Roman Suszko and the non-Fregean Logics. Selected bibliography

SELECTED PUBLICATIONS IN ENGLISH (Works in Polish are not enclosed)


   Co-author: J. Los

   Co-author: Jerzy Los.
   The first article: On the extending of models (I) was published by Jerzy Los in Fundamenta Mathematicae, 42, 1955 pp. 38-54; the third article: On the extending of models. III. Extensions in equationally definable classes of algebras, written by J. Slominski, was published in: Fundamenta Mathematicae, 43, 1956 pp. 69-76

   Co-author J. Los

5. ———. 1958. "Syntactic Structure and Semantical Reference (First Part)." Studia Logica no. 8:213-244.
   "The syntactical and semantical investigations in contemporary formal logic refer always to the languages with specified syntactic structure, as with respect to such languages one can formulate exactly and, subsequently examine with mathematical tools 1) the rules of transformation (axioms, rules of inference) and the systems based on these rules (formalized theories), 2) the relations of semantical reference which occur between linguistic expressions and elements of objective sphere.
   Our considerations belong to that part of logical syntax and semantics which is independent of any assumptions concerning the rules of transformation.
   The syntactic structure of some language $L$ is determined 1° by the vocabulary of $L$ i.e. by the list of simple (undecomposable) expressions in $L$, and 2° by the rules of construction $L$ of which state how the expressions of $L'$, especially the sentences in $L$ are built of simple expressions.
   In the first part of this paper we consider the general principles of the syntactic structure of languages.
   Namely, we shall formulate a scheme of the syntactic structure of language. This scheme will be called the standard formalization and the languages which fall under this scheme will be called the standard formalized languages (1).
   The scheme of standard formalization is based on a purely syntactical classification of expressions into so
called semantical categories.
The standard formalization is an abstract from the concrete material of artificial symbolic languages which are considered in formal logic. It is general in the following sense: every symbolic language known in formal logic - after carrying some modifications in its calligraphy -- falls directly under the scheme of standard formalization.

In the second part of this paper we consider the fundamental properties of semantic reference. First, we introduce a classification of objects into so called ontological categories. Further making use of some simple and quite natural connexion of conformity between semantical categories of simple expressions and ontological categories of corresponding objects, we can introduce the general notion of a model of any standard formalized language. Namely, for every standard formalized language \( L \) we define the family \( M( L \) of all models of \( L \). Every model of \( L \) is a totality to which the expressions of \( L \) can refer semantically and, conversely, every totality to which the expressions of \( L \) can refer semantically, belongs to the family \( M( L \). Thus, we obtain a general scheme of the relations of semantical reference which is quite closely connected with the scheme of standard formalization. This shows the ideographic character of standard formalized languages.

It may be a reasonable conjecture that the content of this paper to be connected with the structural inquires in linguistics and with some problems of the philosophy of language and of thinking. But, we do not discuss here these connexions." pp. 213-214.

(1) These terms are borrowed from A. Tarski (in collaboration with A. Mostowski and R. M. Robinson) - Undecidable Theories, Amsterdam, 1953 p. 5.


We begin the considerations about semantics of standard formalized languages with some general remarks belonging to the theory of signs or semiotic in the sense of Ch. Morris [1938].

We consider the languages as systems of signs participating in the process of communication between persons belonging to some human group (speech community). Communicative employment of linguistic signs in some group is intertwined into the whole of activity of members of this group and of their relations to the environment, and the connection between the employment of linguistic signs and the activity of persons of the given speech community grants an intersubjective meaning to the employed signs.

The considerations about signs and languages may be conducted from a historical and descriptive point of view as well from systematical and theoretical one. On the other hand one can distinguish in these considerations three following ranges: syntax, semantics and pragmatics [Morris 1938]. The syntax deals with the relations which do occur between the signs alone. The principles of combination of simple signs into the composite signs are considered by it. Generally speaking with the syntax it is investigated the syntactic structure of languages. Semantics deals with the relations of semantical reference of signs to objects belonging to the objective sphere. These relations bind the signs with that about what the signs in the process of communication are speaking. Finally, pragmatics take into account the role of persons employing the signs.

One may say that the division of the science of signs and languages into syntax, semantics and pragmatics is made from the point of view of formal logic. Namely, pragmatics is strictly connected with the psychology, sociology, history of culture and other sciences dealing with members of speech communities. On the contrary the considerations about linguistic expressions conducted in formal logic are included in the syntax and semantics.

