

Complete and Annotated Bibliography of Nino Cocchiarella

Index of the Section: "The Rediscovery of Ontology in Contemporary Thought"

- [Table of Formal and Descriptivists Ontologists](#) (PDF - from Bernard Bolzano to present time)
- [Ontologists of the 19th and 20th Centuries](#) (a selection of critical judgments about some of the greatest philosophers of the recent past)
- [Living Ontologists](#) (a list of authors with an interest in ontology, with synthetic Bibliographies)

The Conceptual Realism of Nino Cocchiarella

ESSAYS

1. A Logic of Actual and Possible Objects. *Journal of Symbolic Logic* 31, 688 1966.
2. A Completeness Theorem for Tense Logic. *Journal of Symbolic Logic* 31, 689 1966.
3. Modality within Tense Logic. *Journal of Symbolic Logic* 31, 690 1966.

Notes: Note to the reprint of these three items in *Philosophical Applications of Free Logic*, J. Karel Lambert, ed., Oxford University Press, Oxford, 1991): "The abstracts are summaries of lectures given at the December, 1965 meetings of the Association for Symbolic Logic.

(A preliminary version of those lectures was given at UCLA in 1963, and a final version was given at UCLA in the spring of 1965 at a public lecture constituting the defense of my doctoral dissertation.)"

4. "Some Remarks on Second Order Logic with Existence Attributes," *Noûs* 2: 176-175 (1968).
 "In *Past, Present and Future* A. N. Prior has suggested an approach towards the concept of existence where, following medieval logicians, we are to distinguish "between predicates (like 'is red', 'is hard', etc.) which entail existence, and predicates (like 'is thought to be red', 'is thought of', etc.) which do not" (p. 161). Let us refer to attributes (including relational attributes) which are designated by the former kind of predicate as existence attributes, or for brevity, e-attributes. It is suggested then that "x exists" is to be defined as "there is some e-attribute which x possesses". A formalization of this (at least) second order logic of existence was recently brought about and reported on by the present author in [6]. The formalization was shown to be complete in the sense corresponding to the completeness of standard second order logic, i.e. in the sense which encompasses normal, non-standard as well standard models. (Cfr. A. Church - *Introduction to mathematical logic* (1956) - 54). I should like in the present paper to discuss some of the philosophical issues involved in this formalization as well as some issues concerning the general notion of e-attribute."
5. "A Substitution Free Axiom Set for Second Order Logic," *Notre Dame Journal of Formal Logic* 10: 18-30 (1969).
 "In contrast with the usual characterization of standard second order logic, an axiomatic formulation is presented which is free of the notion of proper substitution of either a term for an individual variable or a formula for a predicate variable. Aside from its obvious benefit of utilizing fewer metalogical notions, such an axiomatization is desirable in that it allows for unqualified

extensions of standard second order logic to tense, epistemic, modal and suchlike logics. As is well known, proper substitution is the most troublesome notion in these areas."

6. "A Second Order Logic of Existence," *Journal of Symbolic Logic* 34: 57-69 (1969).
 "Some attributes, called e-attributes, entail existence (i.e., they cannot be possessed except by existing objects), others do not - e.g., those relating objects whose "life-spans" do not overlap or those relating objects some of which have only "intentional inexistence" with persons who stand to these latter in various cognitive attitudes. The distinction is formalized by distinguishing quantification over attributes in general from quantification over e-attributes. Individual variables have "possibilia" as values and are bindable by a quantifier ranging over such. We define 'x exists' as 'x possesses some e-attribute(s), thus rendering existence essentially impredicative. A semantics is provided along with a substitution free axiom set which is shown to be complete in a secondary sense similar to that in which standard second order logic is complete."
7. "Existence Entailing Attributes, Modes of Copulation, and Modes of Being in Second Order Logic," *Noûs* 3: 33-48 (1969).
 "The existent is ontologically grounded in its possession of existence entailing attributes (e-attributes). Thus, existence, being analyzed in terms of a totality of attributes to which it belongs, is rendered essentially impredicative. The ontological ground of the non-existent does not reside merely in its non-possession of e-attributes but rather positively in its possession of non-e-attributes. Modes of being are generated from the basic mode of existence as affected by corresponding modes of copulation. Quine's dictum is accepted in modified form: to be of a given mode of being is to be the value of a nominal variable bound by a quantifier comprehending that mode of being."
8. "A Completeness Theorem in Second Order Modal Logic\," *Theoria. A Swedish Journal of Philosophy* 35: 81-103 (1969).
 "Both a semantics and a complete (in a secondary sense) substitution free axiom set for this semantics are presented for S5. (both are applicable under obvious changes to all modal systems between S4 and S5, inclusively, as well as to tense logic.) The basic semantical structures are world systems or indexed sets of possible worlds. At each index (reference point) there is associated a set of objects existing at that index, the set of possibilia (which are objects existing at some index or other) and a relevant type of extension drawn from the possibilia for each descriptive constant. n-ary attributes are functions which assign to each reference point a set of n-tuples of possibilia. Existence is analyzed through e-attributes which are attributes the extension of which at any reference point is drawn exclusively from among the objects existing at that reference point."
9. "Properties as Individuals in Formal Ontology," *Noûs* 6: 165-187 (1972).
 "The original ontological context behind Russell's supposed paradox of predication is syntactically represented by a system T which is an extension of second order logic in which predicate variables are allowable substituends of individual variables. Russell's argument fails to generate a paradox but does generate the oddity that there are indiscernible properties that are not co-extensive. Several ways of responding to this oddity are discussed, one utilizing the predicative-impredicative distinction, another in terms of an ontology which denies the existence of complex properties, and another in which identity is syncategorematic. Finally, a Fregean ontology is described which yields a completeness theorem and Russell's argument is seen to result in merely a variant of Cantor's theorem, thus explaining the oddity of T."
10. Whither Russell's Paradox of Predication? In *Logic and Ontology*. Edited by Munitz Milton K. New York University Press: 1973. pp. 133-158
 Contributions to a seminar on ontology held under the auspices of the New York University Institute of Philosophy for the year 1970-1971.

"Russell's paradox has two forms or versions, one in regard to the class of all classes that are not members of themselves, the other in regard to "the predicate: to be a predicate that cannot be predicated of itself". The first version is formulable in the ideography of Frege's Grundgesetze der

Arithmetik and shows this system to be inconsistent. The second version, however, is not formulable in this ideography, as Frege himself pointed out in his reply to Russell. Nevertheless, it is essentially the second version of his paradox that leads Russell to avoid it (and others of its ilk) through its theory of types.(...) Apparently, Russell saw his paradox as generating an aporetic situation in regard to two fundamental "notions", namely, the notion of membership (in a class) and the notion of predication (of an attribute). In regard to the notion of membership, the application of Russell's paradox is not here brought into question. However, in regard to the notion of predication, the applicability of the reasoning grounding Russell's paradox will here be very much brought into question. Indeed, I shall claim that in this case the paradox fails."

11. "Fregean Semantics for a Realist Ontology," *Notre Dame Journal of Formal Logic* 15: 552-568 (1974).
 "An extension of second order logic is formalized in which predicate variables are allowed to be substituends of individual variables. The formalized system is proposed as a syntactical representative of the realistic ontology which is the background of Russell's paradox of predication. Russell's argument fails to generate a contradiction but does yield the result that there are indiscernible properties that are not co-extensive. This result is seen to be but a variant of Cantor's theorem in a Fregean interpretation which construes a predicate in subject position as referring to an individual object correlated with the property designated by the same predicate in a predicate position. The Fregean interpretation yields a completeness theorem for the formalized realistic ontology. Thus not only does Russell's argument fail to generate a paradox but under a Fregean interpretation it is seen to result in merely a variant of Cantor's theorem."
12. Formal Ontology and the Foundations of Mathematics. In *Bertrand Russell's Philosophy*. Edited by Nakhnikian George. London: Duckworth 1974. pp. 29-46
 "In his paper, *The Undefinability of the Set of Natural Numbers in the Ramified Principia*, Myhill has shown that the general concept of a natural number or finite cardinal - general enough, that is, to yield the induction schema - is not definable in terms of ramified type theory in essentially its original form and without the axiom of reducibility. In my commentary I shall examine Myhill's concluding philosophical remarks within the context of general metaphysics or what below I call formal ontology. I shall especially be concerned with the sense in which ramified type theory (without the axiom of reducibility) purports to represent a constructive philosophy of mathematics. In addition, I shall sketch several forms of realism according to which the claim that "impredicativity is present in mathematics from the beginning" is true in an especially apt and interesting sense that goes beyond that intended by Myhill."
13. "Logical Atomism and Modal Logic," *Philosophia.Philosophical Quarterly of Israel* 4: 41-66 (1974).
 "A propositional logic with modal operators for logical necessity and possibility is formulated as a formal ontology for logical atoms (with negative facts). It is shown that such modal operators represent purely formal, internal 'properties' of propositions if and only if the notion of 'all possible worlds' has its standard and not the secondary interpretation which it is usually given (as, e.g., in Kripke model-structures). Allowing arbitrary restrictions on the notion of 'all possible worlds', at least in such a framework as logical atomism, generates internal 'properties' of propositions with material instead of purely formal content."
14. La Semantica della Logica del Tempo. In *La Logica del Tempo*. Edited by Pizzi Claudio. Torino: Boringhieri 1974. pp. 318-347
 talian translation of the third chapter of the unpublished Ph. D. Thesis: *Tense Logic: A Study of Temporal Reference* (University of California - Los Angeles, January 7, 1966).
15. "A New Formulation of Predicative Second Order Logic," *Logique et Analyse* 65-66: 61-87 (1974).
 "In the system formulated bound predicate variables range only over predicatively specifiable properties and relations whereas free predicate variables, and constants as well, are allowed to represent properties in general, whether predicatively specifiable or not. This situation is analogous to first order model logics where bound individual variables range only over the objects existing at

the reference point or possible world in question whereas free individual variables, and constants as well, are allowed to refer to "possibilia". The second order logic differs from standard versions of predicative second order logic especially in ways pertaining to the substitutional role of free predicate variables."

