assumptions of the Fregean logic :

" (i) that the internal structure of general categorical statements is essentially different from that of singular statements, since general categoricals involve truth-functions and arguments under quantification;

(ii) that (in consequence) truth-functional logic (neglected by traditional logicians) is prior to predicate logic or traditional term logic;

(iii) that relational statements are not of subject-predicate form;

(iv) that compound statements cannot even distortedly be construed as being of subject-predicate form;

(v) that (in consequence) it is impossible to reduce compound statement to elementary statements and impossible to eliminate truth-functional connectives;

(vi) that syllogistic is not a basic form of logical reckoning (that honour belonging to the inference techniques of quantificational logic)" (Calculus of Terms – pp. 38–39)

I shall not attempt to discuss Sommers' calculus of terms here. Certain features of the calculus will be discussed in later sections. Nor am I assuming that Sommers succeeds in all that he claims for the calculus. Clearly there are problems still to be faced (and certain of these are being faced). The discovery of the calculus of terms is a *beginning*, and a remarkable beginning. What Sommers has shown beyond doubt is that the classical Aristotelian framework for logic was dismissed prematurely and unjustifiably by Fregean logicians. Sommers has succeeded in showing that the Aristotelian theory of predication is neither a dead end nor Ptolemaic. On the contrary, it is now clear, with the discovery of the calculus, that the proper analysis of the logical form of statements is not at all a settled matter, but is reopened for discussion. Sommers has shown that the Aristotelian logical framework has remarkable theoretical powers which have not previously been recognized. It is *not* inherently defective and it *can* in principle be developed to overcome the defects ascribed to it. It is in *this* respect—the reopening of issues and questions—that I am claiming that Sommers' work is an advance in the understanding of predication. Sommers' insights into the generality of predication, even though suggested and supported by the power and simplicity of the term calculus, do not *depend* for its legitimacy upon the success or failure of the calculus in its present form. Of course an important test of a theory of predication (logical form) is precisely its ability to provide a logical calculus, and its effectiveness in giving an account of inference. I believe that Sommers *has* succeeded here. But what I wish to stress is the understanding and formal analysis of *predication* which forms the basis of calculus, not the other way around. It

is a matter of priority. The understanding of inference and entailment relations (and the development and success of a logical calculus) depend upon the analysis of predication. This is why throughout this essay the focus is primarily upon the analysis of predication, and only secondarily upon the workings of the calculus. Whatever difficulties there may be with the calculus in its present form, and whatever transformations it may undergo with future research, this does not alter the fact that the concept of predication is now placed in a new light, and there is before us now a clear alternative to Frege's extensionalist-singular conception of predication.

Before I discuss the critical theoretical discoveries which led Sommers to the general conception of predication let me digress for a moment and elaborate upon the last sentence. I claim that Sommers' research has *reopened* certain fundamental issues of logical theory, and in so doing has shown that the Aristotelian logical framework is a *worthy* alternative to the Fregean framework. The point is not that it is always good to have an alternative, but rather that such an alternative is *essential* given the thoroughly extensionalist orientation (shape) of the Fregean approach. Most contemporary discussion (and disagreements) in the theory of predication presuppose the Fregean framework as a common denominator, even when (perhaps especially when) certain writers disagree with Frege on certain points. The Fregean assumption that predication is logically singular, for example, is taken as axiomatic. It is critical, therefore, to have a genuinely alternative framework for logical theory. At least now it is *possible* to seriously consider whether general statements are predicative, and whether compound statements (and relational statements) are predicative in logical form.

Another reason for stressing the desirability of an alternative framework for theory of predication is that the Aristotelian theory, despite real limitations and confusions, is essentially *intensional* in orientation. I have been suggesting that the *generic* concept of predication is intensional—i.e., concerned with the sense formation of propositions. Sommers' discovery of the calculus of terms, and the general conception of predication upon which it is based, came only after several years of a systematic move away from the Fregean extensionalist treatment of predication.

In his earlier research on theory of predication Sommers was especially concerned with theory of sense (predicability), and in his paper "The Ordinary Language Tree" (*Mind*, 1959) he discovered that there are formal categorial principles governing predicability or sense-formation. These principles (including the tree-rule) were grounded in the Aristotelian concept of predication. Sommers demonstrated that the Aristotelian concept of predication was *intensional* in the sense that predicability relations between terms conformed to categorial structure in a way that the Fregean theory did not. Sommers located this critical distinction between the two views of predication in the denial-negation distinction. That is, on the Aristotelian view, predication involved the affirmation or *denial* of a predicate of a subject, but denial must not be confused with negation.⁷ For negation is a truth-functional connective which operates on a whole atomic or compound proposition, not on a predicate being applied to a subject (sub-atomically). The logical conditions of affirmation/denial are not the same as the logical conditions of assertion/negation. For example, certain terms are, on the Aristotelian theory, *impredicable* of one another, i.e., if they are joined in predication they form a category mistake which is a sentence that is neither true nor false. However, on the extensionalist

(Fregean) view of predication, in which denial is assimilated to negation, there are no categorial restrictions on predicative formation, hence any two terms may be joined and every syntactically well-formed sentence would have a truth-value.⁸

In his early works, then, Sommers was principally interested in theory of sense-formation (predicability) and this was directly connected with ontological categories and type rules. The formal ontological rules developed and discussed in "Types and Ontology" and "Predicability" were grounded in theory of predication. The primary philosophical motivation centered on formal ontology and metaphysical analysis. Here there is an important contrast to be drawn between Sommers and Frege. Frege was a mathematician, interested in the foundations of mathematics. His logical theory originated and was shaped out of interests in this area (e. g. the shift to the functional paradigm for predication was influenced by his interests in mathematical analysis.⁹) However, Sommers developed theory of predication out of an interest in formal ontology and metaphysical analysis. He found the Fregean theory of predication unsuitable for the task, just as Frege found the classical theory of predication unsuited to his interests in the philosophy of mathematics. Now Aristotle was a metaphysician-ontologist and the organon shaped by him was in certain ways well suited (potentially) to metaphysical analysis. The Aristotelian logic, at least, had *potentiality*!

Let us return to the main point. The philosophical motivation for the development of the Aristotelian logic was the need for a general organon (logical instrument) which was suited to the investigation of sense-formation, ontological categories, and formal ontological analysis. Any serious alternative to the Fregean logical theory should be able to develop a general theory of propositions and provide a general logical calculus.

Unless the Aristotelian logic could be developed and extended to meet the challenges and charges levelled against it by contemporary logicians no discoveries grounded in that framework would be given serious consideration.