If a language \( L \) of some syntactic structure is meaningful in some circumstances (i. e. the expressions of \( L \) are participating in the process of communication in some human group) then the language \( L \) - as a system of expressions - semantically refers to some complex \( R \) of objects which may be called the referent of the whole language \( L \) in the given circumstances of meaningfulness of \( L \). I think that the existence of this referent \( R \) and the occurrence of the relations of semantical reference between the language \( L \) and the referent \( R \) (and between the expressions of \( L \) and fragments of \( R \)) is a basis of the intersubjective meaning of expressions of \( L \). On the other hand the syntactic structure of the language \( L \) depends 1\( ) \) on the referent \( R \) and 2\( ) \) on the members of the given speech community; the principle of the dual control of linguistic structure. [1938] p. 12.

In the case of formalized languages the situation is much more simple. Firstly, in formal logic we abstract from pragmatical properties and relations of linguistic expressions. In formal logic we consider only the syntactic structure of languages and the relations of semantical reference. Therefore, instead of the referent of a given formalized language \( L \) (in the given circumstances of its meaningfulness) we consider here the family of all possible referents of \( L \) which are called models of \( L \) and the principle of dual control mentioned above is reduced to the connection between the syntactic structure and the common structure.
of all models of $L$. This is the connection of conformity of semantical categories with the ontological categories. It will be explained later.

We do not intend here to prove the connection of conformity of categories. It will be enough to remark that this connection is fulfilled in all semantical interpretations of artificial symbolic languages considered in formal logic. We take in our paper the connection of conformity of categories as a fundamental principle by which are characterized the formal properties of relation of semantical reference and, consequently, it is possible to determine the family of all models of any given standard formalized language." pp. 63-64.


Co-authors Jerzy Los and J. Slominski


Abstract


"The Tractatus Logico-Philosophicus of Ludwig Wittgenstein is a very unclear and ambiguous metaphysical work. Previously, like many formal logicians, I was not interested in the metaphysics of the Tractatus. However, I read in 1966 the text of a monograph by Dr. B. Wolniewicz of the University of Warsaw and I changed my mind. I see now that the conceptual scheme of Tractatus and the metaphysical theory contained in it may be reconstructed by formal means. The aim of this paper* is to sketch a formal system or formalized theory which may be considered as a clear, although not complete, reconstruction of the ontology contained in Wittgenstein's Tractatus.

It is not easy to say how much I am indebted to Dr. Wolniewicz. I do not know whether he will agree with all theorems and definitions of the formal system presented here. Nevertheless, I must declare that I could not write the present paper without being acquainted with the work of Dr. Wolniewicz. I learned very much from his monograph and from conversations with him. However, when presenting in this paper the formal system of Wittgenstein's ontology I will not refer mostly either to the monograph of Dr. Wolniewicz or to the Tractatus. Also, I will not discuss here the problem of adequacy between my formal
construction and Tractatus. I think that the Wittgenstein was somewhat confused and wrong in certain points. For example, he did not see the clear-cut distinction between language (theory) and metalanguage (metatheory): a confusion between use and mention of expressions."

*Presented in Polish at the Conference on History of Logic, April 28-29, 1967, Cracow, Poland.


Co-author: H. Lewandowski


Suszko's reply to W. V. Quine and J. Giedymin's discussion notes: pp. 227-230.


Annals of the University of Bucarest


Abstract


Co-authors: Stephen Bloom and D. J. Brown


Co-authors: Stephen L. Bloom and Donald J. Brown

"An abstract logic consists of a pair <a, cn< where a is an algebra and cn is a consequence (alias 'closure') operation on the carrier of a. In this paper several theorems are given characterizing 'structural' and 'invariant' logics by their completeness properties. the method is a generalization of the Lindenbaum-Tarski construction."


"The notion of quasi-completeness (or O-completeness) has been introduced by J. Los [1], [2] into the semantics of theories in open languages with nominal variables. An analogous notion known as Hallden-completeness [3], [4] is applicable to sentential logics. Both notions are of the same formal nature and can be uniformly treated when formulated with respect to W-languages which contain two kinds of variables, sentential and nominal, as well. W-languages considered here are open, that is, not containing bound variables. The aim of this paper is to show that the main theorems of Los concerning the quasi-completeness also hold in non-Fregean logic and semantics.