16. "On the Primary and Secondary Semantics of Logical Necessity," *Journal of Philosophical Logic* 4: 13-27 (1975).

"Logical necessity in its primary semantics pertains to all the possible worlds of a logical space while in its secondary semantics it pertains only to all the worlds in a specified subset of worlds of that space. It is shown that this possible exclusion of some of the worlds of a logical space induces a subtle form of material content into the semantics of logical necessity. E.g., modal monadic predicate logic is decidable in its primary and undecidable in its secondary semantics because the latter, but not the former, generates genuine relational content (for the representation of infinity). The same argument shows standard second order monadic predicate logic to be undecidable in its corresponding secondary semantics."

17. "Second Order Theories of Predication: Old and New Foundations," *Noûs* 9: 33-53 (1975).

"Two general types of second order theories of predication are distinguished according to whether properties and relations (1) have an "individual" as well as a "predicative" nature or (2) have only a predicative nature which excludes their being logical subjects of predication in any sense which is logically similar to that in which individuals are. Typical ambiguity in simple type theory, ST, indicates that ST is really a second order theory of the first group, and a second order system ST which is equi-consistent with ST is described and compared with Quine's system NF as a first order counterpart to ST. Another second order theory, T*, also belonging to the first group is compared with ST. A formulation of the property/class/set distinction shows that every class is a set in ST, though not in T*, and that with an extensionality principle properties can be identified with classes in either system. Both theories, however, are amenable to a Fregean interpretation of subject-position occurrences of predicates as denoting concept-correlates (individuals) rather than concepts (properties) and thereby lead to two Fregean alternatives belonging to group (2)."

18. "Logical Atomism, Nominalism, and Modal Logic," *Synthese* 31: 23-62 (1975).

"While operators for logical necessity and possibility represent "internal" conditions of propositions (or of their corresponding states of affairs), these conditions will be "formal", as is required by logical atomism, and not "material" in content if from the (pseudo) semantical point of view the modal operators range over "all the possible worlds" of a logical space rather than over arbitrary non-empty sets of worlds (as is usually done in modal logic). Some of the implications of this requirement are noted and though several variants of realist logical atomism are distinguished and discussed, the theory of logical form developed is nominalist. Many of nominalism's difficulties and inadequacies become transparent in the context of logical atomism and are so noted."

19. "A Second Order Logic of Variable-Binding Operators," *Reports on Mathematical Logic* 5: 13-18 (1975).

"Second-order logic is extended so as to include both variables and quantifiers for variable-binding formula operators. A set theoretic semantics and completeness theorem is established with respect to general models. Logico-philosophical motivation for construction of the system is provided in terms of Frege's assumption that second-level concepts (represented by variable-binding operators) are reducible to first-level concepts and their extensions. It was this assumption that led Frege to his ill-fated basic law V which Russell showed to be inconsistent. Rejection of the assumption in the Fregean context involves returning to second-level concepts as an unreduced quantifiable category."

20. "A Note on the Definition of Identity in Quine's New Foundations," *Zeitschrift für Mathematische Logik und Grundlagen der Mathematik* 22: 195-197 (1976).

21. "On the Logic of Natural Kinds," *Philosophy of Science* 43: 202-222 (1976).

"A minimal second order modal logic of natural kinds is formulated. Concepts are distinguished from properties and relations in the conceptual-logistic background of the logic through a distinction between free and bound predicate variables. Not all concepts (as indicated by free

predicate variables) need have a property or relation corresponding to them (as values of bound predicate variables). Issues pertaining to identity and existence as impredicative concepts are examined and an analysis of mass terms as nominalized predicates for kinds of stuff is proposed. The minimal logic is extendible through a summum genus, an infima species or a partition principle for natural kinds.

A standard objection to quantified modal logic is that it breeds such reptiles of the mind as Aristotelian essentialism, "the doctrine that some of the attributes of a thing (quite independently of the language in which the thing is referred to, if at all) may be essential to the thing, and others accidental" (Quine, *Three Grades of Modal Involvement* (1953) reprinted in *Ways of Paradox* (1966), p. 156-174). This objection has been criticized on one front by pointing out that none of the standard systems of quantified modal logic commit us to more than the meaningfulness of the non-trivial versions of the doctrine and that indeed we can, if we so choose, actually deny such versions in these systems (cf. T. Parsons *Essentialism and Quantified Logic*, (1969) in *Philosophical Review* p. 35-52). A more heroic response, however, accepts these versions of the doctrine, at least when properly stated, and finds quantified modal logic the appropriate medium for its formulation. In what follows I shall attempt to formulate one such response, at least for the purpose of clarifying the general sort of logistic framework it presupposes if not also for exposing some of the more fascinating serpents that breed therein."

22. "Sortals, Natural Kinds and Re-Identification," *Logique et Analyse* 80: 439-474 (1977).

Reprinted in Lennart Aqvist and Franz Guenther (eds.) - *Tense Logic*, Louvain, Nauwelaerts, 1978.

"This paper focuses on the confrontation in our common sense and scientific frameworks between (1) ontology and individuation in the context of a theory of natural kinds and (2) our conceptual devices for quantifying, identifying, and classifying things. It assumes that there are different stages of conceptual involvement in our common sense and scientific frameworks and investigates a stage at which sortal quantifiers and sortal identity are taken to be conceptually prior to absolute quantifiers and absolute identity and where the problem of cross-world and temporal re-identification of things is to be resolved in sortal terms. Only two minimal theses for re-identification through tense-logical and causal contexts are found to be valid on purely conceptual grounds; and while several other stronger theses are not found to be valid on purely conceptual grounds, their validity on ontological and methodological grounds is defended when the sortals in question serve to identify things belonging to a natural kind."

23. "On the Logic of Nominalized Predicates and Its Philosophical Interpretations," *Erkenntnis* 13: 339-369 (1978).

"By extending the well-formedness conditions for the wffs of standard second order logic so as to allow for the occurrence of nominalized predicates, a number of different logics for nominalized predicates are described and associated with different traditional philosophical theories of universals. E.g., since for the Platonist universals are individuals (in the logical sense), the Platonist takes a nominalized predicate to refer as a singular term to the same universal designated by that predicate in predicate position, i.e., when used predicatively. Universals are unsaturated entities for a Fregean, however, and not individuals; and so the Fregean, who retains the framework of standard second order logic takes a nominalized predicate to refer to an object correlated with the universal designated by that predicate. Abailardians resemble Fregeans but differ in their interpretation of subject position quantifiers insofar as nominalized predicates do not refer at all as singular terms; and nominalists, who interpret predicate quantifiers substitutionally, resemble Abailardians but with an additional restriction regarding quantification into predicate positions."

24. "The Theory of Homogeneous Simple Types as a Second Order Logic," *Notre Dame Journal of Formal Logic* 3: 505-524 (1979).

"As a counterpart of the theory of simple types, ST, Quine's NF eliminates the type distinctions of ST in favor of a first order theory of membership with a stratified comprehension principle for sets.

An alternative procedure is to eliminate only the type distinctions between predicates but not also that between individual and predicate expressions, though predicates can occupy subject as well as predicate positions (the way they do in ST). The stratified comprehension principle now is for predicable concepts and the result, ST, is a theory of predication rather than of membership. It is shown that while NF far exceeds ST in deductive powers, it is equiconsistent with ST; and with an extensionality axiom for predicable concepts, ST+ (EXT) contains Jensen's NFU. Adding to ST+ (EXT) an axiom to the effect that every individual is a predicable concept results in a system equiconsistent with NF."