It was in this sense, then, that Sommers' research in theory of predication moved towards the discovery of the generic-intensional concept of predication. An important breakthrough in this direction was the discovery of the oppositional nature of formatives (or logical signs). Earlier logicians used the term "syncategorematic" for logical signs such as "every", "is", "not", "some", etc. Propositional constants (connectives) such as "if... then...", "either... or...", etc. are also included in the list of logical signs or formatives. They all play some role in the formation of propositions, simple or compound. These logical signs are contrasted with signs which are descriptive or "extra-logical". The Fregean logic treats *propositional* formatives as primary, and the syncategorematic formative are added to the primary propositional logic in the form of quantification theory. Ostensibly there are important logical differences between propositional formatives, the former being truth-functional, the latter not. (At least this is what is assumed.)

Now Sommers points out (in a paper entitled: "Formatives") that no general theoretical account of formatives has been given, either by classical or contemporary logicians. The common practice is to present a list called "logical signs" with no *positive* general characterization (criteria) of such signs. Sommers says,

"The older label is essentially negative: the syncategorematic elements of a categorical proposition are not its terms (predicates or names). A negative characterization has the virtue of not pretending to define a concept governing the

list of non-descriptive expressions. Contemporary labels sound more positive but in fact there is no accepted principle for the distinction between formatives and descriptive elements. What counts as a logical sign remains arbitrary. Logicians will agree that 'is identical with' ought to be included. But they will hesitate over 'is greater than' or 'is between'... The question I wish to consider is: What is a formative element? To say that an expression is formative because it is not descriptive or not extra-logical is to appeal to the distinction that wants illumination. The appeal is not more illuminating than explaining the formative character of 'not' or 'some' by referring to its formative powers". (pp. 1-2)

Sommers proceeds in the "Calculus" paper to give a general characterization of formatives and argues that *formatives are signs of logical opposition*. I shall refer to this as the "Opposition Thesis" (OT) of formatives. The OT applies to both groups of formatives, to syncategorematic as well as propositional formatives. He focuses first on syncategorematic formatives, arguing step by step, that these signs are essentially signs of logical opposition. For example, each term may be positively or negatively "charged" - and this represents the *contrariety opposition* (C-opposition). Thus, the term 'un-wise' is negatively charged, while its opposite 'wise' is positively charged. Sommers uses a plus-sign for positive logical signs and a minus sign for negative logical signs. Every term, then, has a charge: $+P$ or $-P$.

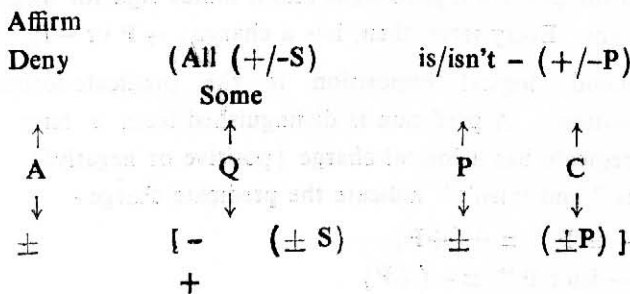
A second logical opposition is the predicate-formative (P-opposition). A predicate is distinguished from a term and every predicate has a logical charge (positive or negative). The signs "is" and "isn't" indicate the predicate charge -

$$\text{"-- is } P" = +(+P)$$

$$\text{"-- isn't } P" = -(+P)$$

A third opposition is the propositional opposition—and this is indicated by a logical function which indicates whether the *predicate* (now distinguished from a term) is *affirmed or denied* of the subject. The sign for affirmation is positive and the sign for denial is negative. Let us call this opposition the assertive opposition (A-opposition). (Sommers does not use this characterization. He calls it the *predicative* opposition. But I maintain that Sommers' sense of predicative, affirmation denial, is assertive. Also, I do not agree with Sommers in the notion of a predicate-formative. In section three I shall argue against this notion of a predicate, which is similar to the Fregean notion).

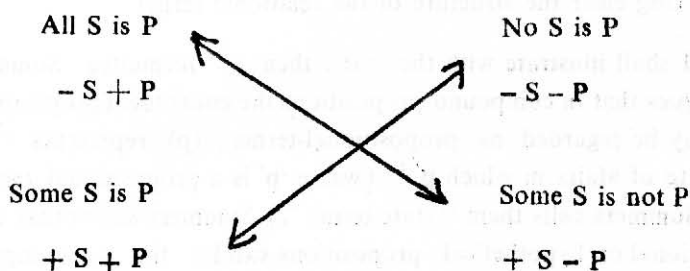
The three oppositional relations presented thus far : C, P, and A, are all qualitative. The critical discovery at this level was that the "quantitative" distinction between "all" and "some" are *also* logical oppositions which may be treated as qualitative opposition, represented by a plus and minus sign also. This distinction is called the Q-opposition. The discovery that the quantifier (*logical quantity*) may be treated along with the other formatives as a qualitative opposition opened the way to a "non-quantificational" (non-Fregean) analysis of general statements. For only then did it become clear that all the predicates are positive and no discriminatory use be made of contrariety to specify the different general statements. Thus, the opposition between and "some" could be brought out as :



Note : It turns out that the "all" is minus and the "some" is plus.

The distinctive logical features of each formative-type is preserved by syntactic position. For example, the left-most opposition preceding the prior term ($+/-S$) is the Q-sign (All or Some). The sign immediately preceding a term (within parentheses) indicate C-opposition : ($+/-S$) and ($+/-P$). etc.

There is some redundancy in the four oppositions (C, P, Q, A) and various schedules of categoricals may be constructed by use of any two oppositions, holding the others constant. A simplified schedule may be used to express the traditional square of opposition as follows :



Sommers demonstrates the power of this analysis by explicating the workings of the calculus which is based upon the opposition notation. For example, a valid inference form from syllogistic is :

$$\begin{array}{rcl}
 \text{All M is P} & = & -M + P \\
 \text{All S is M} & = & -S + M \\
 \hline
 \text{All S is P} & = & -S + P
 \end{array}$$

This example shows that the sum of the premises equals the conclusion, if the argument form is valid (with certain constraints).

$$-S + P - M + M = -S + P$$

But this is very sketchy. The reader is referred to the Calculus paper for the detailed presentation. I give these examples here to show how the opposition notation looks and how it works. The point is that the insight into the oppositional character of formatives (logical signs) makes clear the predicative structure of statements, the logical connections between the formatives themselves in the compositional structure of statements, and provides a model of logical form which provides a simple and powerful calculus. The full generality of the OT emerges when Sommers extends the analysis to propositional formatives as well. (Sommers also applies the model to the analysis of relational statements, extending the notion of a relational term and making clear the structure of the relational term).