The author is indebted to Dr. Stephen L. Bloom from Stevens Institute of Technology for comments on the first draft of this paper."


Co-author: Stephen L. Bloom.

"The SCI (Sentential Calculus with Identity) is obtained from the classical sentential calculus by the
addition of 1° a new binary connective, the identity connective (denoted by =) and 2° axioms which 'say' that \( p \) means "\( p \) is identical to \( q \)" (also: "the situation \( p \) is the same as the situation \( q \)". The new axioms are the weakest possible; no presuppositious about the meaning of "is identical to" are included (other than \( p = p \)). We do not attempt to say what the range of the sentential variables \( p, q, r, \ldots \) is. (In the classical propositional calculus, they are intended to range over a two element set.) In this paper, a number of results about the semantics of the SCI are given without proof. The proofs of these and other results are contained in the much longer Investigations into the Sentential Calculus with Identity."


Abstract


Co-author: Stephen L. Bloom

"The sentential calculus with identity (SCI) is obtained from the classical sentential calculus by the addition of a binary 'identity connective' = and axioms which 'say' that \( p = q \) means \( p \) is identical to \( q \), the study of the semantics of the resulting consequence operation using Tarski's matrix method yields insights into consequence operations in general and the classical and modal consequence operations in particular. One finitely axiomatizable SCI theory is studied. It is shown that this theory consists of those formulas valid in all topological boolean algebras."


Co-author: Mieczyslaw Omyla


Co-author: Mieczyslaw Omyla


Abstract


Co-authors: Stephen Bloom and D. J. Brown (Abstract).


Co-author: D. J. Brown


"This note contains the proof of the following theorem: every model, adequate for SCI, is uncountable."


Co-author: E. Quackenbush


A slightly abridged version of the essay published with the same title in *Colloquium Mathematicum*.


This paper was also published as a separate booklet by the Institute of Philosophy and Sociology of the Polish Academy of Sciences, Warsaw 1972, in a series of preprints.


Co-author: Stephen L. Bloom


Co-author: Aileen Michaels


Co-author: Aileen Michaels.

A loose summary of: *Sentential Calculus of Identity and Negation*.


Co-author: Wojciech Dzik


Summary of the talk given to the 22nd Conference on the History of Logic, Cracow (Poland), July 5-9, 1976.


English translation by Olgierd Wojtasiewicz of an article published in Polish in 1957.
"The antinomy of the liar has been discussed many times in formal logic. It is associated with remarkable advances in logic: the formulation of the semantic theory of truth [4] and the discovery of undecidable statements and the impossibility of proofs of consistency under specified conditions ([2]; see also [3], Vol. II, pp. 256ff). All those results make fundamental use of self-referential expressions, which were first used, in the history of logic, in the antinomy of the liar. The aim of this paper is to demonstrate, by quite elementary methods; something that has been known since the birth of semantics, namely, that the concept of truth and other semantic concepts are relative in nature [5] and that using relative semantic concepts, including the construction of self-referential expressions, does not result in antinomies in natural language. Semantics, and in particular the semantic theory of truth, presupposes syntax. The wealth of semantic analysis thus depends on the wealth of syntactic information about those expressions to which semantic analyses refer. Since in this paper no systematic syntactic studies on the structure of expressions are made, except for the construction of self-referential expressions, the set of concepts used in the semantic theory of truth discussed here is very modest. (…) The semantic theory of truth does not result in the antinomy of the liar if we use concepts restricted to a set of statements which does not include statements from the theory of truth which we are studying in a given case. It can be shown that the same applies to other parts of semantics, namely those in which the other semantic concepts (denoting, satisfying, etc.) are used [4], [5], [6].
To do this it suffices to analyse other antinomies constructed with the aid of semantic concepts, and to modify them in a manner analogous to that applied above in the case of the antinomy of the liar. The semantic concepts which we can use in semantic research without being involved in antinomies are relative (restricted). They have a certain reference to a type $L$ of expressions, which includes neither those semantic terms which have a reference to $L$, nor statements containing those semantic terms. Within those semantic analyses in which we use semantic concepts restricted to type $L$ of expressions we can construct, in accordance with general syntactic rules, an expression which can be proved not to be of type $L$. The proof consists in a reasoning which changes into an appropriate antinomy if the restrictive reference to $L$, applied to the semantic concepts used in that case, is disregarded."
Works cited:


Co-author: Zdzislaw Kraszewski.

