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Edmund Husserl: Formal Ontology and Transcendental Logic

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Introduction

"Husserl's work include lengthy treatment of universals, categories, meanings, numbers, manifolds, etc. from an ontological perspective. Here, however, we shall concentrate almost exclusively on the *Logical Investigations,* which contain in a clear form the ontological ideas which provided the terminological and theoretical basis both for much of the detailed phenomenological description and for many of the metaphysical theses presented in Husserl's later works.
The ontology of the *Logical Investigations* is of interest first of all because of its clear conception of a formal discipline of ontology analogous to formal logic. (Here Husserl's thinking parallels Meinong's development of ontology as a general 'theory of objects.). Formal disciplines are set apart from 'regional' or 'material' disciplines in that they apply to all domains of objects whatsoever, so that they are independent of the peculiarities of any given field of knowledge.
Logic, as Husserl sees it, is concerned in the first place with meanings (propositions, concepts) and with associated meaning-instantiating acts. Most importantly, it is concerned with that sort of deductively closed collection of meanings which constitutes a scientific theory. For Husserl, as for Bolzano, logic is a theory of science. Only where we have an appropriate unity and organization also on the side of the objects (states of affairs, properties) to which the relevant acts refer, however, will we have a scientific theory, so that the unity which is characteristic of the latter must involve both (1) an interconnection of truths (or of propositional meanings in general), and (2) an interconnection of the things to which these truths (and the associated cognitive acts) are directed. Where formal logic relates in the first place to meaning categories such as proposition, concept, subject and predicate, its sister discipline of formal ontology relates to object categories such as object and property, relation and relatum, manifold, part, whole, state of affairs, existence and so on. Logic in a broader sense therefore seeks to delimit the concepts which belong to the idea of a unity of theory in relation to both meanings and objects, and the truths of logic are all the necessary truths relating to those categories of constituents, on the side of both meanings and objects, from out of which science as such is necessarily constituted (including what we might think of as bridge-categories such as identity and truth which span the division between meanings and objects). Husserl's conception of the science of logic is not an arbitrary one.

For formal-ontological concepts are like the concepts of formal logic in forming complex structures in non-arbitrary, law-governed ("recursive") ways. And because they are independent of any peculiar material of knowledge, we are able to grasp the properties of the given structures in such a way as to establish in one go the properties of all formally similar structures." (pp. 27-29)

From: Barry Smith Barry & David Woodruff Smith, *The Cambridge Companion to Husserl,* Cambridge: Cambridge University Press 1995.

"The term 'formal ontology' has been given two different interpretations. The first of these, entirely in keeping with the mainstream of contemporary philosophy, has been what I shall call analytic: formal ontology is that branch of ontology which is analysed within the framework of formal logic. The leading exponent of this approach has undoubtedly been Nino Cocchiarella.' On the premise that each particular science has its own 'mode of being', Cocchiarella has written that 'metaphysics [...] -- or what we might instead call formal ontology --is concerned with the study and development of alternative formalizations regarding the systematic co-ordination of all the 'modes' or 'categories of being' under the most general laws' (1). From this point of view, formal ontology studies the logical characteristics of predication and the various theories of universals.
The other interpretation, which I shall call phenomenological, developed from Husserl's early works, in particular *Logical Investigations*. As a first approximation, we may say that this approach mainly addresses the problems of parts and wholes and of dependence. Despite their differences, these two varieties of formal ontology quite frequently overlap each other, although to date there has been no systematic study of the categories and layers that constitute formal ontology and no systematic analysis of the issues addressed by it.
(...)
The best way to deal with Husserl's theory of formal ontology, therefore, is to explicate both the connections between the formal and material, and those between the ontological and the logical.
In introducing his distinction between formal and material ontology, Husserl asserts that the former is descriptive and involves analytic a priori judgements, and that the latter involves synthetic a priori judgements. In its most general sense formal ontology concerns itself with characterizing the simple 'something'. Depending on how this 'something' is conceived, Husserl adds, the 'field of formal ontology should be the "formal region" of the object in general' (*Formale und transzendentale Logik* 1929, art. 38).
Characterizing material ontology is a more complicated matter, because the term can be interpreted in either of two ways. In the genetic interpretation it relates to the field of perception and its foundations (Husserl *Krisis* 1954, art. 6, sec. 1). In the descriptive interpretation, material ontology is instead ontic and concerns the highest material genera, i.e. the material categories in which single ontologies are rooted (*Ideen zu einer reinen Phenomenologie* 1913, vol. 1, art. 75). The sphere of material ontology in this sense are the laws of non-independence (2) which delimit the ontological regions. For the genetic interpretation, material ontology precedes formal ontology; for the descriptive interpretation it is the other way round (1913, art. 10). Here emerges 'the fundamental distinction between formal and material ontology': namely, the distinction between analytic a priori and synthetic a priori (Introduction to *Formale und transzendentale Logik*, 1929).
Detailed treatment has never been given to the stratified connections between material ontology in the genetic sense, formal ontology, and material ontology in the regional sense. It would, however, go beyond my present brief to investigate this question in detail, even though one should have at least a general topographical outline in mind.
The second opposition distinguishes the 'formal' into ontological and logical. In this sense, we must not confuse or superimpose that which pertains to formal logic and that which pertains to formal ontology. Likewise, we should not superimpose or mix the formal and material meanings of the concepts used." (pp. 1-2)