I shall illustrate with the "if...then..." formative. Sommers argues that in compound propositions the constituent propositions may be regarded as propositional-terms: (p) represents "the state of affairs in which p" (waere 'p' is a propositional term). (Sommers calls them "state-terms".) Sommers shows that conditional or hypothetical propositions exhibit the same logical-predicative form as general (universal) statements:

$-S + P$ All S is P

$-(p) + (q)$ If p then q

The latter is read in the subject-predicate manner: "Every case of p is a case of q".

The following schema of translation shows how other compound formatives are analyzed:

if p then q = $-(p) + (q)$ = Every (p) is (q)

p and q = $+(p) + (q)$ = Some (p) is (q)

p or q = $-(-p) + (q)$ (i.e., if not-p then q)

Notice the correspondence between the "every...is..." form and the "if...then...", on the one hand, and the "some...is..." and the "both...and...". They are isomorphic.

Ironically, I find Frege falling back upon just such an interpretation of the conditional when he attempts to explain the assertive force of hypothetical statements:

"In the sentence—'If the sun has already risen, the sky is very cloudy'—the time is the present, that is to say definite. Here it can be said that a relation between the truth values of conditional and dependent clauses has been asserted, viz such that *the case does not occur in which the antecedent stands for the True and the consequent for the False*". "Sense & Reference" p. 74 (my italics).

That is, the assertive content of a conditional statement is subject-predicate (or categorial) in form: "every case of the antecedent is a case of the consequent", in other words,

"All cases of p are cases of q"

- (p) + (q)

Now it should not be surprising to find an intimate connection between "every...is..." and "if...then...". For, Frege translated general statements formed by "every...is..." into a form which used "if...then...": Every S is P becomes (x) (If Sx then Px). Sommers is merely reversing the translation showing that the "if...then..." statement form may be rendered in subject-predicate form, and with good reason.

The idea, then, is that compound propositions (statements?) be analyzed into subject-predicate form. And the OT is generalized for all formatives.

"The differences between the syncategorematic formatives and the propositional formatives is now clear: A syncategorematic formative is a single sign of opposition, a propositional formative is an ordered sequence of oppositional signs. This complexity of the propositional formatives accounts for the fact that we do not intuitively think of them as either positive or negative in the way we naturally do with most of the syncategorematic formative - signs. The extension of the "oppositional" thesis to propositional formatives accepts the traditional view of compound propositions having the form of such subject-predicate propositions. Leibniz realized that such a uniform analysis of compound propositions must simplify logical syntax". ("Formatives" p 19)

Note: Although Sommers uses the term 'proposition' in the above passage, he does not use it in the special Fregean sense that I have been stressing. Sommers uses the terms 'statement' and 'proposition' interchangeably.

In reading the logical papers of Leibniz I have discovered striking parallels to the calculus of terms. After the discovery of the OT and the calculus Sommers himself discovered such connections (independently), and he refers to two remarkable passages from Leibniz in his Formatives paper :

"Thomas Hobbes, everywhere a profound examiner of principles, rightly stated that everything done by the mind is a *computation*, by which is understood either the addition of a sum or the sub-traction of a difference (De Corpore 1, i.2). So just as there are two primary signs of algebra and analytics, "+" and "-", in the same way there are, as it were, two copulas 'is' and 'is not'. Leibniz, *Of the Art of Combination*, Parkinson, p. 3

"If, as I hope, I can conceive all propositions as terms and hypotheticals as categoricals, and if I can't treat all propositions universally, this promises a wonderful case in my symbolism and analysis of concepts, and will be a discovery of the greatest importance". Leibniz, *Logical Papers, Ibid*, p. 66.

Note : See also, Leibniz – "A Study in the Plus-Minus Calculus"
Ibid p. 122 ff.

Sommers' discovery that formatives are signs of logical opposition, and that it is possible, even plausible, to construe all statement forms on the subject–predicate model exhibiting a common formative structure, was a most important advance towards the generic concept of predication. Logical theory is now brought under a unified and general characterization of formatives : there is no longer any *formal* reason to divide formatives into two types–syncategorematic and propositional. All formatives are part of the predicative form of propositions, and all propositions are predicative in *form*. For example, both types of formatives (if they really are of different type) are governed by common syllogistic rules of inference. It becomes clear that syllogistic–the logic of terms–is at once primary *and* general logic.

"All S is P" for Frege becomes: " (x) (If Sx then Px)"

The point is that there are genuine and irreducible differences between categorical assertive form and hypothetical assertive form. One form cannot, without loss and distortion, translate one form into the other.¹⁰ In terms of assertibility and truth-conditional structure, a categorical is different from a hypothetical. However, it may nevertheless be that they share a common predicative sense-structure. From the *predicative* point of view all propositions are elementary (This is developed below.)

This applies to the distinction between singular and general categoricals as well. Predicatively (propositional structure) they have a common form, but assertively there is a disparity in form. The truth-conditional structure (assertibility conditions) differ. This is why it is critical to distinguish between predicability and assertibility. In failing to make this distinction certain difficulties arise for Sommers in giving a forceful and coherent account of the generality of predication. The generality of the OT applies to the propositional (sense) form—to the sense-functions, not to the truth-functions (statement-form). But apparently Sommers is claiming that predication is the structure of statements.

Again, predication is a purely intensional concept. Although Sommers is especially interested in intensional structure (as evidenced by his earlier critique against the Fregean extensionalism) this becomes obscured by the confusion of proposition with statement (predicability with assertibility, sense-conditions with truth-conditions). Here, we have seen, Frege made the clear distinction between proposition and judgment (assertion), and between sense and reference. So Frege had the advantage here. But Frege lost the advantage since his concept of predication was thoroughly extensional. Frege, too, confused sense-conditions with truth-conditions. On the other hand, Sommers had the advantage in truly generalizing the concept of predication, whereas Frege restricted predication to singular statements. What is needed is a systematic following through of the general concept of predication (suggested by Sommers) with the distinction between proposition and judgment (sense and reference) suggested by Frege. When the generic concept of predication is properly and systematically united with propositional (sense) structure, the generic-intensional concept of predication comes into view.

Let us now leave historical (background) considerations and proceed to the actual explication of the generic concept of predication.

Note: It should now be clear that the criticisms levelled against the classical logic were misdirected. It is not that the logic of terms was inherently defective or Ptolemaic, nor that it was wrong-headed in assuming that all propositions had a common predicative form. Rather it was because the very concept of predication was not properly understood and generalized. But this was a defect that afflicted the Fregean logic as much as it did the classical.