English translation by Olgierd Wojtasiewicz of an article published in Polish in 1966.
"Russell's antinomy of the class of normal classes, i.e., the class of those classes which are not their own elements, emerged when the current concept of class was being given more precision. It is this current concept of class which is blamed for Russell's antinomy. The task of the present paper is to offer a fairly precise definition of the current concept of class, which has subsequently come to be split into the collective (concretistic) concept of class and the distributive (mathematical) concept of class or set. S. Lesniewski's mereology, to which T. Kotarbinski's concretism refers, is a theory of classes in the collective sense. The theory of classes in the distributive sense has taken the form of mathematical set theory, which originated with E. Zermelo; other versions of the theory of classes in the distributive sense are provided by B. Russell's type theory and S. Lesniewski's Ontology. After making the current concept of class more precise, which will consist in a systematization of the assumptions concerning that concept, we shall define normal and non-normal classes as well as the class
of normal classes and the class of non-normal classes. Several variations of these definitions are possible, and Russell's antinomy can be reconstructed in each case. We shall see, however, that his antinomy cannot be reconstructed in current language, since the corresponding reasonings do not yield a contradiction. The thesis of this paper is that the current concept of class, as described below, is not self-contradictory.


Co-author: Zdzislaw Kraszewski.

English translation by Oligierd Wojtasiewicz of an article published in Polish in 1968.

"We shall concern ourselves here with the transition from the current concept of class to the distributive (set-theoretical) and the collective (mereological) concept of class. This transition is linked to the concepts of normal and non-normal class. Preliminary remarks on that issue have already been made in Sec. 8.

We assume here a non-existential axiom system for the current concepts of class and element, as described in Secs. 2 and 3. Consequence and equivalence are interpreted, as before, as consequence and equivalence in the light of that axiom system."


Co-author: T. Weinfeld


"The great task of the theory of reification is to show in what way the so-called ontological assumptions of the structure of the universe of situations are transferred to events by reifications, and to impose an algebraic structure on them. Such an approach to the theory of reification flows from the earlier expressed opinion that situations are primary and events are derived. One should not confuse this point of view with the false opinion, I believe, that situations are primary in relation to all objects. It is an altogether different and difficult matter, and in this case a certain consultation of Wittgenstein would be very useful. But the fact that situations are primary in relation to their reification is rather natural. The abstract process, of which the formal expression is the reification of a situations, finds - I think - its fragmentary expression in ordinary language; I write 'I think' since I enter into the competence of linguists. These examples given by Slupecki are an illustration. Thus, forest fire = reification of the situation that the forest is burning, and Matt's death = reification of the situation that Matt died. These examples do not give evidence that an explicit symbol of the reification of situations, corresponding to the star of Slupecki of our T, exists in natural language. They are examples giving evidence that the grammatical apparatus of a natural language can often, though certainly not always, transform sentences \( p \) (describing situations) into names \( x \) (designating particular events) such that \( x = T(p) \), and sentences containing those names. The opposite transformation is something unnatural, and is hardly taken into consideration by grammarians.

This observation obviously does not remove the most serious difficulties which appear in connection with situations. The principal difficulty appears at the moment of incorporation of non-trivial theories written in natural language with help of (bound) sentence variables. Reading formulas appearing in this theory in natural language immediately raises serious doubts for many logicians with regard to sense or correctness. There are no such difficulties, or they are considerably less, in the reading of formulas with name variables (not sentential. It is probably the symptom of some deep, historical attribute of our thought and natural language, whose examination and explication will certainly be prolonged and arduous.