Notes

(1) "Formal Ontology and the Foundations of Mathematics", in: G. Nakhnikian (ed.), *Bertrand Russell's Philosophy*, Duckworth: London 1974, pp. 29-30.

From: Roberto Poli, "Husserl's Conception of Formal Ontology", *History and Philosophy of Logic*, vol. 14, 1993 pp. 1-14.

"THE CONCEPTION OF A PURE LOGIC - Husserl himself freely admitted that this was anything but a new idea. He mentions Kant, Herbart, Lotze, and Leibniz among its proponents and gives special credit for the nearly forgotten Bernhard Bolzano, 'one of the greatest logicians of all times.' But Husserl's own blueprint shows several original features, among which I shall mention merely what one might call the two-level structure of pure logic. The first level is that of the propositions or 'truths' studied by the logic of statements ('apophantics') as composed of meanings and their various combinations. The second level consists of the 'things' to which these statements refer, i.e., of the states of affairs (*Sachverhalte*) which they assert, the relations, complexes, and other configurations which they can enter and which are to be investigated by what Husserl calls a formal ontology. Actually, this two-level pattern incorporates two one-level conceptions of pure logic, formulated most impressively by Bolzano and by Meinong respectively. Bolzano had organized his pure logic on the propositional level around representational ideas, propositions, and truths (*Vorstellung an sich, Satz an sich, Wahrheit an sich*). Meinong knew only of the 'state of affairs,' which he had named "Objektiv", and of other categories of formal ontology. Husserl's conception incorporated both these levels, that of the propositions, which are valid or invalid, and that of the states of affairs, which do or do not 'subsist,' as Bertrand Russell rendered Meinong's term. ('To be the case' might be a less hypostatizing equivalent of the rather harmless German word 'bestehen'.)However, the development of this pure logic in Husserl's own published writings, originally planned for a third volume '(1) is rather sketchy, although the mathematician Husserl continued to show interest in its mathematical formalization. He even seems to have taken notice of Bertrand Russell's work, but remained sceptical toward the value of a merely symbolic logic and of logical calculus, in which he took no active share. His *Formale and transzendentale Logik* (1929) contains some important additions to the conception of pure logic. Among them is that of a third level of logic, likewise of ideal structure, namely, that of speech, which consists of the identical sentences that express our propositional meanings: ideal, since, even when uttered at different times and places and by different speakers, they remain identically the same sentences. (...)Husserl's major interest, once he had established the possibility of a pure logic, turned immediately to different problems. He left its more systematic development to works like Alexander Pfänder's *Logik* (1921), which investigated the logic of concepts, of propositions, and of inferences, and to studies undertaken by some of his students based on this work, which dealt with the logic of questions, of assumptions, and of laws and commands. Roman Ingarden, one of Husserl's Polish students, gave a particularly impressive application of this type of analysis to the literary work of art, in which he explored separately and in considerable detail its main strata such as that of the sounds, that of the meanings, and that of the objects meant, without neglecting additional aspects and the total structure of the work." (pp. 152-153)

Notes

(1) Karl Schuhmann, *Husserl-Kronik*, Husserliana Documente I. La Haye: Martinus Nijhoff, 1977 pp. 63-64. (some notes omitted)

From: Herbert Spiegelberg, *The Phenomenological Movement. A Historical Introduction,* The Hague: Martinus Nijhoff 1963 (third edition).