SUMMARY PRESENTATION OF MAIN POINTS

Predication as the intensional structure of propositions

Predication consists in the sense-structure of propositions. A proposition is a sense-content (intelligible content) of thoughts. But (as Frege pointed out) it is not an *act*, and *it is not constructed*; it is discerned or apprehended in thought. A proposition is not a judgment, not an assertion, though it figures in these. A proposition (in this special Fregean sense) may equally figure in other linguistic (speech) acts where no assertion is made, no judgment formed, and where the question of truth (fact/existence) does not enter. The constituents of proposition must be sense-contents. Sense-contents which are constituents of propositions are *terms*. Terms configure in a sense-functional way in the *compositional structure* of propositions. Predication consists in the configurability of terms in propositions. Terms are *not* linguistic expressions, though they are *connoted* by expressions (signs), just as a proposition is not an expression (sentence), but is connoted by appropriate sentence-forms.

The rules governing the sense-formation of propositions are predicability rules, rules of intelligibility (sense). These rules

involve categorial relations, category structure. Predicability rules are *not* rules of truth, judgment or assertion; not rules of reference or satisfaction. A Sharp distinction must be made in logical theory between rules of sense (intelligibility) and rules of truth (judgment/assertion/reference). This is a natural outcome of Frege's distinction between proposition and judgment (sense and reference).

Predication, therefore, is not assertion, not judgment. A predication does not consist in a relation between expressions, and objects. A predication does *not* make an existence or truth claim. But a predication does make a *sense claim* over and above its having a sense, i.e., that it *makes sense*. A predication does not *state* facts. A predication (proposition) *specifies* a state of affairs (State), which is a possible fact, a possibility. The relation between a proposition and a State is not like that of an expression to a sense-content (term or proposition). It is not the relation of signification or representation. Rather, in apprehending a proposition one apprehends a state.

Predication is not a relation between a subject and predicate; subject and predicate are not constituents of propositions. Predication must not be confused with the notions of reference (an act performed in the *use* of certain signs) and satisfaction (an expression being true or false of an object). Predication is not the affirmation or denial of a predicate of a subject, for affirmation/denial involve assertion and satisfaction. Nor is predication a relation between substance and attribute (not attribution), for predication consists in a sense relation between *terms*, and substance/attribute are not terms, not constituents of propositions. Only constituents of propositions *can* be elements in predication. Predication does not consist in some relation (as Strawson suggests) between particulars and universals.

The logical analysis of sense (propositions) must be distinguished from the logical analysis of statements (judgments/assertions). A distinction must be made between *sense and meaning*. Let us say that propositions have (constitute) sense, and statements (and other linguistic acts) have meaning. Thus, meaning is a broader notion and includes reference, etc. *Meaning* of statements is given by truth-conditions, but sense of propositions is specified by sense-conditions. A distinction must be made between sense-functions and truth-functions. Sentences (of appropriate form-declarative sentences) have sense-values and truth-values. If a sentence connotes (specifies) a proposition it has a sense-value ("Sense = S"), if it fails to specify a proposition then it is Senseless (= "-S"), and this means that it violates category rules—is a category mistake. By contrast, a sentence is *used* to make a statement (express a judgment), and statements are True or False. Predications are not true or false. Sense-content does not represent (or purport to represent) *what is the case* (fact/existence). Predications *categorially* have truth *Status*, but no determinate truth value; *senses* does not refer, though expressions may be *used* to refer in virtue of sense. Predications are not *potentially* true or false, just as sense is not potentially reference. Nevertheless, propositions have *some* relation to truth (fact/existence), and sense some connection to reference.

Sense is related to truth in a peculiar way. The sense of a proposition is not determined (or specified by) the conditions under which a statement is true or false. The distinction between a property-word and a category-word helps to clarify the peculiar relation between proposition and what is true (between truth-status and truth value). To be true or false is to have a *determinate* truth-value. This is one understanding of the disjunction: true or false. By contrast, a category-word consists of taking disjunction of logical contraries as *essentially* one term:

true-or-false ($= /T/$). The sign $/T/$ stands for a category word. Category words have a different logic from ordinary words; $/T/$ is different from 'true' or from 'false'. Predications are $/T/$, but neither true nor false. Sense coincides with being $/T/$, not with being true or false. Thus, to be $/T/$, does not entail being true or false, even potentially: a predication *itself* does not *become* true or false (sense does not *become* reference). However, to be true or false *does* entail being $/T/$, i.e., involves sense. This is one attempt to formally explicate the elusive relation between proposition and statement (sense and reference). Strictly speaking, then, propositions (predications) are not true or false, only *sentences* which are *used* to make statements (express judgments/assertions) are. Frege, too, when he is speaking strictly, makes this point (See section I).

Note : To be intelligible is to be $/T/$. If a sentence represents a proposition it is $/T/$. This does not entail that in this sense-function it is true or false. For example, "There will be a sea battle tomorrow" is intelligible, hence, has truth status $-/T/$. But it need not be true or false (determinately). Contrast this with "The equator is clean" which is unintelligible (senseless) and has no truth-status, is not $/T/$. The truth-functional logician will have difficulty here, for the disjunction "true or false" entails determinate truth-value. Often, writers claim that meaning consists in being *true or false*, and this disjunctive predicate is disjunctively stressed, intending to distinguish it from being true or being false. Strawson is a good example of this, especially when he explicates the relation of presupposition. I suggest that what is intended in stressing the disjunctive predicate "true or false" in this context is $/T/$. The truth-functional logician, however, would deny this, for he has no option but to interpret the 'or' in a determinate-distributive way. For example, the principle of bi-valence: *every statement is true or false* is inter-

preted to mean that every statement has a determinate truth-value. Aristotle, as we shall see, questions this interpretation for singular predictions (statements about future contingencies). '/T/'—a category-word—defines the category of sense. It is essentially a sign of possibility. This must be distinguished from assertibility—i.e., the conditions under which a statement is true or false. Assertibility is connected with *being the case* (fact), predicability is not. The critical connection between /T/ (sense) and being true or false (truth) is *judgment*. Frege rightly stressed that it is in judgment that a thinker-judge moves beyond sense to reference or truth. It is in judgment that sense is brought into relation with truth (fact/existence). Thus, the concept of truth is essentially related to judgment-assertion. (The concept of sense is essentially related to possibility. But not the sense of possibility which is associated with the assertive mode—*may be*.)