From the rather narrow point of view of formal logic the following considerations are suggested. The difference between a sentence and a name is not exhausted in their syntactical properties. A certain syntactic analogy even exists between the category of sentences and the category of names, which can stretch very far (for example the rules of operations for quantifiers are formally similar in the case of sentential and name variables). The difference between sentences and names appears first of all in that sentences, and not names, are subject to assertion, as well as that sentences are premises and conclusions in reasoning. These distinctions on the language level are transferred in some manner to that to which the sentences and names semantically refer. Semantical relation (reference), however, of sentences and names are also - formally - to a certain degree analogical.
Names designate and sentences describe. The difference in terminology (designate, describe) is not essential. The essential point is that we attribute reference to something both to names and to sentences, and that this, in the case of a given name and a given sentence, is exactly one; with the assumption, obviously, of a univocal sense of expression and with exclusion of mythological terms. This analogy, however, is not complete, just like the analogy between sentences and names, with result that a categorial gap exists between that which a sentence describes (a situation) and that which a name designates (an object). The fact that the expressions \( p = x \) and \( p \ x \), where on the left we have a sentence and on the right a name, are not well formed formulas, shows this profound gap. The analogies between situation and objects as well as that between sentences and names are not complete. But it does not stop at the level of the formation of sentences and names, not at the level of the formal operation on them in accordance with logic. What, therefore, is the cause that our thought and natural language discriminate sentence variables to a certain degree, and particularly, general and existential sentences about situations? The above considerations about the reification of situations show that the theory of situations and the theory of events are, in certain manner, equivalent. Why, therefore, prefer the theory of events to the theory of situations?" pp. 249-250.

STUDIES ABOUT THE WORK OF ROMAN SUSZKO


   "A sequent calculus S3 for Lukasiewicz's logic L3 is presented. The completeness theorem is proved relatively to a bivalent semantics equivalent to the nontruthfunctional bivalent semantics for L3 proposed by Suszko in 1975. A distinguishing property of the approach proposed here is that we are keeping the format of the classical sequent calculus as much as possible."


6. Caleiro, C., Carnielli, W., Coniglio, M.E., and Marcos, J. 2003. Suszko Thesis and Dyadic Semantics. Research report, CLC, Department of Mathematics, Instituto Superior Técnico, 1049-001 Lisboa, Portugal, 2003. Presented at III World Congress on Paraconsistency, Toulouse, France, July 28-31, 2003. "A well-known result by Wojcicki-Lindenbaum shows that any tarskian logic is many-valued, and another result by Suszko shows how to provide 2-valued semantics to these very same logics. This paper investigates the question of obtaining 2-valued semantics for many-valued logics, including paraconsistent logics, in the lines of the so-called "Suszko's Thesis". We set up the bases for developing a general algorithmic method to transform any truth-functional finite-valued semantics satisfying reasonable conditions into a computable quasi tabular 2-valued semantics, that we call dyadic. We also discuss how "Suszko's Thesis" relates to such a method, in the light of truth-functionality, while at the same time we reject an endorsement of Suszko's philosophical views about the misconception of many-valued logics."


   "The main results of the paper: Fregean deductive systems that either have the deduction theorem, or are protoalgebraic and have conjunction, are completely characterized. They are essentially the intermediate logics, possibly with additional connectives.
All the full matrix models of a protoalgebraic Fregean deductive system are Fregean, and, conversely, the deductive system determined by any class of Fregean 2nd-order matrices is Fregean. The latter result is used to construct an example of a protoalgebraic Fregean deductive system that is not strongly algebraizable.


"We show that there are continuum many different extensions of SCI [sentential calculus with identity] (the basic theory of non-Fregean propositional logic) that lie below WF (the Fregean extension) and are closed under substitution. Moreover, continuum many of them are independent from WB (the Boolean extension), continuum many lie above WB and are independent from WH (the Boolean extension with only two values for the equality relation), and only countably many lie between WH and WF."


"The paper concerns the intuitionistic sentential calculus with identity IISCID, mentioned by professor R Suszko in his several papers. The work presents a semantics for ISCI, which combines the ideas of the matrix semantics for sentential calculi with the well-known Kripke-Grzegorczyk for the intuitionistic logic. Besides sketching a proof of the strong completeness theorem for ISCI, there are some straightforward connections between the new semantical construction and the modeling of SCI, i.e., the ordinary calculus with identity. The end of the work deals with a simplified version of the frame-matrix semantics for the intuitionistic logic without sentential identity."


"Sentential calculus with identity /SCI/ has been created by Professor R Suszko. The discussion on SCI was a subject of many works. The intuitionistic weakening of this calculus /ISCI/ is presented in Psłukowski's "Intuitionistic sentential calculus with identity", Bulletin of the Section of Logic, 19, 3. In fact SCI is a classical propositional calculus with classical identity, while ISCI an intuitionistic propositional calculus with intuitionistic identity. Thus in the present paper two strengthenings of ISCI, i.e., intuitionistic propositional calculus with classical identity /ISCI CI/ and classical propositional calculus with intuitionistic identity /SCI II/ are considered. There are also presented adequate semantics for both calculi."