"Husserl's conception of formal ontology is intimately involved with his conceptions both of logic and of what comprises possible objects of theoretical inquiry. He inherited an Aristotelian metaphysical perspective from the school of Franz Brentano; his conception of logic was informed by an ontology that included both universals and particulars of ontologically dependent and independent types. The elucidation of his conception of logic as formal ontology therefore requires a consideration of his ontology of universal essences and his eidetic method. He distinguishes various types of universal essences (*eide*) in terms of the relations of generalization and formalization.
Husserl assumes that each thing is an instance of some eidos or essence, and that essences may not only have, but be instances (e.g., he holds that every essence is an instance of the universals "object in general" and "essence'). Besides the relation of instance to essence, he held that there is a second relation (of generalization) defined on essences. In *Ideen zu einer reinen Phänomenologie und phänomenologischen Philosophie* I (1913), the essence "red" is a specification (but not an instance)

of the more general essence, "color." Specification and generalization are inverses: for any two essences x and y, x is a generalization of y just in case y is a specification of x.

But the genus "essence" is not a generalization of the essence "red" or the essence "triangle." These are instances (not specifications) of the genus "essence." A (rough) guide for understanding this distinction: the instancing relation is to the generalization relation as the membership relation is to the subset relation; similar and easily confused but different. Husserl provides a part-whole characterization of the difference between the relations of instance to essence and specification to generalization (which he treats under the topics "formalization" and "generalization," respectively). If y is a generalization of x, then y is a part of x (at least in some "comprehensive" use of the term "part" that Husserl is willing to accept). But if y is a part of x (even in the comprehensive use of the term "part"), then y is not a formalization of x.

From this it follows that no formalization is a generalization and vice versa. The relation of specification to generalization enables the definition of some important types of essences. Any essence x is a genus iff there is some different essence y such that x is a generalization of y. Similarly, any essence x is a species *iff* there is some different essence y such that y is a generalization of x. Any essence x is a highest genus iff it is a genus and not a species, and a lowest species iff it is a species and not a genus. Every essence either is a lowest (*infima*) species or is specifiable to an infima species, and is either a highest genus, or is generalizable to a highest genus. Husserl distinguishes between the extension and the empirical extension of an essence. For any essence x, there exists an extension of instances of x. Any y is the extension of an essence x iff y is the class of all possible instances of x. Any y is the empirical extension of an essence x iff y is the class of all actual (i.e., real) instances of x. If both the empirical extension and the extension of a given essence are non-empty, then the former is a proper subclass of the latter.

But Husserl distinguishes further types of extensions relevant to his conception of formal ontology. For any essence x, there exists an eidetic extension of x. The eidetic extension of any essence x is the class of lowest species that are specifications of x. Husserl then distinguishes between two types of eidetic extensions of universals: "material" and "mathematical." Any eidetic extension is mathematical just in case it is a subset of the eidetic extension of the essence "object in general" (*etwas überhaupt*); otherwise, it is a material eidetic extension.

A second set of distinctions regarding *eide* are developed by Husserl in terms of his notions of ontological dependence and independence. He calls things that require nothing else (other than the essences they instance) in order to exist ontologically independent (example: the nose of Socrates), and things that require something else (besides the essences they instance) in order to exist ontologically dependent (example: the pugness of the nose of Socrates). He refers to dependent individuals as moments of the things they require in order to exist." (pp. 238-239)

From: Gilbert T. Null, "Formal and Material Ontology", in: Lester Embree et alii (eds.), *Encyclopedia of Phenomenology,* Dordrecht: Kluwer 1997.