There is a systematic ambiguity in the concept of logical semantics. The ambiguity is due to the distinction between sense and truth. The characterization of semantics in terms of the relation between signs and what they signify slurs over this important distinction: sense and meaning. For the relation between a sign (expression) and what it *connotes* (specifies), viz *sense*, is not the same as a relation between a sign and its reference, i.e., between a sign and *what is* (fact/existence). A propositional sign (sentence) does not connote (specify) fact (what is the case). Theory of sense must be distinguished from theory of reference. The theory of sense and truth are usually included under the rubric 'semantics', and these distinct concepts are usually linked: sense is specified by truth conditions (consists in being true or false).

Pure semantics is theory of sense (intelligibility). Theory of truth (and reference) involves epistemics and pragmatics. Logic.

in the primary sense, deals with the laws of sense, not truth. Theory of truth presupposes theory of sense, not the other way around. This should have been the natural outcome of the Fregean line of thought. (See section 1.)

Syntax reflects semantics. The ambiguity found in semantics is reflected in logical syntax (theory of logical form). Sytanx is not autonomous and prior to semantics. The logical form of statements (judgments), i.e., truth-conditional structure need not (does not) coincide with logical form of propositions (predication), i.e., sense-conditional structure or configurability of terms. There is a disparity between assertive-judgmental form and propositional-predicative form.¹¹ Take, for example, a singular definite description : "The Present King of France is bald". The *proposition* specified is predicative in sence-structure, and this does not involve existential import. However, if Russell was correct, the assertive structure (truth-conditional structure) is that of a general *statement*, and involves the existential quantifier. Because Russell failed to distinguish (as Frege implicitly did) between sense and meaning he was forced to deny that the *proposition* was predicative, for he assumed that if it were predicative then this would mean that there was a Present King of France, i.e., that a predication involved the existence of the logical subject. But a predication does not *assert* existence, only statements do. Russell was proposing an analysis of the assertive (statements) form in his theory of definite descriptions.

Again, some philosophers argue that "singular predictions"—e. g. "Professor Carnap will fly to the moon" are *really* general in logical form (Ryle, Pierce—"the generality of predictions thesis"). Here again there is a confusion due to ambiguity in 'logical form'. For the *proposition* is predicative and logically singular, but (if Ryle's thesis is correct) the *statement* (assertive form) is logically general. Here too there is a disparity between

logical form (sense-structure) of proposition and logical form (truth-conditional/assertive) of statement. A *prediction* is an assertion about some future state. *Propositions* have the same predicative form, past, present or future. (Aristotle's insight into the logic of singular predictions of future contingents trades on this point. See below.) (Thus, syntax (logical form) is the formal representation of semantic features.)

The difference between sense and truth penetrates to the concepts of inference and validity. A distinction must be made between inference and entailment. Entailment is to sense as inference is to assertion. Entailments consist in sense-relations between propositions, or better, entailment is a "purely intensional relation between propositions (sense-contents); it is *not* a truth relation. *Validity* of inference is determined by entailment relations. The confusion between sense and truth emerges in this context in the characterization of validity in terms of truth-relations: if the premises are true, the conclusion must be true. But actually validity depends upon sense-relations between propositions, not truth-relations. The truth-characterization works in practice because it presupposes that entailment holds, but *theoretically* it is not accurate, it is not an *essential* characterization.

This point extends also to the distinction between analytic and synthetic judgments (statements). This distinction applies to *judgment* and truth-conditions (the grounds for the judgment). Usually the distinction is explicated in terms of the grounds of the judgment: if a judgment is true in virtue of meaning or sense then it is analytic, if it is true in virtue of experience then it is synthetic. This characterization *fails*. A truth-characterization of the distinction fails to get at the essential point. Predicatively (propositionally) both forms of judgment involve sense relations between terms, and this is so apart from the question of grounds

of judgment. For the predicative content of the judgment, which has nothing to do with truth or assertibility or the grounds of judgment (evidence), inherently exhibits the distinction we are after. For example, in the two *propositions* specified by the sentences :

“ The grass is green ” and

“ Bachelors are unmarried males ”

the predicative sense-structure involves sense-relations between terms in both cases; both involve intelligible (sense) content. If there is an analytic/synthetic distinction it must be drawn at this predicative level, not in terms of judgment. as Kant, for example, does, nor in terms of truth, as is a common practice.” The point is that from the predicative point of view both propositions involve sense-relations between terms—both are of a type (kind), since propositions are sense-contents. Now this might suggest that there is no analytic/synthetic distinction at all. But this does not follow. For there is an important distinction to be drawn between entailment (sense) relations and “ empirical ” (contingent) sense relations. There is an important distinction to be drawn between the two sentences above; there are two types of sense-relations, and only intensional criteria will do. It becomes clear that the division of judgments into matters of fact and relations between ideas (synthetic and analytic) misses the point, for both involve sense relations. The proper way to draw the distinction is not in terms of judgment or in terms of truth-conditions

Modality, the modal concepts relate to “ may be ” (possibility) “ can’t be ” (impossibility), “ must be ” (necessity) are assertive concepts. They indicate modes of judgment. A systematic distinction must be made in the analysis of the assertive

copula in ordinary language. For example, in the *statement* (assertion) made in the *use* of the declarative sentence :

“ Socrates was a philosopher ”

the logical (formative) sign “ was ” is logically complex and four distinct concepts may be distinguished :

- 1) a predicative sense function (predication)
- 2) an assertive truth function (assertion)
- 3) tense (is was, will be)
- 4) modality (may be, must be, can't be).

The propositional content may be indicated by the neutral predicative sense-function “ be ” : “ Socrates *being* a philosopher ”. The predicative “ be ” does not carry truth-force (assertoric force), whereas the assertive “ is ” does indicate assertive force. Strictly speaking, whenever we use a sentence which specifies a proposition but does not have assertive force the neutral “ be ” should be used instead of the *charged* “ is ”. For example, in the antecedent of a hypothetical :

If Socrates *be* a philosopher, then ...

Now modality (at least in one clear sense) applies to the assertive copula (formative), not to the predicative copula. Modal concepts indicate modes of assertion (judgment), not modes of predication. Modal concepts fall within theory of assertion, not theory of sense. That is, sense-formation is independent of modal considerations. Debates as to whether logic is two-valued or three (many)-valued fail to make this clear. A three-valued logic, such as that suggested by Lukasiewicz, does not apply to propositions but to truth conditions and assertibility. The modal concepts related to “ may ”, “ can't ” and “ must ” are modes of *judgment*. Here is another reason for

a systematic distinction between theory of sense (propositions) and the theory of assertion/truth.