The aim of the paper "is to present Sentential Calculus with Identity in comparison with other formalizations of propositional identity."

"Final remarks. It is evident that any comparative question concerning the logic of propositional identity may be posed either in reference to a particular language or to a special feature of a formalisation. Among several current requirements the three following seem to be of it particular importance:

(1) Extensionality in the sense at Leibniz Law of indiscernibility of identicals.
(2) Formal character of identity: nothing except general properties such as e.g. reflexivity, symmetry or transitivity has either be assumed or proved
(3) Purely sentential character of formalisation: the language has to contain only sentential variables.

(...) If one agreed that all the properties (1)-(3) are basic for the logic of propositional identity, SCI would be
considered as the only genuine logic of this kind. [The property that logics of identity corresponding to
S4 and S5 proved to be axiomatic strengthenings of SCI, cf. [Bloom & Suszko 1972] and [Suszko 1971]
supports the conclusion.]

References
S. L. Bloom, R. Suszko, Investigations into the Sentential Calculus with Identity, Notre Dame Journal of


"On semantic principles of Frege and non-fregean definition of the concept of propositional identity. A
non-fregean realization of the semantic programme of G. Frege elaborated by R. Suszko is one of the
most interesting recent logical constructions. The aim of the paper is to present formal and philosophical
aspects of the sentential calculus with identity, SCI, constituting the base of that realization."


"According to Professor Suszko's declaration on page 169, the main subject of his paper is the
construction of non-Frégean logic (NFL) and its basic properties. To satisfy the reader's curiosity, we may
say that NFL is generally speaking a result of the rejection of the Fregean axiom. This amounts to the
following:

(FA) all true (and, similarly, all false) sentences describe the same, that is, have a common referent.

Before describing the content of the paper in some detail, we would like to draw the reader's attention to
the facts that (1) the paper is concerned with the philosophy of logical constructions and the properties
of logic but not with the proofs of theorems; (2) the paper is a survey in which the author presents his own
results as well as those of his colleagues. The presentation is against the broad background of the
historical development of modern logic and recent research in possible world semantics, modal logics,
intensionality and entailment, and all this is in order to strongly criticize 'that messy abyss with all its
diffuse ghosts of ambiguity, vague flexibility, intensionality and modality' (cf. p. 171).

The paper under review consists of an introduction, 14 main sections, a supplement and a bibliography.
The supplement contains 53 notes which provide us with deeper elaboration of some of the networks,
comments, complements, sketches of proofs, etc. presented earlier. The bibliography, also containing 53
items, is not arranged alphabetically but in order of their citation in the main text, and includes the titles
of almost all the important works by R. Suszko and his colleagues on non-Frégean logic - and in
particular, sentential calculus with identity."

Point of View of Philosophy and Methodology." In Essays on Philosophy and Logic. Proceedings of the
Xxxth Conference on the History of Logic, Dedicated to Roman Suszko. Cracow, October 19-21, 1984,

"Roman Suszko writes: "The semantical assumption that all true (and, similarly, all false) sentences
describe the same, i.e. have a common referent (Bedeutung) is called the Fregean Axiom" (Suszko 1977,
p. 377). He himself distinguishes in a strict way between logical and algebraic valuations of expressions
of languages and speaks of an amalgamation into an inseparable unity of logical valuations (truth and
falsity) end algebraic valuations (reference assignments) in Frege's thinking which he rejects (Suszko

From the point of view of the history of logic it is of interest to know something about the reasons why
Frege used this amalgamation of two kinds of valuations. The main theses of this talk are the following
(1) The amalgamation is based on epistemological assumptions.
(2) Analysing semantical aspects of his general scientific problem of the foundation of mathematics Frege
treated a similar subject as the two kinds of valuations, distinguishing referent (truth and falsity) and
sense ("Gedanke") of sentences.
(3) The difference between Frege's approach in solving his problem and other authors' approaches is
based on different epistemologies.
(4) Distinguishing between the two kinds of valuation of sentences is of interest not only with respect to
philosophical aspects of logic but also from the point of view of methodology." p. 167.