Bolzano and Husserl

"Though Bolzano's propositions in themselves had originally seemed to Husserl to be metaphysical abstrusities, it then became clear to him that what Bolzano had in mind was basically something quite obvious. By proposition in itself, Husserl now understood what people ordinarily called the sense of a statement, what is explained as one and the same when, for example, different persons are said to have asserted the same thing. Or, again. propositions in themselves were simply what scientists called a theorem, for example, the theorem about the sum of the angles in a triangle, which no one would think of considering the product of anyone's subjective experience of judging. This realization demystified Bolzano's teachings for Husserl (Husserl, *Early writings in the philosophy of logic and mathematics,* 1994, 201-02; Husserl, *Briefwechsel. Die Brentanoschule, I* (Husserl to Brentano, 27.III. 1905 *)* 1994, 37).

It then further became clear to Husserl that this identical sense could be nothing other than the universal, the species, which belongs to a certain moment present in all actual assertions with the same sense and makes that very identification possible, even when the descriptive content of the individual lived experiences of asserting varies considerably otherwise. Interpreted in this way, he found Bolzano's idea that propositions are objects that nonetheless have no existence quite

intelligible. They had the ideal being or validity of objects which are universals, the being which is established, for example, M the existence proofs of mathematics (Husserl, *Early writings*, cit. 1994, 201-02).

So, although Husserl had come to Halle free of Platonic idealism, he was to leave a committed Platonic idealist, who had come to believe that idealistic systems were of "the highest value", that entirely new and totally radical dimensions of philosophical problems were illuminated in them, that "the ultimate and highest goals of philosophy were opened up only when the philosophical method which these particular systems require is clarified and developed" (Husserl, "Recollections of Franz Brentano" (1919) in: *Husserl: Shorter works,* 1981, 345). Every possible effort, Husserl would write, had been made in the *Logical Investigations* "to dispose the reader to the recognition of this ideal sphere of being and knowledge ... to side with 'the ideal in this truly Platonistic sense', 'to declare oneself for idealism' with the author" (Husserl, *Introduction to the Logical Investigations* 1975, 20). Phenomenology would be an "eidetic" discipline. The "whole approach whereby the overcoming of psychologism is phenomenologically accomplished", Husserl explained, "shows that what ... was given as analyses of immanent consciousness must be considered as a pure a priori analysis of essence" (Husserl, *Introduction* cit. 1975, 42).

This transformation had been prepared, Husserl said, by the study of Leibniz and reflections on his distinction between *verités de raison* and *verités de fait* and on Hume's ideas about knowledge about matters of fact and relations of ideas. Husserl had become keenly aware of the contrast between Hume's distinction and Kant's distinction between analytic and synthetic judgments and this became crucial for the positions that he later adopted (Husserl, *Introduction* cit. 1975, 36).

The early 1890s thus found Husserl striving to develop the true concept of analyticity and to discover the basic philosophical line separating genuine analytical ontology from material, synthetic a priori, ontology, which he believed must be fundamentally distinct from it (Husserl, *Introduction* cit. 1975, 42-43). In the *Logical Investigations*, he would condemn Kant's logic as being utterly defective (Husserl, 1900-01, *Prolegomena*, 58). Kant, Husserl maintained, had not understood the nature and role of formal mathematics and the way in which he had defined the concept of analyticity was totally inadequate and even utterly wrong (Husserl, *Einleitung in die Logik und Erkenntnistheorie* 1906-07, 23). "Not only", Husserl complained, did Kant "never see how little the laws of logic are all analytic propositions in the sense laid down by his own definition, but he failed to see how little his dragging in of an evident principle for analytic propositions really helped to clear up the achievements of analytic thinking" (Husserl, 1900-01, *Sixth Investigation*, 66). Persuaded of the inadequacy of Kant's analytic- synthetic distinction, Husserl came to believe that Bolzano's more Leibnizian approach to analyticity and meaning

harbored the insights logicians needed to prove their propositions by purely logical means. However, in Husserl's opinion, Bolzano never saw the internal equivalence between the analytic nature of both formal logic and formal mathematics made possible by developments in the field of mathematics that had only taken place after his death (Husserl, *Formal and Transcendental Logic* 1929, 26; Husserl, *Introduction* cit. 1975, 36-38).