25. "Nominalism and Conceptualism as Predicative Second Order Theories of Predication," *Notre Dame Journal of Formal Logic* 21: 481-500 (1980).
 "A model-theoretic semantics for nominalism is formulated and shown to be complete with respect to standard predicative second order logic. The models are the same as those for first-order logic and (n-place) predicate quantifiers are interpreted substitutionally with open first order formulas (of degree n) as their substituends. A formal comparison and contrast is then made with a nonstandard predicative second order logic formulated by the author in an earlier paper as a representation of a constructive conceptualism where predicate quantifiers are interpreted referentially regarding concepts as cognitive capacities for classifying, characterizing relating objects in various ways."
26. "The Development of the Theory of Logical Types and the Notion of a Logical Subject in Russell's Early Philosophy," *Synthese* 45: 71-115 (1980).
 "Russell's involuted path in the development of his theory of logical types from 1903 to 1910-13 is examined and explained in terms of the development in his early philosophy of the notion of a logical subject vis-a-vis the problem of the one and many; i.e., the problem for Russell, first, of a class-as-one as a logical subject as opposed to a class as many, and, secondly, of a propositional function as a single and separate logical subject as opposed to existing only in the many propositions that are its values."
27. Richard Montague and the Logical Analysis of Language. In *Contemporary Philosophy: A New Survey. Vol. 2, Philosophy of Language*. Edited by Fløistad Guttorm. The Hague: Martinus Nijhoff 1981. pp. 113-155
 "Richard Montague was an exceptionally gifted logician who made important contributions in every field of inquiry upon which he wrote. His professional career was not only marked with brilliance and insight but it has become a classic example of the changing and developing philosophical views of logicians in general, especially during the 1960's and 70's in regard to the form and content of natural language. We shall, in what follows, attempt to characterize the general pattern of that development at least to the extent that it is exemplified in the articles Montague wrote during the period in question."
28. "Meinong Reconstructed versus Early Russell Reconstructed," *Journal of Philosophical Logic* 11: 183-214 (1982).
 "A reconstruction of Bertrand Russell's pre-1905 theory of nonexisting individuals is contrasted with Terry Parsons' reconstruction of Meinong's theory in his book *Nonexistent objects*. Meinongian objects, complete and incomplete, possible and impossible, are shown to be parasitic upon Russellian individuals, and Meinong's distinction between nuclear and extra-nuclear properties and relations is explained in terms of the distinction between those properties and relations which can hold only of existing individuals and those which can hold of nonexisting individuals as well."
29. Philosophical Perspectives on Quantification in Tense and Modal Logic. In *Handbook of Philosophical Logic. Vol. 2. Extensions of Classical Logic*. Edited by Gabbay Dov and Guenther Franz. Dordrecht: Reidel 1983. pp. 309-353
 "Predication has been a central, if not the central, issue in philosophy since at least the time of Plato and Aristotle. Different theories of predication have in fact been the basis of a number of philosophical controversies in both metaphysics and epistemology, not the least of which is the problem of universals. In what follows we shall be concerned with what traditionally have been the three most important types of theories of universals, namely, nominalism, conceptualism, and

realism, and with the theories of predication which these theories might be said to determine or characterize.

Though each of these three types of theories of universals may be said have many variants, we shall ignore their differences here to the extent at they do not characterize different theories of predication. This will apply especially to nominalism where but one formal theory of predication is involved. In both conceptualism and realism, however, the different variants of each type do not all agree and form two distinct subtypes each with its own theory of predication. For this reason we shall distinguish between a constructive and a holistic form of conceptualism on the one hand and a natural realism on the other. Constructive conceptualism, as we shall see, has affinities with nominalism with which it is sometimes confused, and holistic conceptualism has affinities with logical realism with which it is also sometimes confused. Both forms of conceptualism may assume some form of natural realism as their causal ground; and natural realism in turn must presuppose some form of conceptualism as its background theory of predication. Both forms of realism may be further divided into their essentialist and non-essentialist variants (and in logical realism even a form of anti-essentialism), and though an essentialist logical realism is sometimes confused with Aristotelianism, the latter is really a form of natural realism with natural kinds as the only essential properties objects can have."

INDEX OF THE PARAGRAPHS:

1. Predication and the problem of universals
2. Nominalism
3. A nominalistic semantics for predicative second order logic
4. Nominalism and modal logic
5. Conceptualism vs. nominalism
6. Constructive conceptualism
7. Ramification of constructive conceptualism
8. Holistic conceptualism
9. Logical realism vs holistic conceptualism
10. Possibilism and actualism in modal logical realism
11. Logical realism and essentialism
12. Possibilism and actualism within conceptualism
13. Natural realism and conceptualism
14. Aristotelian essentialism and the logic of natural kinds

References

30. "Two Λ -Extensions of the Theory of Homogeneous Simple Types as a Second Order Logic," *Notre Dame Journal of Formal Logic* 26: 377-407 (1985).

"Two second order logics with λ -abstracts are formulated as counterparts to the theory of homogeneous simple types. Predicates can be nominalized and occur as abstract singular terms in these logics so that self-predication is meaningful in general and, in certain special cases, even provable. Extensional and intensional Fregean semantics in which nominalized predicates are assigned individuals as concept-correlates are formulated and the extensional and intensional versions of these logics are shown to be complete with respect to their corresponding semantics. The logics are also shown to be consistent relative to weak Zermelo set theory.

"In the theory of simple logical types as originally conceived, it is meaningless for one predicate expression to occur in one of the subject or argument positions of another unless the latter is assigned a higher logical type than the former within the grammar of the object language; and therefore it is meaningless in particular for any predicate expression to apply to itself, i.e., to occur in one of its own subject positions. Russell's paradox of predication is thereby avoided, of course, but the price is high, for the resulting theory is not an accurate representation of the role of predicates in natural language where predicate expressions can apply not only to the nominalizations of other predicates but to their own nominalizations as well -- and without regard at

all for the notion of a logical type. In the theory of logical types as a second-order logic, on the other hand, predicate expressions are typed within the grammar of the object language only in the way they are typed in standard second-order logic, i.e., only with respect to their degree or number of subject positions, and they are allowed otherwise to meaningfully occur in the subject or argument positions of other predicates, and of themselves as well, without regard to the notion of a logical type. Russell's paradox of predication can be avoided, it turns out, not by resorting to the notion of a logical type as a part of the grammar of the object language but rather only as a part of the metalinguistic description of the conditions under which properties and relations are to be posited by means of the grammar of the object language. The difference is crucial, needless to say, since it allows for a more accurate representation of the role of predicates and predication in natural language. The resulting theory is not, to be sure, a second-order logic in the "standard" sense used today (though it does contain the latter), but it is a second-order logic in the traditional or pre-type-theoretical sense in which quantifier expressions are allowed to reach into both subject and predicate positions without obliterating the logical and conceptually important distinctions between the two."

INDEX OF THE PARAGRAPHS:

0. Introduction

1. HST* revisited

2. An improved axiom set for HST*

3. The grammar of HST* with λ -abstracts

4. The system λ HST*

5. The system HST* λ

6. An extensional Fregean semantics for nominalized predicates

7. The relative consistency of HST* λ + (Ext*) to λ HST* + (Ext*)

8. An intensional Fregean semantics for nominalized predicates

9. Identity versus indiscernibility in HST* λ

31. "Frege's Double Correlation Thesis and Quine's Set Theories NF and ML," *Journal of Philosophical Logic* 14: 1-39 (1985).

"Frege's form of logicism (where classes have their being in the concepts whose extensions they are rather than in the objects that belong to them) is defended and reconstructed as a second order logic with nominalized predicates (as singular terms). Two consistent reconstructions are given; one by modifying Frege's correlation of first level concept and relations with second level concepts and relations (by dropping unequal leveled relations); the other by modifying the correlation of extensions (as the referents of nominalized predicates) with first level concepts. The two reconstructions are shown to be similar to Quine's set theories NF and ML when the latter are modified to include Ur-elements (as non-sets)."

32. Frege, Russell and Logicism: A Logical Reconstruction. In *Frege Synthesized: Essays on the Philosophical and Foundational Work of Gottlob Frege*. Edited by Haaparanta Leila and Hintikka Jaakko. Dordrecht: Reidel 1986. pp. 197-252

"A logical reconstruction of Frege's and Russell's early (pre-1905) forms of logicism is given on the basis of their writings and their 1903-04 correspondence with one another. The reconstruction describes two second order logics with nominalized predicates as abstract singular terms, both of which are consistent relative to weak Zermelo set theory. The differences between Russell's and Frege's forms of logicism are described mainly in terms of what each took nominalized predicates to denote and of their respective view of the principle of extensionality."

33. "Conceptualism, Ramified Logic, and Nominalized Predicates," *Topoi. An International Review of Philosophy* 5: 75-87 (1986).

"A ramified second order logic is formulated for constructive conceptualism and compared with standard ramified second order logic and under its nominalistic or substitutional interpretation. The logic is also extended to include nominalized predicates as abstract singular terms, but without the

grammatical restrictions of third and higher order logic. Holistic conceptualism is described as an extension of constructive conceptualism that is based on an idealized transition to a limit of the different stages of concept-formation characterized by the ramified conceptualist comprehension principle."

34. Rigid Designation. In *Encyclopedic Dictionary of Semiotics. Vol. 2*. Edited by Sebeok Thomas A. Berlin: Mouton de Gruyter 1987. pp. 834
35. Russell, Bertrand. In *Encyclopedic Dictionary of Semiotics. Vol. 2*. Edited by Sebeok Thomas A. Berlin: Mouton de Gruyter 1987. pp. 840-841
36. "Predication Versus Membership in the Distinction between Logic as Language and Logic as Calculus," *Synthese* 75: 37-72 (1988).