"The distinction between the two different dimensions of valuation of sentences or logical formulæ
claimed by Suszko seems to me relevant especially from the point of view of methodology but also for
the philosophical dispute over logic. For the second aspect the discussion of so called "paradoxes of


"In Roman Suszko's logical writings there are to be found many remarks and reflections on the idea of logic which is closely related to his work in formal logic. Though the scope of this paper makes it impossible to deal with them all, I would like nevertheless to draw the reader's attention to some of Suszko's views concerning the philosophy of logic. The aim of this study is to call the reader's attention to the most important of them."
"In this paper I intend to present the general and formal principles of non-Fregean semantics for sentences and to derive the simplest consequences of these principles. The semantic principles constitute foundation of non-Fregean sentential calculus and its formal semantics and the philosophical interpretations of it. Non-Fregean sentential calculus is the basic part of non-Fregean logic. Non-Fregean logic is a generalization of classical logic. It was conceived by Roman Suszko under the influence of Wittgenstein's Tractatus Logico-Philosophicus. The term "non-Fregean" indicates that the set of semantic correlate of sentences need not contain of just two elements, as it assumed by Frege in Über Sinn und Bedeutung (1892). Frege accepted the following semantic principle: (A.F.) all true sentences have the same common referent, and similarly all false sentences also have the one common referent.

J. Łukasiewicz interpreted the common referent of true sentences as "Being" and analogically the common referent of all false sentences as "Unbeing". Suszko called the principle (A.F) the "semantical version of the Frege an axiom".

In Abolition of the Fregean Axiom (1975) Suszko wrote: "If one accepts the Fregean Axiom then one is compelled to be an absolute monist in the sense that there exists only one and necessary fact". According to Suszko (A. F.) has a counterpart in the language of classical logic which is a formula asserting that the universe of sentential variables is a two-element set. This formula is not expressed that fact in the language of non-Fregean logic.

In SCI and modal systems (1972) Suszko presents the properties of his logic as follows: "... non-Fregean logic is the realization of the Fregean program in pure logic, logically bivalent and extensional with two modifications: (1) keep formulas (sentences) and terms (names) as disjoint syntactic categories, having sense and denotations,as well, and (2) drop the desperate assumption that all true or false sentences have the same denotation (not sense that is proposition)"." pp. 153-154.

"The theoretical foundation for this paper is the system of a non-Fregean logic created by Roman Suszko under the influence of Wittgenstein's Tractatus Logico-Philosophicus. In fact, we use just a fragment of it called here a non-Fregean sentential logic.

Our basic term is that of a 'situation'. We do not answer the question what situations are. We simply assume that sentences present situations, and we provide a criterion determining when two sentences of some fixed language present the same situation.

The lay-out of this paper is the following. First we set out certain philosophical consequences of the assumption adopted in classical logic that the only connectives of the language in question are the truth-functional ones. Then we sketch out briefly the axiomatics of non-Fregean sentential logic, and of a formal semantics of the algebraic type for it.

Next, for an arbitrary model for a non-Fregean sentential logic, we pick out from the formulae true in that model a theory to be called the 'ontology of situations determined by the model in question' - in contradistinction to all sentences holding contingently in that model, i.e. not determined by its algebra. In the ontology of situations determined by a model we point out those propositions which pertain to possible worlds." p. 173

3. Philosophical Interpretations of non-Fregean Sentential Logic

According to the principles of non-Fregean semantics as presented in Omyla 1975, all sentences of an interpreted language have their references. However, not in every such language are we in a position to put forward universal and existential theorems with regard to the structure of the universe of those references. To be in such position the language in question must contain as its sublanguage the language of non-Fregean sentential logic, or at least a significant part of it. As we are not interested here in the universe of any particular language, but only in that of a quite arbitrary one, let us consider now some philosophical aspects of arbitrary models of that kind. Let M = (U, F) be such a model. The elements of the universe of U do not generally answer to the intuitions we have about the reference of sentences, and about situations in particular. However, the algebraic structure imposed on U by the theory TR(M) is the same as that of a possible universe of situations, with regard to the operations corresponding to logical
constants. Moreover, the set F has the formal properties of a possible (or 'admissible') set of situations obtaining in that universe. This is so because sentential variables are at the same time sentential formulae, and because the logical constants get in the model M their intended interpretation. Thus for any model M = (U, F) its algebra U is a formal representation of some universe of situations, and the set F is a formal representation of some admissible set of facts obtaining in some universe of situations. Not all the generalized SCI-algebras represent some algebra of situations; for not all of them contain a set F representing the facts, i.e. such that the couple (U, F) is a model. This depends on how the operations in the algebra U are defined. For the sake of simplicity the algebra of any model M = (U, F) for the language of a non-Fregean sentential logic will be called the algebra of situations occurring in the model M, and the designated set F will be called the set of facts obtaining in M. Such a terminology is appropriate here for we are interested only in the formal properties of those universe of situations which in view of our semantic principles find expression in the logical syntax of the language in question, and in consequence operation holding in it. By the completeness theorem for non-Fregean logic it follows that for any consistent theory T in L there is a model M such that T e TR(M). Hence any theory in the language of non-Fregean sentential logic will be called a theory of situations.