By drawing the boundary line existing a priori between mathematics and natural sciences like psychology, Husserl believed that he was drawing the line of demarcation and expanding the domain of the analytical in keeping with the most recent discoveries in mathematics. Analytic logic, Husserl would ultimately explain in *Formal and Transcendental Logic*, is first of all valid as an absolute norm presupposed by any rational knowledge. His "war against logical psychologism, was in fact meant to serve no other end than the supremely important one of making the specific province of analytic logic visible in its purity and ideal particularity, freeing it from the psychologizing confusions and misinterpretations in which it had remained enmeshed with from the beginning". The value of his criticisms of logical psychologism lie, he believed, precisely in his drawing attention to a pure, analytic logic, distinct from any psychology, as being an independent field, like geometry or the natural sciences. Epistemological questions may well arise regarding this pure logic, he considered, but this must not interfere with its independent course, or involve delving into the concrete aspects of the logical life of consciousness. For that would be psychology (Husserl, *Formal* cit. 1929, 67).

No psychologistic empiricism, Husserl had come to believe, "can change the fact that pure mathematics is a strictly self-contained system of doctrines which is to be cultivated using methods that are essentially different from those of natural science" (Husserl, *Ideas. General Introduction to Pure Phenomenology* 1913, 29). "The empirical sciences--natural sciences", Husserl wrote to Brentano in 1905, "-- are sciences of 'matters of fact' ... . Pure Mathematics, the whole sphere of the

genuine Apriori in general, is free of all matter of fact suppositions .... We stand not within the realm of nature, but within that of Ideas, not within the realm of empirical ... generalities, but within that of the ideal, apodictic, general system of laws, not within the realm of causality, but within that of rationality .... Pure logical, mathematical laws are laws of essence ... " (Husserl, cit. 1905, 37). Husserl did, though, realize that not all the sciences are theoretical disciplines that, like mathematical physics, pure geometry or pure arithmetic, are characterized by the fact that their systemic principle is a purely analytical one. Sciences like psychology, history, the critique of reason and, notably, phenomenology, he believed, require that one go beyond the analytico-logical model. When they are formalized and one asks what it is that binds the propositional forms into a single system form, one finds oneself facing, Husserl maintained, nothing more than the empty general truth that there is an infinite number of propositions connected in objective ways that are compatible with one another in that they do not contradict each other analytically (Husserl, *Logik und allgemeine Wissenschaftstheorie* 1917/18, 54)." (pp. 83-84)

From: Claire Ortiz Hill, "On Husserl's Mathematical Apprenticeship and Philosophy of Mathematics", in: Anna-Teresa Tymieniecka (ed.), *Phenomenology World-Wide. Foundations - Expanding Dynamics - Life-Engagements. A Guide for Research and Study,* Dordrecht: Kluwer 2002, pp. 78-94.

"An aspect of Bolzano's influence on Husserl which is well known is the Husserlian definition of analyticity (Simons, 1992, Ch. 15; Benoist, 1997, Ch. 2). In the Third Logical Investigation, 12, Husserl gives a definition by substitutivity: an analytic proposition is a proposition that keeps its truth-value by substitution of its extra- logical constituents. That definition seems evidently Bolzanian (Bolzano, 1837, 148), and not Kantian.

However, concerning that point, there are also differences. Bolzano's definition of analyticity is not only a logical one (Proust, 1986). According to Bolzano, there is logical analyticity, but also a more general kind of analyticity (defined by the possibility of substituting a determinate representation of the proposition by any other one, without changing the truth value of the proposition). Bolzano is aware of the difficulty of defining the logical constituents of a proposition as opposed to the other constituents (Simons, 1992, Ch. 2). In that sense, he is very far from the contrast between "formal" and "material" constituents that Husserl defends. Husserl was aware of this because he says that Bolzano completely missed the very idea of a "formal ontology".

A remaining point may not be as well known: the Bolzanian idea of "synthetic a priori" may also have had a great influence on Husserl's thought. Bolzano had the idea of synthetic a priori ("internal") relations between concepts, especially (in his early work: cf. Laz, 1993) concepts related to perception. According to him, there was an a priori of color, as well as of spatial extension, etc. Such ideas (of a "conceptual a priori", but one concerning intuition) may have played a decisive role in the invention of a phenomenological a priori (Benoist, 1999).

