13. Reflections on Logical Semantics and Its Potential for Human Society

1. Introduction

Any attempt to represent Logic as closely related to human activities and interests, i.e., to Politics in the wider sense, clearly puts Logic into some conceptual dependence on Politics (in that wider sense) and invites us to revisit and re-estimate the objectivism and antipsychologism in academic logic that was inherited from Frege and Russell. A new solution is needed for the classical dilemma between the ideal of the objectivity of Logic on the one hand and its potential for dealing with human reasoning on the other.

What should logical semantics be? What will it have to be in order to *simultaneously* guarantee the objectivity of logic and represent it as an empirical and pragmatically oriented science? To answer this question, let us — as a preliminary — consider the role that is ascribed to logical semantics by traditional views.

2. Semantics: To Which Purpose?

For which end is logical semantics set up? What kind of problems does it solve? The answer is unlikely to reduce to the statement that within a logical system the semantical part is intended for nothing more than the 'semanticizing' of the syntax of the system in question. The very fact that presently no calculus is deemed valid without an 'adequate' semantics makes it clear that the notion of Semantics plays a more significant role than that. The current ideas of precisely what this role is are those that have been handed down to present-day logic from Russell, Husserl, Meinong, and, above all, from Frege. An analysis of their work shows that these classical logicians approached logical semantics as a whole, as well as the logico-semantical notions of Truth, Object, and Domain (of objects) in particular, from the prospect of finding *a foundation* for valid logical inference; this goal being understood as a prerequisite for a status of logic proper as 'absolutely objective'. For Frege, for instance, the purpose of any science is to discover Truth and that of logic, being an objective science, to discover the laws of Truth, taken as absolutely objective, i.e., independent of individual knowledge seekers. According to Frege the objectivity of logic can be achieved only as a postulated objectivity, to be ascribed to the body of logico-semantical primitives: objects, including sets of objects; i.e., through an ontologization of the domain.[1]

Here it should be noted that the problem of *grounding* inference in something else allows for solutions of different degrees of generality. It is therefore important here to distinguish between general validity (i.e., validity grounded in more general tenets or concepts), epistemological validity (epistemologically grounded validity), and conceptual validity (conceptually grounded validity). The latter must be understood as a *relative* notion, since it reduces the notion of valid logical inference to concepts that are not necessarily more general but rather to ones that are deeper and in that sense more basic. The question now arises: *What kind of grounding* is standard modeltheoretical semantics supposed to provide — an epistemological grounding or a conceptual one?

A generally accepted interpretation of

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[1] See E.-H. Kluge, *The Metaphysics of Gottlob Frege*, The Hague, 1980.

modeltheoretical semantics is the one that present-day logic inherited from Frege and which endeavours to provide foundations for logical inference in epistemological terms. It is based on a number of assumptions:

(a) the logico-semantical notion of truth is treated as an epistemological concept;

(b) this notion is regarded as an explication of the classical notion of Truth in the proper sense (truth as correspondence with the objective world);

(c) reality is assumed to be adequately represented through the concepts of Object and Set;

(d) objects and sets are taken to have an objective existence.

Now Frege's definition of a valid inference — one which is certain to lead to true conclusions given the truth of the premises — does not necessarily involve an epistemological notion of truth (although this is the interpretation which Frege's logico-semantical doctrine claims to express).

The assumption that logical semantics provide no more than a conceptual foundation for inference presents us with the problem of making a choice among those concepts to which the notion of logical inference can be reduced and which are likely to be seen as more fundamental, clearer, and more definite than the notion of logical inference itself.

3. Truth Oriented Modeltheoretical Semantics and the Request for *Grounding*

Frege's definition of valid inference is, as a rule, considered to constitute a reduction of this notion to the notion of truth. Valid inference is a truth-preserving inference, and the notion of truth is recognized as primary and basic with respect to the notion of valid inference. However, the inconsistency of this position becomes evident once we recall the Liar Paradox. On the one hand, the paradox establishes the ambiguity of the naive notion of truth and

on the other, it shows the priority of the naive notion of true inference over the naive notion of truth (nobody would doubt the validity of the reasoning from which the paradox results). Thus, in order to *ground* the validity of inference through its reduction to the notion of truth, it is necessary that prior to this the notion of truth be properly elucidated. In fact, this elucidation is deemed to have been provided by the standard semantical theory (model theory).