Certain problems concerning reference and existential import stem from a failure to properly distinguish between theory of sense and theory of truth. Predication does not have existential import. A *person* is committed to the existence of what he *asserts*. Nor does predication involve *reference* to existent objects. Only assertions have existential import. Predication does not commit one to existence of objects or facts. Quine, who rejects all talk of sense (meanings), and who confuses predication with satisfaction (extensionalist thesis) finds himself in an extensionalist bind. He is forced back to sense (he speaks of "purports") in order to explain how a predication can be "meaningful" even when there is no object (existent) referred to (named) by the logical subject (singular term). The failure to distinguish between sense and truth leads to perverse doctrines about existential import—for example, that general statements made by use of "some" have existential import, while statements made by use of "all" have no existential import. The difference is *not* in the logical meaning of "all" and "some". *Predications*, whether involving "all" or "some" have no existential import, do not *assert* existence. But *assertions* (statements) whether involving *all* or *some* may (or may not) have existential import. The claim that universal statements have no existential import and are essentially hypothetical in assertive form: $(x) (If Hx then Mx)$ = "All Humans are mortal" goes too far. For clearly *some* (most) universal statements do have existential import. Some universal assertions do *not* have existential import and these may be interpreted in hypothetical form.

Thus, in terms of sense-formation (predicative structure) both universal and particular *propositions* have a common predicative

structure. It becomes clear that the Fregean analysis of general *statements* captures (attempts to capture) the truth-conditional structure, and is not an analysis of the sense-structure (which is predicative). The confusion of sense-structure and truth-structure leads to *ad hoc* devices (stipulations) concerning existential import, e.g. that "some" has existential import but "all" does not, so that the former is an "existential quantifier". Here, again, we find a difference in "form" between singular and general statements. A general statement is true if and only if each instance (individual case) is true: "All humans are mortal" is true if for each x , if it is human, then it is mortal. However, "Socrates is mortal" is true if Socrates is mortal. Frege's "insight" into the disparity in logical form between singular and general *statements* does not apply to the sense-structure of propositional content, but to the statement-meaning (truth-conditional structure). We shall see that both singular and general *propositions* have a common predicative structure. Frege went too far in analyzing all universal categoricals into quantified hypotheticals.

Hence, Quine's criterion of ontological commitment in terms of quantification (being the value of a bound variable) trades on the fact that the quantificational form is assertive form "For every x , it is the case that (if Hx , then Mx)". However, quantification figures in predicative (propositional) content and here it has no existential import or ontological commitment. The critical distinction is not between "all" and "some".

Summary

Predication is essentially intensional consisting in the sense-structure of propositions. Predication is not an *act*, not judgment, not assertion, not affirming or denying a predicate of a subject (or what a subject refers to). It is not the relation of satisfac-

tion—a predicate applying to (being true or false of) an object. Predication is not attribution, and does not involve a relation between substance and attribute, nor (as Strawson suggests) between particulars and universals in a non-relational tie. Predication does not involve truth conditions, nor does it involve reference to fact and existence. Predication, as a purely intensional concept, involves sense relations between terms, and terms are sense-constituents of propositions.

All propositions are predicative in sense structure. This is so whether the proposition is singular, general, relational compound, etc. These differences (which are logically important and irreducible) are due more in the types of terms involved than to the sense structure of form. The generic concept of predication is not characterized by saying that every proposition is of subject-predicate form. This terminology is crippling and misleading. It happens to apply naturally to certain types of statements (singular and general) but not to compound statements. We shall speak instead of *terms* and prior/posterior positions, and drop all talk of subject/predicate.

Every proposition consists of two terms in configuration. A proposition consists of terms and formatives (logical signs). Formatives represent sense-functions. (In statements formatives take on additional truth-functional meaning). (This reflects the distinction between sense-value and truth-value.) Every proposition consists of two main terms and one main formative. The two terms must be configurable, and the formative indicates the mode of sense-configuration. Propositional formatives are indicated by oppositional signs.

Terms and formatives are both constituents of propositions. Terms are "incomplete" with respect to formatives, and vice versa. Neither can function apart from the other. Each *completes*

the other in the unity of a proposition. Outside of a proposition a term (quaterm) has no function. They are *essentially* constituents of propositions.

Terms are sense-contents. They must not be confused with entities (objects) to which they correspond. Objects are constituents of the world. If one insists upon entifying terms, and treating them as objects of some sort (sense-objects), then these must be distinguished from objects which are not-constituents of propositions.

A term occupies logical space—it displaces other terms. This metaphor helps to make the distinction between terms (content) and formatives (which do not occupy logical space but structure it). The sense of a term is constituted by its configurative possibilities. Only certain terms configure with each other. The theory of sense-formation (predicability) aims at articulating the formal principles (categorical) which determine configurability. A term's sense is a function of its *exculsion* (displacement) of other terms. A term *excludes* only those terms which are contiguous (configurable) with it. (This gives a hint of the theoretical basis of the opposition thesis of formatives.) The more determinate the sense of a term the more *dense* it is (the more definite). Density is a function of exclusion-specificity. The sense of a term is determined by its "location" in logical space—its configurability-range with respect to other terms. Some terms have a *wider range* than others. Thus, the sense of a term is essentially connected with *other* terms. Configurability is determined by categorical structure. Sense rules are categorical rules. (See Sommer's "Ordinary Language Tree" and "Types and Ontology".)

The formal structure of a proposition is represented by :

$$A \text{ +/- } B$$

We shall speak of prior and posterior terms and positions, instead of subject and predicate (positions). 'A' is prior term and 'B' is posterior term. Position is relative to the formative. For the full explication of formal structure see Section 2.

Any term-type may occupy posterior position. The *formal* concept of predication does not restrict prior position to individuals or particulars. Predication is neither logically singular nor general. Any type of term may be a "logical subject". Predication is not essentially tied to a material ontology, either substance/attribute (Aristotle) or concept/object (Frege). Predication is not essentially connected to an ontology of *individuals*. State-terms, for example, (i.e., a term which specified a state of affairs) may figure in predication, occupying either prior or posterior position.

("Clouds being present +/- Rain falling")

(A)

(B)

Thus, from the predicative point of view, there is no *formal* distinction between a singular-term and a state-term (even though the type differences between such terms are formally rendered). A singular term (representing an individual) is constituted by the possible *states* in which it may configure (configurative possibilities). We must look elsewhere for criteria of type distinction between terms.¹³ Quine's criterion of grammatical role (position) for distinguishing between singular and general terms misses the point. For terms are not expressions, not constituents of sentences. Quine's criterion works only if one presupposes the singular dogma of predication.