"Two types of framework are distinguished regarding the nature of logic and the logical analysis of language: one in which logical forms are semantic structures in their own right when they are viewed as based on a formal theory of predication representing a theory of universals, and the other in which logical forms have only an external semantics given through a set-theoretic model theory. It is argued that the first type of framework gives a more adequate analysis of natural language than the second. Moreover, because the second provides only an extrinsic characterization of validity for the first, it cannot be used to show the first to be semantically incomplete and therefore inadequate as a foundation for logic."

FROM INTRODUCTION:

"There are two major doctrines regarding the nature of logic today. The first is the view of logic as the laws of valid inference, or logic as Calculus. This view began with Aristotle's theory of the syllogism, or syllogistic logic, and in time evolved first into Boole's algebra of logic and then into quantificational logic. On this view, logic is an abstract calculus capable of various interpretations over domains of varying cardinality. Because these interpretations are given in terms of a set-theoretic semantics where one can vary the universe at will and consider the effect this, has on the validity of formulas, this view is sometimes described as the set-theoretic approach to logic (see van Heijenoort "Logic as Language and Logic as Calculus" *Synthese* 17, 1967, p. 327).

The second view of logic does not eschew set-theoretic semantics, it should be noted, and it may in fact utilize such a semantics as a guide in the determination of validity. But to use such a semantics as a guide, on this view, is not the same as to take that semantics as an essential characterization of validity. Indeed, unlike the view of logic as calculus, this view of logic rejects the claim that a set-theoretic definition of validity has anything other than an extrinsic significance that may be exploited for certain purposes (such as proving a completeness theorem). Instead, on this view, logic has content in its own right and validity is determined by what are called the laws of logic, which may be stated either as principles or as rules. Because one of the goals of this view is a specification of the basic laws of logic from which the others may be derived. this view is sometimes called the axiomatic approach to logic."

FROM THE CONCLUDING REMARKS:

"The account we have given here of the view of logic as language should not be taken as a rejection of the set-theoretical approach or as defense of the metaphysics of possibilist logical realism. Rather, our view is that there are really two types of conceptual framework corresponding to our two doctrines of the nature of logic. The first type of framework is based on membership in the sense of the iterative concept of set; although extensionality is its most natural context (since sets have their being in their members), it may nevertheless be extended to include intensional contexts by way of a theory of senses (as in Montague's sense-denotation intensional logic). The second type of framework is based on predication, and in particular developments it is associated with one or another theory of universals. Extensionality is not the most natural context in this theory, but where it does hold and extensions are posited, the extensions are classes in the logical and not in the

mathematical sense.

Russell's paradox, as we have explained, has no real bearing on set-formation in a theory of membership based on the iterative concept of set, but it does bear directly on concept-formation or the positing of universals in a theory based on predication. As a result, our second type of framework has usually been thought to be incoherent or philosophically bankrupt, leaving us with the set-theoretical approach as, the only viable alternative. This is why so much of analytic philosophy in the 20th Century has been dominated by the set-theoretical approach. Set theory, after all, does seem to serve the purposes of a *mathesis universalis*.

What is adequate as a *mathesis universalis*, however, need not also therefore be adequate as a *lingua philosophica* or *characteristica universalis*. In particular, the set-theoretic approach does not seem to provide a philosophically satisfying semantics for natural language; this is because it is predication and not membership that is fundamental to natural language. An adequate semantics for natural language, in other words, seems to demand a conceptual framework based on predication and not on membership.(...)We do not maintain, accordingly, that we should give up the set-theoretic approach, especially when dealing with the philosophy and foundations of mathematics, or that only a theory of predication associated with possibilist logical realism will provide an adequate semantics for natural language. In both cases we may find a principle of tolerance, if not outright pluralism, the more appropriate attitude to take."

INDEX OF THE PARAGRAPHS:

0. Introduction

1. The problem with a set-theoretic semantics of natural language
2. Intensional logic as a new theoretical framework for philosophy
3. The incompleteness of intensional logic when based on membership
4. Predication versus membership in type theory
5. Second order predicate logic with nominalized predicates
6. A set theoretic semantics with predication as fundamental
7. Concluding remarks

37. Philosophical Perspectives on Formal Theories of Predication. In *Handbook of Philosophical Logic. Vol. 4. Topics in the Philosophy of Language*. Edited by Gabbay Dov and Guentner Franz. Dordrecht: Reidel 1989. pp. 253-326

"Different formal theories of predication are associated with nominalism, conceptualism and realism as theories of universals. Two different formal theories are associated with conceptualism, depending on whether concepts are assumed to be formed only predicatively (under the constraint of the vicious circle principle) or impredicatively as well. Two different formal theories are also associated with realism, one Platonistic (logical realism), the other Aristotelian (natural realism), with each validating different versions of essentialism, but only natural realism also validating a logic of natural kinds. All of the formal theories are described as second-order logics, with only the logic of nominalism being based on a substitutional interpretation of predicate quantifiers."

38. Russell's Theory of Logical Types and the Atomistic Hierarchy of Sentences. In *Rereading Russell: Essays on Bertrand Russell's Metaphysics and Epistemology*. Edited by Savage C. Wade and Anderson C. Anthony. Minneapolis: University of Minnesota Press 1989. pp. 41-62

"It is shown in this paper that the theory of logical types Russell was committed to after 1913 (as described in his lectures on logical atomism and in his introduction to the 1925 second edition of "Principia Mathematica" ("PM")) amounts to no more than ramified second-order logic, a fragment of the full theory of types described in the 1910-13 "PM", and, in particular, a fragment in which Russell's construction of mathematics is no longer possible. Russell's 1908 theory of logical types is also described and distinguished from his 1910-13 theory. How Russell came to be committed to three different theories of types over these different periods is explained in terms of Russell's changing views on the notion of a logical subject."

39. "Conceptualism, Realism and Intensional Logic," *Topoi. An International Review of Philosophy* 7:

15-34 (1989).

"A conceptualist theory of predication is described in which both referential and predicable concepts are taken as complementary unsaturated cognitive capacities, which, when exercised, mutually saturate each other and result in a mental act (such as a judgment) and a speech act as well if overtly expressed. Simple and complex referential concepts are represented in intensional logic by common and proper name quantifier phrases, and predicable concepts are represented by simple and complex predicate expressions. Realism, as the reification of the contents of concepts as objects, is represented through the transformation of quantifier phrases into predicate expressions, which in turn are transformed into abstract singular terms. (natural numbers, as objects, e.g., are the contents of pure numerical quantifier phrases.) Predicates that represent applied predicable concepts must be fully intensionalized in that all referential expressions occurring in those predicates are nominalized and represent only the deactivated referential contents of those expressions. Problems of intentional identity are explained in terms of the contents of deactivated referential concepts as intensional objects."

40. Conceptualism. In *Handbook of Metaphysics and Ontology*. Edited by Smith Barry and Burkhardt Hans. Munich: Philosophia Verlag 1991. pp. 168-174
41. Logic, Higher Order. In *Handbook of Metaphysics and Ontology*. Edited by Smith Barry and Burkhardt Hans. Munich: Philosophia Verlag 1991. pp. 466-470
42. Ontology, Fomal. In *Handbook of Metaphysics and Ontology*. Edited by Smith Barry and Burkhardt Hans. Munich: Philosophia Verlag 1991. pp. 640-647
43. Russell, Bertrand. In *Handbook of Metaphysics and Ontology*. Edited by Smith Barry and Burkhardt Hans. Munich: Philosophia Verlag 1991. pp. 796-798
44. Quantification, Time and Necessity. In *Philosophical Applications of Free Logic*. Edited by Lambert Karel. Oxford: Oxford University Press 1991. pp. 242-256

"A logic of actual and possible objects if formulated in which "existence" and "being", as second-level concepts represented by first-order (objectual) quantifiers, are distinguished. A free logic of actual objects is then distinguished as a subsystem of the logic of actual and possible object. Several complete first-order tense logics are then formulated in which temporal versions of possibilism and actualism are characterized in terms of the free logic of actual objects and the wide logic of actual and possible objects. It is then shown how a number of different modal logics can be interpreted within quantified tense logic, with the latter providing a paradigmatic framework in which to distinguish the interplay between quantifiers, tenses and modal operators and within which we can formulate different temporal versions of actualism and possibilism.

"The fundamental assumption of a logic of actual and possible objects is that the concept of existence is not the same as the concept of being. Thus, even though necessarily whatever exists has being, it is not necessary in such a logic that whatever has being exists; that is, it can be the case that there be something that does not exist. No occult doctrine is needed to explain the distinction between existence and being, for an obvious explanation is already at hand in a framework of tense logic in which being encompasses past, present, and future objects (or even just past and present objects) while existence encompasses only those objects that presently exist. We can interpret modality in such a framework, in other words, whereby it can be true to say that some things do not exist. Indeed, as indicated in Section 3, infinitely many different modal logics can be interpreted in the framework of tense logic. In this regard, we maintain, tense logic provides a paradigmatic framework in which possibilism (i.e., the view that existence is not the same as being, and that therefore there can be some things that do not exist) can be given a logically perspicuous representation.