The term 'ontology of situations' we take over from the title of Wolniewicz 1985 [Ontologia sytuacji: Ontology of situations in Polish], but we understand it a bit differently. By an ontology of situations we mean a theory describing the necessary facts of universe of situations fixed beforehand. I.e. an ontology of situations is a set of formulae holding in some fixed universe of situations, independently of which situations there are facts. To be more accurate, by an ontology of situations we mean a set of formulae with the following three properties:

(1) An ontology of situations is a theory having in its vocabulary just one kind of variable - e. the sentential one. Under the intended interpretation they range over a universe of situations. (Like in modern set theory there are variables of just one kind, i.e. those ranging over sets.)

(2) An ontology of situations is formulated in a language containing logical symbols only, i.e. logical constants and variables. To justify that postulate let us note that such a basic theory should not presuppose any other terminology except the logical one. At most it might adopt some specific ontological terms as primitive, characterizing them axiomatically. However, we shall deal here only with such ontologies of situations which are expressed exclusively in logical terms.” pp. 180-181.


"The term "possible world" is used usually in the metalanguage of modal logic, and it is applied to the interpretation of modal connectives. Surprisingly, as it has been shown in Suszko Ontology in the Tractatus L. Wittgenstein (1968) certain versions of that notion can be defined in the language of non-Fregean logic exclusively, by means of sentential variables and logical constants. This is so, because some of the non-Fregean theories contain theories of modality, as shown in Suszko Identity Connective and Modality (1971).

Intuitively, possible worlds are maximal (with respect to an order of situations) and consistent situations, while the real world may be understand as a situation, which is a possible world and the fact. Non-Fregean theories are theories based on the non-Fregean logic. Non-Fregean logic is the logical calculus created by Polish logican Roman Suszko in the sixties. The idea of that calculus was conceived under the influence of Wittgenstein's Tractatus. According to Wittgenstein, declarative sentences of any language describe situations."


"This paper gives a semantical account for the (i) ordinary propositional calculus, enriched with quantifiers binding variables standing for sentences, and with an identity-function with sentences as arguments; (ii) the ordinary theory of quantification applied to the special quantifier; and (iii) ordinary laws of identity applied to the special function. The account includes some thoughts of Roman Suszko as well as some thoughts of Wittgenstein's *Tractatus."


"Suszko's thesis maintains that many-valued logics do not exist at all. In order to support it, R. Suszko offered a method for providing any "structural" abstract logic with a complete set of bivaluations. G. Malinowski challenged Suszko's thesis by constructing a new class of logics (called "q"-logics by him) for which Suszko's method fails. He argued that the key for logical two-valuedness was the "bivalent" partition of the Lindenbaum bundle associated with all structural abstract logics, while his "q"-logics were generated by "trivalent" matrices. This paper will show that contrary to these intuitions, logical two-valuedness has more to do with the geometrical properties of the deduction relation of a logical structure than with the algebraic properties embedded on it."


"We use here the notions and results from algebraic theory of programs in order to give a new proof of the decidability theorem for Suszko logic SCI (Theorem 3). We generalize the method used in the proof of that theorem in order to prove a more general fact that any prepositional logic which admits a cut-free Gentzen type formalization is decidable (Theorem 6). We establish also the relationship between the Suszko Logic SCI, one-to-one Gentzen type formalizations and deterministic and algorithmic regular languages (Remark 2 and Theorem 7, respectively)."


"This paper examines how the work of Frege was known and received in Poland in the period 1910-1935 (with one exception concerning the later work of Suszko). The main thesis is that Frege's reception in Poland was perhaps faster and deeper than in other countries, except England, due to works of Russell and Jourdain. The works of Lukasiewicz, Lesniewski and Czezowski are described."


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