But can one really accept modeltheoretical semantics as something more precise, more definite, and more fundamental than the notion of logical inference? Conceptually, it represents the reduction of the notion of truth to that of satisfaction, while the latter reduces to a combination of 'naive' set theory and concepts of reference. The underdetermined concept of satisfaction, however, is no less paradoxical than that of truth (*vide* Grelling's paradox). The attempt to explicate satisfaction in set-theoretical terms is no more helpful because 'naive' set theory itself is not free from paradoxes either (Russell's paradox, for example). Formalized set theories, such as those of the Zermelo-Fraenkel-type, which steer clear of Russell's paradox are of no use here, since they contain rules of quantificational inference that, in this case, stand themselves in need of justification. One might hope that the limited fragment of naive set theory used in standard semantics would be consistent. However, what is left of this hope, if one takes into account the necessity, in order to define a general notion of validity for formulas, of a simultaneous appeal to all domain-sets, the set of all sets (legitimate in 'naive' set theory) included?

The concept of reference within Semantics runs into its own paradoxes. For instance, consider the term 'object unsignified by any term'. Does it signify anything, or not? Hence, all the above notions and concepts need themselves to be (logically!) grounded and so cannot serve as a reliable basis for *grounding* the

notion of valid logical inference. As H. Field has shown, Tarski's formalized theory of truth either contains unexplicated semantic concepts or yields a truth definition that simply *postulates* axioms or rules of inference, and in addition takes the consistency of meta-language for granted.[2] Thus, apparently, when standard semantics is understood as representing a relative grounding of logical inference both its formal and its conceptual variants will of necessity contain a vicious circle.

This vicious circle can be avoided if standard semantics be treated not as a relative (conceptual) but as an epistemological grounding of logical inference. Tarski's theory of truth, however, can be shown to be an explication, not only of the classical notion of truth but of intuitionistic, conventional and pragmatical notions of truth as well.[3] In other words, it does not fix the logico-semantical notion of truth in an epistemological sense at all. This indeterminacy thesis shows that standard semantics cannot be taken to present an acceptable *epistemological* grounding of logical inference. Thus, standard semantics (however understood) cannot be considered to offer satisfactory foundations for logical (quantificational) inference.

4. Farewell to *Grounding*: Substitutional Semantics

There are, however, other possibilities available. Substitutional semantics (SS), the development of which was pioneered by R. Barcan Marcus,[4] gives a much more general and consistent solution to the problem of grounding the notion of valid quantificational inference than a semantics based on Truth, Object/Reference and Domain can do.[5] Within substitutional semantics a sentence of the form $(Ex)Fx$ is true if and only if the substitution of some term t at the place of the variable x in Fx results in a true sentence, regardless of whether this term does or does not refer to any object. On the substitutional interpretation the truth value of a complex sentence is said to be a function of the truth values of simpler sentences and, ultimately, of the truth values of atomic sentences. By adopting SS rather than referential semantics we get rid of the necessity to fix definite notions of Truth and Domain, or to appeal to modeltheoretic concepts, such as the notion of reference. It follows that for the purpose of finding a foundation for inference the traditional approach to logico-semantical notions of Truth, Object and Domain may be deemed inadequate.

What is the real function of these notions in logical semantics? To answer this question we must take into account that the deepest reason why logic has been connected with a notion of Domain is the fact that symbolic logic can be used only when the meanings of the terms in a language do not vary throughout the reasoning process in question. Consequently, the minimal assumption underlying symbolic logic is that of rigidly identifiable meanings of the terms that occur in a given argument. In other words, the notion of Domain should be dealt with from the standpoint of providing *non-ambiguity* for linguistic expressions during inference processes. And the problem of logical objects reduces to a problem of

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[2] H. Field, 'Tarski's Theory of Truth,' *The Journal of Philosophy 69* (1972), 347-375.
[3] See: H. Putnam, *Meaning and the Moral Sciences,* Boston, 1978, Lect. II-III; A.V. Bessonov, *The Theory of Objects in Logics,* Novosibirsk, 1987, Ch. II [in Russian].
[4] R. Barcan Marcus, 'Modalities and Intensional Languages,' *Synthese 13* (1961), 303-322.

[5] S. Kripke, 'Is There a Problem About Substitutional Quantification?' In: G. Evans and J. McDowell (eds.), *Truth and Meaning*, Oxford, 1976, 325-419; A.V. Bessonov, *The Notion of Domain in Logical Semantics*, Novosibirsk, 1985 [in Russian].

identifiable meanings.

The standard Frege-Russell solution for the problem of the objects of logic is based on the assumption that only objects are absolutely 'objective'. Hence for them the problem of the identification of meanings simply cannot arise. However, Quine's thesis of the indeterminacy of reference, if accepted, supports the opposite conclusion: this problem is a real one. This allows us to conclude that the notion of reference, if based on the requirement that objects of reference be absolutely independent of Language, is absolutely empty of content. Even if it were established beyond doubt that a linguistic expression were significant, it could not be used. This means that the interpretation of Language within Logic cannot be considered as pertaining to a reference relation that is absolutely objective and independent of the thinking individual.