Tense logic also provides a paradigmatic framework for actualism as the view that is opposed to possibilism; that is, the view that denies that the concept of existence is different from the concept of being. Indeed, as we understand it here, actualism does not deny that there can be names that have had denotations in the past but that are now denotationless, and hence that the statement that some things do not exist can be true in a semantic metalinguistic sense (as a statement about the

denotations, or lack of denotations, of singular terms). What is needed, according to actualism, is not that we should distinguish the concept of existence from the concept of being, but only that we should modify the way that the concept of existence (being) is represented in standard first-order predicate logic (with identity). A first-order logic of existence should allow for the possibility that some of our singular terms might fail to denote an existent object, which, according to actualism, is only to say that those singular terms are denotationless rather than what they denote are objects (beings) that do not exist. Such a logic for actualism amounts to what nowadays is called free logic."

INDEX OF THE PARAGRAPHS:

0. Introduction

1. A Logic of Actual and Possible Objects

2. A Completeness Theorem for Tense Logic

3. Modality Within Tense Logic

4. Some Observations on Quantifiers in Modal and Tense Logic

5. Concluding Remarks

45. "Conceptual Realism Versus Quine on Classes and Higher-Order Logic," *Synthese* 90: 379-436 (1992).

"The problematic features of Quine's 'set' theories NF and ML are a result of his replacing the higher-order predicate logic of type theory by a first-order logic of membership, and can be resolved by returning to a second-order logic of predication with nominalized predicates as abstract singular terms. We adopt a modified Fregean position called conceptual realism in which the concepts (unsaturated cognitive structures) that predicates stand for are distinguished from the extensions (or intensions) that their nominalizations denote as singular terms. We argue against Quine's view that predicate quantifiers can be given a referential interpretation only if the entities predicates stand for on such an interpretation are the same as the classes (assuming extensionality) that nominalized predicates denote as singular terms. Quine's alternative of giving predicate quantifiers only a substitutional interpretation is compared with a constructive version of conceptual realism, which with a logic of nominalized predicates is compared with Quine's description of conceptualism as a ramified theory of classes. We argue against Quine's implicit assumption that conceptualism cannot account for impredicative concept-formation and compare holistic conceptual realism with Quine's class Platonism."

INDEX OF THE PARAGRAPHS:

0. Introduction

1. Predication versus Membership

2. Old versus New Foundations

3. Concepts versus ultimate Classes

4. Frege versus Quine on Higher-Order Logic

5. Conceptualism versus Nominalism as Formal Theories of predication

6. Conceptualism Ramified versus Nominalism Ramified

7. Constructive Conceptual Realism versus Quine's view of Conceptualism as a Ramified Theory of Classes

8. Holistic Conceptual Realism versus Quine's Class Platonism

46. "Cantor's Power-Set Theorem Versus Frege's Double-Correlation Thesis," *History and Philosophy of Logic* 13: 179-201 (1992).

"Frege's thesis that second-level concepts can be correlated with first -level concepts and that the latter can be correlated with their value-ranges is in direct conflict with Cantor's power-set theorem, which is a necessary part of the iterative, but not of the logical, concept of class. Two consistent second-order logics with nominalized predicates as abstract singular terms are described in which Frege's thesis and the logical notion of a class are defended and Cantor's theorem is rejected.

Cantor's theorem is not incompatible with the logical notion of class, however. Two alternative similar kinds of logics are also described in which Cantor's theorem and the logical notion of a class are retained and Frege's thesis is rejected."

47. "On Classes and Higher-Order Logic: A Critique of W.V.O. Quine," *Philosophy and the History of Science. A Taiwanese Journal* 2: 23-50 (1993).

"The problematic features of Quine's set theories NF and ML result from compressing the higher-order predicate logic of type theory into a first-order logic of membership, and can be resolved by turning to a second-order predicate logic with nominalized predicates as abstract singular terms. A modified Fregean position, called conceptual realism, is described in which the concepts (unsaturated cognitive structures) that predicates stand for are distinguished from the extensions (or intensions) that their nominalizations denote as abstract singular terms. Quine's view that conceptualism cannot account for impredicative concept-formation is rejected, and a holistic conceptual realism is compared with Quine's class Platonism."

48. "Knowledge Representation in Conceptual Realism," *International Journal of Human-Computer Studies* 43: 697-721 (1995).

"Knowledge representation in Artificial Intelligence (AI) involves more than the representation of a large number of facts or beliefs regarding a given domain, i.e. more than a mere listing of those facts or beliefs as data structures. It may involve, for example, an account of the way the properties and relations that are known or believed to hold of the objects in that domain are organized into a theoretical whole - such as the way different branches of mathematics, or of physics and chemistry, or of biology and psychology, etc., are organized, and even the way different parts of our commonsense knowledge or beliefs about the world can be organized. But different theoretical accounts will apply to different domains, and one of the questions that arises here is whether or not there are categorial principles of representation and organization that apply across all domains regardless of the specific nature of the objects in those domains. If there are such principles, then they can serve as a basis for a general framework of knowledge representation independently of its application to particular domains. In what follows I will give a brief outline of some of the categorial structures of conceptual realism as a formal ontology. It is this system that I propose we adopt as the basis of a categorial framework for knowledge representation."

CONCLUDING REMARKS:

"We have given here only an overview or sketch of conceptual realism as a formal ontology, i.e. as a theory of logical form having both conceptual and ontological categories - but in which the latter are represented in terms of the former. The categories of natural kinds and of natural properties and relations, for example, are represented in terms of the categories of sortals and predicable concepts, respectively, and the category of abstract objects is represented in terms of the process of conceptual nominalization (reification) as a subcategory of objects. Not all of these categories or parts of this formal ontology will be relevant in every domain of knowledge representation, but each is relevant at least to some domains and is needed in a comprehensive framework for knowledge representation. In those domains where certain categorial distinctions are not needed - such as that between predicative and impredicative concepts, or that between predicable concepts and natural properties and relations, or between sortal concepts and natural kinds, etc. - we can simply ignore or delete the logical forms in question. What must remain as the core of the system is the intensional logic around which all of the other categories are built - namely, the second-order predicate logic with nominalized predicates as abstract singular terms that we call HST*- λ . It is this core, I believe, that can serve as a universal standard by which to evaluate other representational systems."

49. Conceptual Realism as a Formal Ontology. In *Formal Ontology*. Edited by Poli Roberto and Simons Peter. Dordrecht: Kluwer 1996. pp. 27-60

FROM THE INTRODUCTION:

"A formal ontology is both a theory of logical form and a metaphysical theory about the ontological structure of the world. What makes it a theory of logical form is that different ontological categories or modes of being are represented in it by different logico-grammatical categories. It is specified in this regard by what might be called an ontological grammar that determines how the expressions of those logico-grammatical categories can be meaningfully combined so as to represent different ontological aspects of the world.

There is more to a formal ontology than ontological grammar, however. In particular, besides determining the ways that the expressions of the different logico-grammatical categories can be meaningful combined, a formal ontology also determines the ways those expressions can be deductively transformed as well - i.e., the ways those expressions determine the valid formulas of that ontology. As a theory of logical form, a formal ontology involves not only an ontological grammar, accordingly, but also ontological laws determining the valid formulas of that grammar. What is central and fundamental in determining both of these functions of a formal ontology as a theory of logical form is how the metaphysical system it represents interprets the nexus of predication. That is because, whether directly or indirectly, it is the nexus of predication that determines how the expressions of the different logico-grammatical categories of a theory of logical form can be both meaningfully combined and deductively transformed - which is to say that it is in terms of this nexus that the unity of the different categories or modes of being of the formal ontology in question is ultimately to be understood."

CONCLUDING REMARKS:

"As this informal sketch indicates, conceptual realism, by which we mean conceptual natural realism and conceptual intensional realism together, provides the basis of a general conceptual-ontological framework, within which, beginning with thought and language, a comprehensive formal ontology can be developed. Not only does conceptual realism explain how, in naturalistic terms, predication in thought and language is possible, but, in addition, it provides a theory of the nature of predication in reality through an analogical theory of properties and relations. In this way, conceptual realism can be developed into a reconstructed version of Aristotelian realism, including a version of Aristotelian essentialism. In addition, through the process of nominalization, which corresponds to a reflexive abstraction in which we attempt to represent our concepts as if they were objects, conceptualism can be developed into a conceptual intensional realism that can provide an account not only of the abstract reality of numbers and other mathematical objects, but of the intensional objects of fiction and stories of all kinds, both true and false, and including those stories that we systematically develop into theories about the world. In this way, conceptual realism provides a framework not only for the conceptual and natural order, but for the mathematical and intensional order as well. Also, in this way, conceptual realism is able to reconcile and provide a unified account both of Platonism and Aristotelian realism, including Aristotelian essentialism - and it does so by showing how the ontological categories, or modes of being, of each of these ontologies can be explained in terms a conceptualist theory of predication and its analogical extensions."