Type differences between terms, between singular and general terms, or between singular and state terms, for example, must be located in the sense-contents themselves i.e., in the configurative possibilities of the terms. And this takes us back to

categorial criteria. Here Strawson is moving in the right direction in proposing a type-criterion (in a different sense of type) to distinguish between singular and general terms. The latter distinction has to do with the fact that singular and general terms have different *configurative ranges*. This does not preclude general terms from occupying prior position in predication, nor does it restrict singular terms to prior position. Formally, predication is *symmetric*. The Fregean view that predication is inherently assymmetric goes back to the singular dogma and the extensionalist thesis of predication. A term with *wider* configurative range (of any two given terms) is the natural posterior term (natural predicate), while the "narrower" term is the "natural subject". Some such thesis was subscribed to by Aristotle. (See Sommer's "Confirmation and the Natural Subject" *Philosophical Forum*, 1972; and "Do we need Identity?" — *J. of Philosophy*, August, 1969)

In systematically following through on the distinction between sense and truth, between sense-value and truth-value, sense functions and truth functions, sense structure and assertive structure, it becomes clear that compound statements, too, have sense-content. The truth-functional analysis of compound formatives focuses on truth-functions. Here, again, we find the extensionality thesis at work. For, the truth-functional analysis of compound formatives (as defined by truth tables) is explicitly extensional; the sense content is not important. The reference or truth-value is important. Despite this, Frege clearly assumed that compound statements had propositional (conceptual) content: there are compound *propositions*. What is needed to supplement the truth-functional analysis of compound statements is a sense-functional (predicative) analysis of compound *propositions*.

In an "if...then. . ." hypothetical *statement*, for example, the formative (if. . .then. . .) indicates both truth-function *and* sense,

function. Since the formative is taken to be *essentially* extensional (truth-functional), as it is by Fregean logicians, it is no wonder that perplexities arise regarding the proper understanding of the sense-formation (propositional content). Sense-rules govern the relations between antecedent and consequent terms, and there can be violations of category rules (category mistakes) here as well. (The 'if...then...' like the 'is' in ordinary language is logically complex and it too must be analyzed and excavated, distinguishing sense-function, truth-function, modality.. And this leads to a predicative analysis of compounds).

For example, in the *conditional* proposition, which involves the two state terms "Clouds being present" and "Rain falling", the propositional connection relates the two terms sense-functionally.

"Clouds being present" is sense related to "Rain falling".

If Clouds be present *then* rain falls

The truth-functional analysis focuses on the assertive form of hypothetical *statements*. Once the distinction is made between propositional content (predicative sense structure) and judgmental conditions (assertive truth structure) we are in a position to avoid the *reductions* of both Frege and Sommers. Frege assimilated general universal *categoricals* to hypothetical (truth-functional) form under quantification: "All humans are mortal" becomes.

(x) (If Hx then Mx).

Sommers went the other way in assimilating hypothetical truth-functional "if...then..." statements to universal categorical form:

"If clouds are present then rain falls"

becomes $\neg(p) + (q)$ or "All cases of (clouds being present) are cases of (rain falling)"; "Every (p) is (q)"

From the point of view of assertive functions, it appears that hypothetical assertions are significantly different from categorical assertions, even though from the predicative (sense-functional) point of view the propositions expressed exhibit a common generic predicative form. It may be noted here that Leibniz, as seen in an earlier quote, wished to treat hypotheticals as categoricals. (I am suggesting that such attempts are ill-founded if directed at assertive form). Categorical assertive functions cannot be reduced to hypothetical assertive functions, except perhaps where the general statement does not have existential import.

Note : (1) Scarle rightly distinguishes between categorical and hypothetical reference (See *Speech Acts*, p. 73)

(2) Note also, that in Kant's table of *judgments*, hypothetical, categorical and disjunctive are placed in one category. Kant has been unfairly criticized (e.g. by Ryle) for this classification (See Ryle's "Categories"). They *do* belong under one heading since they are modes of judgment (assertion).

The realization that compound statements have propositional sense-content, and that compound formatives are also *sense-functions* opens the way for a very different analysis of the "meaning" of such statements. The preoccupation with truth-functionality has displaced and obscured the proper understanding of the sense-formative content of such statements. Here again the distinction between sense and meaning (truth) is critical. Once the propositional (predicative) content of compound statement is disclosed new possibilities of analysis are opened. For example, the theory of compounds now have something in common with truth-analysis of other statement-forms. From the predicative point of view *all* propositions are elementary

(atomic). And truth of compound statements as well as categoricals may be treated under one model. A statement is true if and only if it corresponds to the facts. At the same time all statements involve truth-functions, even categoricals.

Truth is essentially connected with judgment and assertion. A distinction must be made between States (what is apprehended in the apprehension of a proposition) and *Facts*. Facts are stated, and this involves judgment. This does not, of course, mean that the *being of a fact* depends upon judgment, only that the *stating of a fact* does. Propositions do not represent (picture) facts, as Wittgenstein claimed, at least not propositions in the special Fregean sense in which I have been using the term. There is a space between conceptual content (sense-content) and being the case (facticity). The analysis of the concept of truth is essentially bound up in theory of judgment and assertibility. (Strawson approaches something like this in locating *meaning* (not *sense*) in sentences, and truth in statements.)

Predication is concerned with possibility, assertion with actuality. Aristotle finds an important asymmetry between principles of predicability and assertibility in discussing the sea-battle problem in *De Interpretatione* (Chapter 9). If every *statement* is true or false, then reality is fully determinate—past, present and future. Rightly or wrongly Aristotle inferred a logical determinism from this (a truth-necessitation) which, he believed, precluded chance and entailed fatalism. Aristotle proposed a way out which modern truth-functional logicians (some of them anyway) find perverse. Aristotle suggests that when matters are future, contingent, potential, indeterminate—an assertion (statement) is assertively vacuous, neither true nor false. Nevertheless, he insists that the statements is *true-or-false*, and the principle of excluded middle :

(S will be P or S won't be P)

is necessarily true, even when each disjunct is neither true nor false. Some interpreters suggest that Aristotle is rejecting the universal sway of the principle of bi-valence while subscribing to the universality of the principle of excluded middle. Such a maneuver, it is maintained, is a gross error (see Kneale—*The Development of Logic*). Quine also calls this a "logical howler"). However, if we are generous to Aristotle and resist construing his analysis in a truth-functional way, we may find an important insight here.

I suggest that Aristotle is taking exception to the assertive principles (bi-valence *and* excluded middle) while reaffirming the predicative principles. If we interpret him in this way, he is suggesting that singular predictions of future contingents are assertively vacuous, neither true nor false, but still predicatively they are /T/.