There are, in fact, numerous similarities between Bolzano's and Husserl's thoughts, and one may say that, along with Brentano, Bolzano was the author who had the greatest influence on Husserl. We are not, however, to forget the fundamental differences which also separate their ways of thinking. Bolzano was above all a realist. He did not care for constitution problems, and Husserl was right when he wrote in Ideas 94 that Bolzano had no idea of what phenomenology actually was. Certainly, the first stage of Husserl's thought, which can be called a "realist" one, was much closer to Bolzano's thought than what came afterward. However, Husserl, who inherited a way of thinking in terms of "acts" from his mentor Brentano, was at that time already of the opinion that consciousness may determine the real, and give an intentional sense to it. The very idea of intentionality is, however, very far removed from Bolzano's thought, which holds to an absolute realism. Such a position can also explain the fact that Bolzano had no idea of the Husserlian concept of "formal object", which is bound up in the concept of categorial operations on the object. Consequently, Husserl remarks, not without reason, that Bolzano was much more of an empiricist than he himself was (Husserl, 1913, 9). In Bolzano's work, a form of semantical realism (and, in another sense, of idealism) is to be found, but no sense of ontological (Platonic) idealities, because Bolzano had no way of constituting them.

The Bolzano-Husserl relation therefore provides an interesting example of a very close relationship, both historical and conceptual, between two ways of thinking founded on very different, even quite opposite presuppositions. Such a paradoxical synthesis may actually constitute the originality of

phenomenology, in its unification of both branches (the psychological and the semantical) of the Austrian philosophical tradition." (p. 99)

From: Jocelyn Benoist, "Husserl and Bolzano", in: Anna-Teresa Tymieniecka (ed.), *Phenomenology World-Wide. Foundations - Expanding Dynamics - Life-Engagements. A Guide for Research and Study*, Dordrecht: Kluwer 2002, pp. 98-100.

Frege and Husserl

"There is a historiographical myth or tale in analytic circles according to .which in his youth Husserl was a very naive philosopher who in his *Philosophie der Arithmetik* (1) of 1891 not only propounded an extreme form of psychologism but also dared to criticize the almighty Frege's views as presented in *Die Grundlagen der Arithmetik* (2) of 1884. According to the tale, it was Frege's 'devastating' critique of Husserl's book in 1894 and the study by Husserl of other of Frege's writings which were responsible for Husserl's abandonment of psychologism in the first volume of his *Logische Untersuchungen* (3) of 1900/1901 and his embracing of Frege's views on logic, mathematics and their relationship, and of Frege's distinction between sense and reference of expressions in the First Logical Investigation.
Husserl, however, so says the tale, fell once more out of grace into psychologism in the second volume of *Logische Untersuchungen* and never freed himself from such a pernicious addiction. To this historiographical myth have adhered many influential scholars in the analytic tradition, e.g., Evert W. Beth in *The Foundations of Mathematics*, (4) Michael Dummett in *Frege: Philosophy of Language*, (5) Dagfinn Follesdal in *Husserl and Frege,* (6) and, of course, almost every Fregean scholar that has ever mentioned issue, e.g., Hans Sluga (7) and Christian Thiel, (8) to name just two of the most distinguished. It is then no mystery that Husserl's views on logic and mathematics have been completely ignored in the analytic tradition.
The historiographical myth has been challenged in my dissertation of 1973 and especially in my paper "Remarks on Sense and Reference in Frege and Husserl," (10) and also by J. N. Mohanty in various writings, (11) and more recently and forcefully by Claire Ortiz Hill in her *Word and Object in Frege and Russell* (12) and in other writings. The result of such investigations is essentially the following: (1) *Philosophie der Arithmetik*, although published in 1891, represents Husserl's views at most up to 1890; (2) Husserl made the distinction between the sense and reference of expressions around 1890, and it is present in his review of the first volume of Ernst Schroder's *Vorlesungen ber die Algebra der Logik* also published in 1891, as Frege himself acknowledged in a letter to Husserl of May of that same year; (13) (3) Husserl's views on logic and mathematics as presented in *Logische Untersuchungen* and other later writings were developed from 1890 to 1895 with total independence of Frege, but under the influence of Bolzano, Lotze, and others, and of the mathematical work of Riemann, Cantor, and others, and are clearly distinct from Frege's; (4) there was no conversion to psychologism in the second volume of *Logische Untersuchungen* and later writings. By the way, as Claire Ortiz Hill has shown, (14) Husserl was not the propounder of a naive extreme psychologism in *Philosophie der Arithmetik* as Frege and his uncritical followers would like us to believe. But even if that were the case, it is a very unusual piece of scholarship to consider only a philosopher's early views on a subject while completely ignoring his mature views. If Kantian scholars from the very beginning had examined only Kant's pre-critical writings, we would very probably never had learnt about his duly famous views on space and time in his critical philosophy." (pp. 199-200)