INDEX OF THE PARAGRAPHS:

1. Introduction
2. Substitutional versus Ontological Interpretations of Quantifiers
3. The Importance of the Notion of Unsaturatedness in Formal Ontology
4. Referential and Predicable Concepts Versus Immanent Objects of Reference
5. Conceptual Natural Realism and the Analogy of Being Between Natural and Intelligible

Universals

6. Conceptual Natural Realism and Aristotelian Essentialism

7. Conceptual Intensional Realism versus Conceptual Platonism and the Logic of Nominalized Predicates

8. Concluding Remarks

50. Formally Oriented Work in the Philosophy of Language. In *Routledge History of Philosophy. Vol. X - The Philosophy of Meaning, Knowledge and Value in the 20th Century*. Edited by Canfield John. New York: Routledge 1997. pp. 39-75

"One of the perennial issues in philosophy is the nature of the various relationships between language and reality, language and thought, and language and knowledge. Part of this issue is the question of the kind of methodology that is to be brought to bear on the study of these relationships. The methodology that we shall discuss here is based on a formally oriented approach to the philosophy of language, and specifically on the notion of a logically ideal language as the basis of a theory of meaning and a theory of language."

INDEX OF THE PARAGRAPHS:

1. The notion of a *Characteristica Universalis* as a philosophical language
 2. The notion a a logically perfect language as a regulating ideal
 3. The theory of logical types
 4. Radical empiricism and the logical construction of the world
 5. The logical empiricist theory of meaning
 6. Semiotic and the trinity of syntax, semantics and pragmatics
 7. Pragmatics from a logical point of view
 8. Intensional logic
 9. Universal Montague grammar
 10. Speech-act theory and the return to pragmatics
51. "Conceptual Realism as a Theory of Logical Form," *Revue Internationale de Philosophie*: 175-199 (1997).

"The central notion in the philosophy of logic is the notion of a logical form, and the central issue is which theory of logical form best represents our scientific (including our mathematical) and commonsense understanding of the world. Here, by a theory of logical form, we mean not only a logical grammar in the sense of a system of formation rules characterizing the well-formed expressions of the theory, but also a logical calculus characterizing what is valid (i.e., provable or derivable) in the theory. The representational role of the logical forms of such a theory consists in the fact that they are perspicuous in the way they specify the truth conditions, and thereby the validity, of formulas in terms of the recursive operations of logical syntax. In conceptualism we also require that logical forms be perspicuous in the way they represent the cognitive structure of our speech and mental acts, including in particular the referential and predicable concepts underlying those acts. The purpose of a theory of logical form, accordingly, is that it is to serve as a general semantical framework by which we can represent in a logically perspicuous way our commonsense and scientific understanding of the world, including our understanding of ourselves and the cognitive structure of our speech and mental acts. So understood, the logical forms of such a theory are taken to be semantic structures in their own right, relative to which the words, phrases, and (declarative) sentences of a (fragment of) natural language, or of a scientific or mathematical theory, are to be represented and interpreted. The process by which the expressions of a natural language or scientific theory are represented and interpreted in such a theory relative to the aims, purposes and pragmatic considerations regarding a given context or domain of discourse - amounts to a logical analysis of those expressions. (A different group of aims, purposes, etc., might give a finer- or a coarser-grained analysis of the domain.) Ideally, where the syntax of a target language or theory has been recursively characterized, such an analysis can be given in terms of a precisely

characterized theory of translation. Usually, however, the analysis is given informally. In what follows I will briefly describe and attempt to motivate some (but not all) aspects of a theory of logical form that I associate with the philosophical system I call conceptual realism. The realism involved here is really of two types, one a natural realism (amounting to a modern form of Aristotelian essentialism) and the other an intensional realism (amounting to a modern, but also mitigated, form of Platonism). The core of the theory is a second-order logic in which predicate expressions (both simple and complex) can be nominalized and treated as abstract singular terms (in the sense of being substituends of individual variables). In this respect the core is really a form of conceptual intensional realism, which is the only part of the system we will discuss here(**)."

(*) See Montague "Universal Grammar (1969) for a description of such a theory of translation (for Montague's type theoretical intensional logic).

(**) See Cocchiarella "Conceptual Realism as a Formal Ontology" (1996) for a description of conceptual natural realism as a modern form of Aristotelian Essentialism.

52. Property Theory. In *Routledge Encyclopedia of Philosophy - Vol. 7*. Edited by Craig Edward. New York: Routledge 1998. pp. 761-767

"Traditionally, a property theory is a theory of abstract entities that can be predicated of things. A theory of properties in this sense is a theory of predication -just as a theory of classes or sets is a theory of membership. In a formal theory of predication, properties are taken to correspond to some (or all) one-place predicate expressions. In addition to properties, it is usually assumed that there are n-ary relations that correspond to some (or all) n-place predicate expressions (for $n > 2$). A theory of properties is then also a theory of relations.

In this entry we shall use the traditional labels 'realism' and 'conceptualism' as a convenient way to classify theories. In natural realism, where properties and relations are the physical, or natural, causal structures involved in the laws of nature, properties and relations correspond to only some predicate expressions, whereas in logical realism properties and relations are generally assumed to correspond to all predicate expressions.

Not all theories of predication take properties and relations to be the universals that predicates stand for in their role as predicates. The universals of conceptual ism, for example. are unsaturated concepts in the sense of cognitive capacities that are exercised (saturated) in thought and speech. Properties and relations in the sense of intensional Platonic objects may still correspond to predicate expressions, as they do in conceptual intensional realism, but only indirectly as the intensional contents of the concepts that predicates stand for in their role as predicates. In that case, instead of properties and relations being what predicates stand for directly, they are what nominalized predicates denote as abstract singular terms. It is in this way that concepts - such as those that the predicate phrases 'is wise', 'is triangular' and 'is identical with' stand for - are distinguished from the properties and relations that are their intensional contents - such as those that are denoted by the abstract singular terms 'wisdom', 'triangularity' and 'identity, respectively. Once properties are represented by abstract singular terms, concepts can be predicated of them, and, in particular, a concept can be predicated of the property that is its intensional content. For example, the concept represented by 'is a property' can be predicated of the property denoted by the abstract noun phrase 'being a property', so that 'being a property is a property' (or, 'The property of being a property is a property') becomes well-formed. In this way, however, we are confronted with Russell's paradox of (the property of) being a non-self-predicable property, which is the intensional content of the concept represented by ' is a non-self-predicable property'. That is, the property of being a non-self-predicable property both falls and does not fall under the concept of being a non-self-predicable property (and therefore both falls and does not fall under the concept of being self-predicable)."

53. The Theory of Types (Simple and Ramified). In *Routledge Encyclopedia of Philosophy - Vol. 9*. Edited by Craig Edward. New York: Routledge 1998. pp. 359-362

"The theory of types was first described by Bertrand Russell in 1908. He was seeking a logical theory that could serve as a framework for mathematics and, in particular, a theory that would avoid

the so-called 'vicious-circle' antinomies, such as his own paradox of the property of those properties that are not properties of themselves - or, similarly, of the class of those classes that are not members of themselves. Such paradoxes can be thought of as resulting when logical distinctions are not made between different types of entities and, in particular, between different types of properties and relations that might be predicated of entities, such as the distinction between concrete objects and their properties, and the properties of those properties, and so on. In 'ramified' type theory, the hierarchy of properties and relations is, as it were, two-dimensional, where properties and relations are distinguished first by their order, and then by their level within each order. In 'simple' type theory properties and relations are distinguished only by their orders."

54. "Reference in Conceptual Realism," *Synthese* 114: 169-202 (1998).

"A conceptual theory of the referential and predicable concepts used in basic speech and mental acts is described in which singular and general, complex and simple, and pronominal and non-pronominal, referential concepts are given a uniform account. The theory includes an intensional realism in which the intensional contents of predicable and referential concepts are represented through nominalized forms of the predicate and quantifier phrases that stand for those concepts. A central part of the theory distinguishes between active and deactivated referential concepts, where the latter are represented by nominalized quantifier phrases that occur as parts of complex predicates. Peter Geach's arguments against theories of general reference in "Reference and Generality" are used as a foil to test the adequacy of the theory. Geach's arguments are shown to either beg the question of general as opposed to singular reference or to be inapplicable because of the distinction between active and deactivated referential concepts."

CONCLUDING REMARKS:

"We do not claim that the theory of relative pronouns as referential expressions proposed in Section 7 is unproblematic, it should be noted. If it should turn out that it cannot be sustained, then we still have the theory proposed in Section 6, where relative pronouns are taken as anaphoric proxies for non-pronominal referential expressions. In other words, whether the proposal of Section 7 is sustained or not, we maintain that Geach's arguments against complex names and general reference do not work against the kind of conceptualist theory we have presented here.

We also do not claim to have proved that our conceptualist theory of reference resolves all problems about reference, but only that it has passed an initial test of adequacy as far as Geach's arguments in (Geach Reference and Generality third edition, 1980) are concerned. It is our view that a conceptualist theory is what is needed to account for reference and predication in our speech and mental acts, and that only a theory of the referential and predicable concepts that underlie the basic forms of such acts will suffice. Such a theory, we maintain, must provide a uniform account of general as well as singular reference, and, in terms of the referential and predicable concepts involved in a speech or mental act, it must distinguish the logical forms that represent the cognitive structure of that act from the logical forms that only represent its truth conditions. That, in any case, is the kind of conceptualist theory we have attempted to describe and defend here."