This means that from the propositional (predicative) point of view a proposition may have truth status /T/ without having truth value, without being true or false. And this is precisely what it means to be potential: to be /T/ and yet not be determinate i.e., neither true nor false. Thus, there are two principles—one applying to what is actual, and one applying to what is potential. In the former, to be /T/ entails being determinate in truth value and being. In the latter, being /T/ does *not* entail being true or else false; it is indeterminate.

However, on the truth-functional view every statement must have a determinate truth value, whether or not we are in a position to judge what it is.

Here we find another application of the point made earlier that truth status (intelligibility) is independent of truth-value

(truth-determination). For clearly certain singular predictions (*assertions* about the future) are *intelligible* (make sense). But this does not entail that they must have determinate truth value. Sense is independent of truth. Principles of predicability are independent of principles of assertibility. From the predicative point of view past, present and future are symmetric. This *need not* be the case for assertibility. We have already illustrated this with the generality of predictions thesis of Ryle and Pierce.

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NOTES

1. For recent discussions of Sommers' work see - *The New Syllogistic*, George Englebretsen, ed. (Peter Lang, Ny, 1987).
2. Van Heijenoort says, "And when in his *Begriffsschrift* Frege introduced quantifiers, he thereby had to make the subject-Predicate form the onique form of his prime sentences. Frege is generally credited with having introduced, to get full quantification [theory, the generalized subject-predicate form, that is, the one in which there is more than one subject. This is true. But it is also true that he was making more than a generalization of something already existing. He was putting the subject-predicate form squarely at the basis of logic, both in its generalized (more than one subject) and in its simple (just one subject) versions."

"Subject and Predicate in Western Logic" (Presented at the East-West Philosophers' Conference on The Development of Logic: East and West, June 1973.)

It must be stressed here that this form of generality introduced by Frege is not the sort of generality I am claiming for the generic concept of predication. Frege's generality applies to the extension of predication from absolute form (one subject) to relative form (more than one subject). This extension, although an important advance, nevertheless restricts predication to logically singular propositions. General propositions, and compound propositions, for example, are not subject-predicate in form.

3. These prominent writers on predication differ in their views on substantive points. Nevertheless, they all in one way or another subscribe to the Fregean framework for logical theory. Their disagreements, however real, presuppose certain common Fregean assumptions—such as that predication is logically singular.
4. It should be added here that the Fregean view of predication did not escape being enmeshed in material ontological doctrines. The Aristotelian theory is sometimes criticized for having confused predication with the metaphysical relation of substance / attribute. It is often overlooked that the Fregean conception is also tied with the object / concept ontology of individuals. In this respect, then, the Fregean approach cannot claim an advantage over the classical view. What is wished for is a conception of predication that avoids material ontological doctrines and is a formal organon for ontology.
5. For example, Van Heijenoort says, "Aristotle's syllogistic was his lucky strike. He had the luck to hit upon a part of logic where quantifiers are unnecessary. Syllogistic deals with one-place predicates, and, as such, is part of monadic quantification theory..." (Op. cit.)

See also, P. T. Geach *Logic Matters* – "History of the Corruptions of Logic."

6. See, for example, Frege's introduction to the *Begriffsschrift*, and Russell's "Logic as the Essence of Philosophy" op. cit. Leibniz attempted to develop a universal logical language which presupposed the Aristotelian framework. He assumed that all statements are subject-predicate in logical form, and that it was possible to develop a general calculus of terms which was based upon a plus-minus arithmetic model. (We shall see in a moment that this is essentially the type of calculus developed by Sommers). For example, "If, as I hope I can conceive all propositions as terms, and hypotheticals as categorials and if I can treat all propositions universally, this promises a wonderful case in my symbolism and analysis of concepts, and will be a

discovery of the greatest importance". *Logical Papers* ed. Parkinson - p. 66.

See also pp. 17, and 143 - "A study in the Plus-Minus Calculus".

7. It was pointed out earlier that this characterization of predication—affirmation / denial—confuses predicability with assertibility. Nevertheless categorial rules govern the affirmation / denial of terms, for assertibility presupposes predicability. So there is still an important difference between this conception of predication and the Fregean—which assimilates denial to negation.
8. For details on these points see the following papers of Sommers :
 "Types and Ontology" - *op. cit.*
 "Predicability" - *Philosophy in America* (ed. Max Black, Ithaca, 1965)
 "On a Fregean Dogma" - *Problems in Philosophy of Mathematics* - I. Lakatos, ed. Amsterdam, 1967, North Holland.
 "Truth-Value Gaps" - *Analysis* - 25 (1965).
 "Meaning Relations and the Analytic" - *J. of Philosophy*, 60 (1963)
9. F. Ramsey remarks on a characteristic feature of mathematical logic in the context of discussion whether predication is symmetric or asymmetric :
 "...The reason for this lies in a fundamental characteristic of mathematical logic, its extensionality, by which I mean its primary interest in classes and relation in extension. Now if in any proposition whatever we change any individual name into a variable, the resulting propositional function defines a class. So mathematical logic, being only interested in functions as a means to classes, sees no need to distinguish these two sorts of functions, because the difference between them, though all important to philosophy, will not correspond to any difference between the classes they define. ...Anyone who was interested not only in classes of things, but also their qualities, would want to distinguish from among the others those functions which were names..."
 "Universals" - *The Foundation of Mathematics*, (pp. 131-132).
10. There are some cases where general-categorial assertions are translatable into hypothetical form (and vice versa) with no apparent loss. (See H. B. Joseph - *An Introduction to Logic*, pp. 181 ff.)
11. Frege attempted to formally depict this difference in his signs for the content and judgment strokes : This attempt failed since it did not actually penetrate into the representation of formatives (logical signs). Frege later recognized the redundancy in this "assertion" sign, for he realized that assertion was already indicated in the "form of the declarative sentence".

12. Frege was essentially correct in his criticisms of Kant's method of drawing the distinction. In the *Foundations of Arithmetic* he argues convincingly that Kant's criteria fail to adequately draw the distinction. Frege preferred to use the principle of non-contradiction as the criterion, and this shifted the focus away from judgment towards the conceptual concept.

Quine is on the right track when he rejects the truth-characterization of analyticity. The appeal to "truth in virtue of meaning" is unsatisfactory. But his *reasons* for rejecting the distinction thus characterized are very different from the approach I am taking. For Quine's rejection of the distinction presupposed the truth-characterization, for he observes that from the point of view of judgment and truth it is a matter of degrees, not kind.

13. Given this intimate connection between individual terms it seems that Wittgenstein's opening statement of the *Tractatus*: the world consists of facts not things, is a specious contrast. States (states of affairs) are constituted by objects, and objects are constituted by configurability in states. It is a matter of description, rather than an ultimate ontological dichotomy.

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