Notes

(1) E. Husserl, *Philosophie der Arithmetik, mit ergänzenden Texten*, Husserliana, vol. XII (The Hague: M. Nijhoff, 1970 [1891]).
(2) G. Frege, *Die Grundlagen der Arithmetik* (Hamburg: Centenarausgabe, Meiner, 1986 [1884]), introduction by C. Thiel.
(3) E. Husserl, *Logische Untersuchungen*, Husserliana, vols. XVIII and XIX (The Hague: M. Nijhoff, 1975 and 1984 [1900/01,2nd ed. rev.,1913]).

(4) E. W. Beth, T *he Foundations of Mathematics*, 2nd ed. rev. (Amsterdam: North-Holland, 1965 [1959]), p. 353.

(5) M. Dummett, *Frege, Philosophy of Language* (London: Duckworth, 1973), XLII-XLIII and p. 158.

(6) D. Follesdal, "Husserl and Frege,"*Mind, Meaning and Mathematics*, ed. L. Haaparanta (Dordrecht: Kluwer, 1994), pp. 3-47, translation of his 1958 Norwegian Masters thesis.

(7) E.g., in H. Sluga, *Gottlob Frege* (London: Routledge and Kegan Paul, 1980), p..2, and especially pp. 39-40 and his "Semantic Content and Cognitive Sense,"*Frege Synthesized*, ed. L. Haaparanta and J. Hintikka (Dordrecht: Reidel, 1986), pp. 3-47.

(8) E. g. in C. Thiel's Editor's Introduction to the Centenarausgabe edition of Frege's *Die Grundlagen der Arithmetik,* p. LI.

(9) "Edmund Husserls Philosophie der Logik und Mathematik im Lichte der genwärtigen Logik und Grundlagenforschung," Ph.D. diss., Rheinische Friedrich-Wilhelms-Universität, Bonn, 1973.

(10) "Remarks on Sense and Reference in Frege and Husserl," Kant-Studien 73, no. 4 (1982): 425-39, chapter 2 of the present book. Although published in 1982, this paper was accepted for publication in 1979.

(11) E. g. in J. N. Mohanty, *Husserl and Frege* (Bloomington, IN: Indiana University Press, 1982).

(12) C. O. Hill, *Word and Object in Husserl, Frege and Russell* (Athens, OH: University of Ohio Press, 1991). See also her "Frege's Attack on Husserl and Cantor" (chapter 6 of the present book), "Husserl and Frege on Substitutivity" (chapter 1 of the present book), and "Husserl and Hilbert on Completeness" (chapter 10 of the present book).

(13) See Frege's *Wissenschaftlicher Briefwechsel,* ed. G. Gabriel et. al. (Hamburg: Meiner, 1976), pp. 94-98.

(14) See Hill's "Frege' Attack on Husserl and Cantor," chapter 6 of the present book.

From: Guillermo E. Rosado Haddock, "To Be a Fregean or To Be a Husserlian: That is the Question for Platonists", in: Claire Ortiz Hill and F. E. Rosado Haddock, *Husserl or Frege? Meaning, Objectivity, and Mathematics*, La Salle: Open Court 2000, pp. 199-220.