INDEX OF THE PARAGRAPHS:

1. The core of Conceptual Intensional Realism
2. Referential concepts, simple and complex
3. Geach's negation and complex predicate arguments
4. Active versus deactivated referential concepts
5. Deactivation and Geach's arguments
6. Relative pronouns and referential concepts
7. Relative pronouns as referential expressions
8. Concluding remarks

55. *Lógica Como Lenguaje y Lógica Como Cálculo: su Papel en la Teoría de la Atribución*. Heredia,

Costa Rica: Departamento de Filosofía, Universidad Nacional 2000.

Coleccion Prometeo n. 20

56. "Russell's Paradox of the Totality of Propositions," *Nordic Journal of Philosophical Logic* 5: 25-37 (2000).
 "Russell's "new contradiction" about "the totality of propositions" has been connected with a number of modal paradoxes. M. Oksanen has recently shown how these modal paradoxes are resolved in the set theory NFU. Russell's paradox of the totality of propositions was left unexplained, however. We reconstruct Russell's argument and explain how it is resolved in two intensional logics that are equiconsistent with NFU. We also show how different notions of possible worlds are represented in these intensional logics."
57. "A Logical Reconstruction of Medieval Terminist Logic in Conceptual Realism," *Logical Analysis and History of Philosophy* 4: 35-72 (2001).
 "The framework of conceptual realism provides a logically ideal language within which to reconstruct the medieval terminist logic of the 14th century. The terminist notion of a concept, which shifted from Ockham's early view of a concept as an intentional object (the *fictum* theory) to his later view of a concept as a mental act (the *intellectio* theory), is reconstructed in this framework in terms of the idea of concepts as unsaturated cognitive structures. Intentional objects (*ficta*) are not rejected but are reconstructed as the objectified intensional contents of concepts. Their reconstruction as intensional objects is an essential part of the theory of predication of conceptual realism. It is by means of this theory that we are able to explain how the identity theory of the copula, which was basic to terminist logic, applies to categorical propositions. Reference in conceptual realism is not the same as supposition in terminist logic. Nevertheless, the various "modes" of personal supposition of terminist logic can be explained and justified in terms of this conceptualist theory of reference."
58. "Logic and Ontology," *Axiomathes. An International Journal in Ontology and Cognitive Systems* 12: 127-150 (2001).

FROM THE INTRODUCTION:

"The idea that logic has content, and ontological content in particular, is described today as the view of logic as language. This view is generally rejected in favor of a view of logic as an abstract calculus that has no content of its own, and which depends upon set theory as a background framework by which such a calculus might be syntactically described and semantically interpreted.* We briefly describe the opposition between these two views of logic in section one, as well as give some of the history of the idea of logic as language. In section two, we argue that predication is more fundamental than membership and that different theories of predication are ontologically based on different theories of universals, the three most prominent types being nominalism, realism, and conceptualism. These theories of universals can be developed as alternative formal ontologies, each with its own logic, and, in that regard, each with its own account of the view of logic as language. The opposition between the views of logic as language and logic as calculus can be mitigated in this way by using set theory as a mathematical framework in which different formal ontologies can be described and compared with one another in terms of their explanatory powers, even if only in terms of a somewhat distorting external semantical representation within set theory. We then briefly examine nominalism, logical realism, and conceptualism within the framework of comparative formal ontology and argue that an extended form of conceptual realism seems to provide the most coherent formal ontology by which to defend the view of logic as language."

* See Jean van Heijenoort, *Logic as Language and Logic as Calculus*, *Synthese* 17 (1967) pp. 324-330.

CONCLUDING REMARKS:

"Despite our extended discussion and defense of conceptual realism, the fact remains that this is a formal ontology that can be described and compared with other formal ontologies in the set-theoretic framework of comparative formal ontology. Set theory, as we have said, provides a convenient mathematical medium in which both the syntax and an extrinsic semantics of different formal ontologies can be formulated, which then can be compared and contrasted with one another in their logical and descriptive powers. This is the real insight behind the view of logic as calculus. But membership is at best a pale shadow of predication, which underlies thought, language and the different categories of reality. Set theory is not itself an adequate framework for general ontology, in other words, unless based on a theory of predication (as in Quine's nominalist-platonism). Only a formal theory of predication based on a theory of universals can be the basis of a general ontology. This is the real insight behind the view of logic as language. But there are alternative theories of universals, and therefore alternative formal theories of predication, each with its own logic and theory of logical form. A rational choice can be made only by formulating and comparing these alternatives in comparative formal ontology, a program that can best be carried out in set theory. Among the various alternatives that have been formulated and investigated over the years, the choice we have made here, for the reasons given, is what we have briefly described above as conceptual realism, which includes both a conceptual natural realism and a conceptual intensional realism. Others may make a different choice. As Rudolf Carnap once said: "Everyone is at liberty to build up his own logic, i.e. his own form of language, as he wishes." But then, at least in the construction of a formal ontology, we all have an obligation to defend our choice and to give reasons why we think one system is better than another. In this regard, we do not accept Carnap's additional injunction that in logic, there are no morals."

INDEX OF THE PARAGRAPHS:

1. Logic as language versus Logic as Calculus
2. Predication versus Membership
3. The vagaries of Nominalism
4. The Vindication (Almost) of Logical Realism
5. Conceptualism Without a Transcendental Subject
6. Conceptual Natural realism and the Analogy of being Between Natural and Conceptual Universals
7. Conceptual Intensional Realism
8. Concluding Remarks

Translated in Italian by Flavia Marcacci with revision by Gianfranco Basti, as: *Logica e Ontologia in Aquinas. Rivista Internazionale di Filosofia*, 52, 2009.

59. "A Conceptualist Interpretation of Lesniewski's Ontology," *History and Philosophy of Logic* 22: 29-43 (2001).

"A first-order formulation of Lesniewski's Ontology is formulated and shown interpretable within a free first-order logic of identity extended to include nominal quantification over proper and common-name concepts. The latter theory is the shown to be interpretable in monadic second-order predicate logic. which shows that the first-order part of Lesniewski's Ontology is decidable."

60. "On the Logic of Classes as Many," *Studia Logica* 70: 303-338 (2002).

"The notion of a 'class as many' was central to Bertrand Russell's early form of logicism in his 1903 *Foundations of Mathematics*. There is no empty class in this sense, and the singleton of an urelement (or atom in our reconstruction) is identical with that urelement. Also, classes with more than one member are merely pluralities -- or what are sometimes called 'plural objects' -- and cannot as such be themselves members of classes. Russell did not formally develop this notion of a class but used it only informally. In what follows we give formal, logical reconstruction of the logic of

classes as many as pluralities (or plural objects) within a fragment of the framework of conceptual realism. We also take groups to be classes as many with two or more members and show as groups provide a semantics for plural quantifiers phrases. "

61. "Logical Necessity Based on Carnap's Criterion of Adequacy," *Korean Journal of Logic* 5: 1-21 (2002).

"A semantics for logical necessity, based on Carnap's criterion of adequacy, is given with respect to the ontology of logical atomism. A calculus for sentential (propositional) modal logic is described and shown to be complete with respect to this semantics. The semantics is the modified in terms of a restricted notion of 'all possible worlds' in the interpretation of necessity and shown to yield a completeness theorem for the modal logic S5. Such a restricted notion introduces material content into the mean of necessity so that, in addition to atomic facts, there are 'modal facts' that distinguish one world from another."

62. "Conceptual Realism and the Nexus of Predication," *Metalogicon* 16: 45-70 (2003).

"The nexus of predication is accounted for in different ways in different theories of universals. We briefly review the account given in nominalism, logical realism (modern Platonism), and natural realism. Our main goal is to describe the account given in a modern form of conceptualism extended to include a theory of intensional objects as the contents of our predicable and referential concepts."

63. "Denoting Concepts, Reference, and the Logic of Names, Classes as Many, Groups and Plurals," *Linguistics and Philosophy* 28: 135-179 (2005).

"Bertrand Russell introduced several novel ideas in his 1903 *Principles of Mathematics* that he later gave up and never went back to in his subsequent work. Two of these are the related notions of denoting concepts and classes as many. In this paper we reconstruct each of these notions in the framework of conceptual realism and connect them through a logic of names that encompasses both proper and common names, and among the latter complex as well as simple common names. Names, proper or common, and simple or complex, occur as parts of quantifier phrases, which in conceptual realism stand for referential concepts, i.e., cognitive capacities that inform our speech and mental acts with a referential nature and account for the intentionality, or directedness, of those acts. In Russell's theory, quantifier phrases express denoting concepts (which do not include proper names). In conceptual realism, names, as well as predicates, can be nominalized and allowed to occur as "singular terms", i.e., as arguments of predicates. Occurring as a singular term, a name denotes, if it denotes at all, a class as many, where, as in Russell's theory, a class as many of one object is identical with that one object, and a class as many of more than one object is a plurality, i.e., a plural object that we call a group. Also, as in Russell's theory, there is no empty class as many. When nominalized, proper names function as "singular terms" just the way they do in so-called free logic. Lesniewski's ontology, which is also called a logic of names can be completely interpreted within this conceptualist framework, and the well-known oddities of Lesniewski's system are shown not to be odd at all when his system is so interpreted. Finally, we show how the pluralities, or groups, of the logic of classes as many can be used as the semantic basis of plural reference and predication. We explain in this way Russell's "fundamental doctrine upon which all rests," i.e., "the doctrine that the subject of a proposition may be plural, and that such plural subjects are what is meant by classes [as many] which have more than one term" ([*Principles of Mathematics*], p. 517)."