Does this conclusion imply that the property of objectiveness cannot apply to logical objects at all and therefore cannot apply to Logic properly so called? To answer this question, it seems expedient to set up different degrees of objectiveness: independence from the individual users of language (intersubjectivity) and independence from the speakers' community as a whole. The understanding of language as a means of communication is itself based on the assumption of intersubjectively existent meanings. Hence an understanding of Logic which is oriented towards natural language must assume that meanings are intersubjectively identifiable.

In general, the logico-semantical notion of Truth should not be seen as an epistemological concept. Instead it should be considered from the point of view of its own logical validity, which is to say that it should be related to the *use* of terms whose meanings have been intersubjectively fixed, i.e., terms which stand in *intersubjectively fixed relations* to terms of other semantic categories.

Such an interpretation is certain to agree with the treatment of logical truth as reducible to truths that are analytical, though by no means to a priori Truth. The fact that any communicative society adopts meaning postulates is actually never established *a priori*. It is demonstrated by means of empirical research, such as sociological surveys of the practical uses of language. The meaning postulates, and hence ones insight into the validity of inferences, may vary from community to community, from one point in a community's history to another, etc. An example: magical thought assumes the entailment *'post hoc, ergo propter hoc'* as a logical axiom. Prior to Brouwer almost everyone accepted the unrestricted Law of Excluded Middle; more recently the rule of Modus Ponens has suffered a number of attacks. It is also easy to imagine even an experienced logician uttering a remark of the type 'Life is life', 'War is war', or asserting the sentence 'Today I am not myself' — which are by no means logical axioms, or supported by them.

5. A Prerequisite for a Political Semantics: Intersubjectivist Conventionalism

Does what has been said above mean that we are back again with conventionalism? I'd answer 'Yes'; but this time it is real conventionalism and not a mere subjectivism. Elements of convention in adopting this or that criterion for evaluating an argument as valid are always sure to be present. On the view that I want to defend, the convention is never arbitrary.

In my opinion, pure conventionalism is an extremely naive doctrine. A convention is adopted, not by arbitrary, abstract individuals who are at liberty to introduce any conceivable convention, it is adopted by real people living under real, objective circumstances.

It is simply impossible to arrive at a convention concerning the adoption of meaning postulates unless the conveners have an initial desire to come to an agreement. (It is hard even to reach an agree-

ment about some uniform notation for logical operations.) Moreover, the convention is difficult to accomplish even when the participants do have the intention to pull it off. To justify this thesis it suffices to recall the USSR/USA bilateral negotiations on limitations of armaments and the debate around a 'wide' versus a 'narrow' interpretation of the Anti-missile Treaty.

Consequently, when a convention on the validity of reasoning is suggested it should, minimally, comply with the desires of the convening sides. Desires, however, are determined by interests, and interests, whether those of humanity as a whole or those of other communities[6] of human beings, do not depend on the will and the intentions of individual humans.

Intersubjectivity provides us with a sufficient degree of that objectivity which is required for logic to be a science. Professor Barth has proposed an interpretation according to which the rules of logic are represented as an assemblage of the rights and obligations of the participants in a debate.[7] For this code to be in force it is not necessary that it be ascribed the status of a categorical imperative, it is enough that the parties involved quite simply accept it. The thesis that an intersubjectivity status will suffice for logic to be a science, cannot be refuted. Any attempt at a refutation would represent a bit of reasoning of some kind, whose very acceptance or non-acceptance would in fact be determined not by 'absolutely objective' reasons but by an agreement among the parties involved. And this means that the adoption of the refutation would itself depend on intersubjective reasons.

6. Logic and Human Actions

This approach to Logic provides, I think, general philosophical foundations for a presentation of Logic as directly concerned with human actions, that is to say: as a science that itself depends on politics in the wider sense. Does it follow that the most general characteristic of absolute objectivity,[8] that of 'absolute Truth', does not apply to systems of logic? No, it does not. For language is not *only* a means of communication, it also guides us in our understanding of the world. Hence the rules for how to use language, including the rules of inference, will in fact — after all — be determined *also* by absolutely objective reasons. That is why Logic can truly be said to involve absolutely objective knowledge, much in the same sense as (say) physics does. But, just as in the case of physics, we can at no moment specify with absolute precision what an absolute Truth of Logic is.

[6] Not to be conceptually divested of their histories (for which parameters are needed in any realistic theory of valid inference).
[7] E.M. Barth, 'From an Empirical and Pragmatical Point of View.' In: V.V. Tselishev (ed.), *Logic, Computer and Cognitive Science* [in Russian], forthcoming.

[8] By 'absolute objectivity' I mean independence from individual thinkers as well as from human society as a whole.