64. "Ontology in infinity and mind," *Axiomathes. An International Journal in Ontology and Cognitive Systems* 18: 1-24 (2008).

"Two fundamental categories of any ontology are the category of objects and the category of universals. We discuss the question whether either of these categories can be infinite or not. In the category of objects, the subcategory of physical objects is examined within the context of different cosmological theories regarding the different kinds of fundamental objects in the universe. objects are discussed in terms of sets and the intensional objects of conceptual realism. The category of universals is discussed in terms of the three major theories of universals: nominalism,

realism, and conceptualism. The finitude of mind pertains only to conceptualism. We consider the question of whether or not this finitude precludes impredicative concept formation. An explication of potential infinity, especially as applied to concepts and expressions, is given. We also briefly discuss a logic of plural objects, or groups of single objects (individuals), which is based on Bertrand Russell's (1903, *The principles of mathematics*, 2nd edn. (1938). Norton & Co, NY) notion of a class as many. The universal class as many does not exist in this logic if there are two or more single objects; but the issue is undecided if there is just one individual. We note that adding plural objects (groups) to an ontology with a countable infinity of individuals (single objects) does not generate an uncountable infinity of classes as many."

65. "Mass nouns in a logic of classes as many," *Journal of Philosophical Logic* 38: 343-361 (2009). "A semantic analysis of mass nouns is given in terms of a logic of classes as many. In previous work it was shown that plural reference and predication for count nouns can be interpreted within this logic of classes as many in terms of the subclasses of the classes that are the extensions of those count nouns. A brief review of that account of plurals is given here and it is then shown how the same kind of interpretation can also be given for mass nouns."
66. "Reply to Gregory Landini's Review of *Formal Ontology and Conceptual Realism*," *Axiomathes. An International Journal in Ontology and Cognitive Systems* (2009).

"1. Some Initial Ontological Distinctions.

In our discussion of Greg Landini's review, we should distinguish how the logical systems λHST^* and $HST^*\lambda$ that I have developed are to be understood in my reconstructions of Gottlob Frege's and Bertrand Russell's *Principles of mathematics* (1903) ontologies as opposed to how $HST^*\lambda$ is understood as a (proper) part of my ontology of conceptual realism. Both of these systems are type-free second-order predicate logics that allow predicate expressions (complex or simple) and formulas (propositional forms) to be nominalized and occur in formulas as abstract singular terms.(1)

The main logical difference between these systems, as Landini notes, is that whereas λHST^* contains standard first-order logic (with identity) as a proper part, the system $HST^*\lambda$ is free of existential presuppositions regarding singular terms, including nominalized predicates as abstract singular terms, which is essential to any argument for Russell's paradox of predication. In particular, nominalization of the Russell predicate that is not predicable of itself turns out to be denotationless in $HST^*\lambda$ as an abstract singular term.

The main ontological difference between Russell's and Frege's ontologies is that one is intensional and the other is extensional. Russell's (1903) ontology is based on predication as the ontological nexus of propositions, whereas Frege's is based on predication as a function from properties and relations to truth values. (2) In conceptual realism, predication is based on the mutual saturation of referential and predicable concepts as unsaturated complementary cognitive structures, the result being a speech or mental act. (3)

In Russell's ontology, a nominalized predicate denotes, as an abstract singular term, the very same property or relation (in-intension) that the predicate stands for in its role as a predicate. In Frege's ontology, a nominalized predicate denotes the extension (value range, *Wertverläufe*) of the concept or relation (*qua* function from objects to truth values) that the predicate stands for in predicate position; and in conceptual realism, a nominalized predicate denotes the intension of the concept (*qua* cognitive structure) that the predicate stands for in its role as a predicate. Because what a predicate stands for and what its nominalization denotes are not the same type of entity in either Frege's ontology or my conceptual realism, the fact that a nominalized predicate, on pain of contradiction, might fail to denote as an abstract singular term does not affect the objective reality of what that predicate stands for in its role as a predicate.

That is why the system $HST^*\lambda$ can be used in a reconstruction of Frege's ontology as well as in my conceptual realism. The system λHST^* will also suffice for a reconstruction of Frege's ontology, but a free first-order predicate logic is essential to my analysis of plurals and mass nouns in terms of the

logic of classes as many developed in my book, which means that only $HST^*\lambda$ is appropriate for conceptual realism.

On the other hand, for a reconstruction of Russell's ontology, where nominalized predicates denote the same property or relation they stand for in their role as predicates, only the system λHST^* is appropriate. That is, because it is the same entity involved in both roles in Russell's ontology, we cannot in that framework both affirm the being of what a predicate stands for in its role as a predicate, and also deny that being in the nominalization of the predicate as an abstract singular term."

(1) There is of course a type distinction between object terms and predicates in these systems; but unlike the situation in type theory there is no hierarchy of predicates of different types.

(2) Frege's *Begriffe* are really *Eigenshaften*, and in our in present context where we want to distinguish concepts as cognitive capacities from Frege's *Begriffe*, it is better to speak of his *Begriffe* as properties instead.

(3) We assume in this discussion a distinction between predication in language, predication in our speech and mental acts, and predication as the nexus of propositions or of states of affairs, or, in Frege's case, as functional application.

67. "Reply to Andriy Vasylchenko's Review of *Formal Ontology and Conceptual Realism*," *Axiomathes. An International Journal in Ontology and Cognitive Systems* (2009).

"Adriy Vasylchenko makes the interesting observation that our references are frequently emotionally charged. A comprehensive theory of reference, Vasylchenko suggests, should include an account of this phenomenon. We agree.

Indeed, as we will see, the theory of reference in conceptual realism can be used to explain an important feature of our emotional states when we read a novel, or watch a play, a movie, or even when viewing a painting. This feature, which in aesthetics is called psychical distance, is connected in part with the difference between active and deactivated reference in conceptual realism. We will take up that issue at the end this reply.

There is, however, an important misunderstanding in Vasylchenko's review of how the notion of existential presupposition applies -- or, as he claims, fails to apply -- to fictional objects and more generally to the abstract intensional objects of conceptual realism. We will discuss this latter issue first, and then turn to the issue of our emotional states and psychical distance when reading fiction or watching a play or a film, and perhaps even when having an aesthetic experience in general."

68. "Logica e ontologia," *Aquinas. Rivista Internazionale di Filosofia* 52: 7-50 (2009).

Italian translation by Flavia Marcacci, revised by Gianfranco Basti of *Logic and Ontology* (2001)

69. Actualism versus Possibilism in Formal Ontology. In *Theory and Applications of Ontology. Vol. 1: Philosophical Perspectives*. Edited by Poli Roberto and Seibt Johanna. Dordrecht: Springer 2010. pp. 105-118.

"Cocchiarella analyses the difference between being and existence. The simplest account of the distinction between being and existence is that between actualism and possibilism, where by existence he means physical existence, i.e., existence as some type of physical object; and by being he means possible physical existence, i.e., physical existence in some possible world. According to possibilism, there are objects that do not now exist but could exist in the physical universe, and hence being is not the same as existence. On the other hand, in actualism being is the same as existence. Cocchiarella then clarifies their differences by formally modeling different aspects of actualism and possibilism within a suitable system of formal ontology." (from the *Introduction* by the Editors p. XIV).

70. "Predication in Conceptual Realism," *Axiomathes* 20: 1-21 (2010).

"Conceptual realism begins with a conceptualist theory of the nexus of predication in our speech and mental acts, a theory that explains the unity of those acts in terms of their referential and predicable aspects. This theory also contains as an integral part an intensional realism based on

predicate nominalization and a reflexive abstraction in which the intensional contents of our concepts are "object"-ified, and by which an analysis of predication with intensional verbs can be given. Through a second nominalization of the common names that are part of conceptual realism's theory of reference (*via* quantifier phrases), the theory also accounts for both plural reference and predication and mass noun reference and predication. Finally, a separate nexus of predication based on natural kinds and the natural properties and relations nomologically related to those natural kinds, is also an integral part of the framework of conceptual realism."

71. "Representing Intentional Objects in Conceptual Realism," *Humana.mente* (2012).

To appear in 2012 in a special number dedicate to Alexius Meinong.

"In this paper we explain how the intentional objects of our mental states can be represented by the intensional objects of conceptual realism. We first briefly examine and show how Brentano's actualist theory of judgment and his notion of an immanent object has a clear and natural representation in our conceptualist logic of names. We then briefly critically examine Meinong's theory of objects before turning finally to our own representation of intentional objects in terms of the intensional objects of conceptual realism. We conclude by explaining why existence-entailing concepts are so basic to our commonsense framework and how these concepts and their intensions can be used to model Meinong's ontology."

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