Husserl's *Formal and Transcendental Logic* (1929)

"In 1929 Husserl published *Formal and Transcendental Logic*, which was the product of decades of reflection upon the relationship between logic and mathematics, between mathematical logic and philosophical logic, between logic and psychology, and between psychologism and his own transcendental phenomenology. One of the stated goals of the book was to redraw the boundary line between logic and mathematics in light of the new investigations into the foundations of mathematics. A second goal was to examine the logical and epistemological issues such developments have raised (Husserl, 1929, 10-17).

In *Formal and Transcendental Logic*, Husserl expressed his conviction that the formalization of large tracts of mathematics in the nineteenth century had laid bare the deep, significant connections obtaining between formal mathematics and formal logic, and had thus raised profound new questions about the deep underlying connections existing between the two fields. Logic and mathematics, he believed, had originally developed as separate fields because it had taken so long to elevate any particular branch of mathematics to the status of a purely formal discipline free of any reference to particular objects. Until that had been accomplished the important internal connections obtaining between the two fields were destined to remain hidden. However, once large tracts of mathematics had been formalized, the parallels existing between its structures and those of logic became apparent, and the abstract, ideal, objective dimension of logic could then be properly recognized, as it traditionally had been in mathematics. Developments in formalization had thus unmasked the close relationships between the propositions of logic and number statements, making it possible for logicians to develop a genuine logical calculus which would enable them to calculate with propositions in the way mathematicians did with numbers, quantities and the like (Husserl, 1929, Chapter 2).

Mathematics, Husserl deemed, has its own purity and legitimacy. Mathematicians are free to create arbitrary structures. They need not be concerned with questions regarding the actual existence of their formal constructs, nor with any application or relationship their constructs might have to

possible experience, or to any transcendent reality. They are free to do ingenious things with thoughts or symbols that receive their meaning merely from the way in which they are combined, to pursue the necessary consequences of arbitrary axioms about meaningless things, restricted only by the need to be non-contradictory and in coordination with concepts previously introduced by precise definition. And the same, Husserl contended, was true for formal logic when it was actually developed with the radical purity that is necessary for its philosophical usefulness and gives it the highest philosophical importance. Severed from the physical world, it lacks everything that makes possible a differentiation of truths or, correlatively of evidences (Husserl, 1929, 138, 23, 40, 51). However, as theoreticians of science in general, philosophical logicians are obliged to contend with the question of basic truths about a universe of objects existing outside of formal systems. They are called upon to seek solutions to the problems that come up when scientific discourse steps outside the purely formal domain and makes reference to specific objects or domains of objects. They are not free to sever their ties with nature and science, to accept a logic that tears itself entirely away from the idea of any possible application and becomes a mere ingenious playing with thoughts, or symbols that mere rules or conventions have invested with meaning. They must step out of the abstract world of pure analytic logic, with its ideal, abstract entities, and confront those more tangible objects that make up the material world of things. In addition, they are obliged to step back and investigate the theory of formal languages and systems themselves, and their interpretations (ex. Husserl, 1929, 40, 52).

So, Husserl believed that formal logic required a complement. Once liberated from things and psychologizing subjectivity, pure logic had to find its necessary complement in a transcendental logic that would take into account the connections that philosophical logic inevitably maintains with both knowing subjects and the concrete world. For Husserl, true philosophical logic could only develop in connection with a transcendental phenomenology by which logicians penetrate an objective realm which is entirely different from them (ex. Husserl, 1929, 40, 42).

However, Husserl always insisted on the primacy of the objective side of logic. He insisted that the subjective order could not be properly examined until the objective order had been, and until the objectivity of the structures girding scientific knowledge had been established and demonstrated. He maintained that pure logic with its abstract ideal structures had to be clearly seen and definitely apprehended as dealing with ideal objects before transcendental questions about them could be asked (Husserl, 1929, 8, 9, 11, 26, 42-44, 92, 98, 100).

It is knowledge of formal logic, he reminded readers in Formal and Transcendental Logic, that supplies the standards by which to measure the extent to which any presumed science meets the criteria of being a genuine science, the extent to which the particular findings of that science constitute genuine knowledge, the extent to which the methods it uses are genuine ones (Husserl, 1929, 7). The world constituted by transcendental subjectivity is a pre-given world, Husserl explained in Experience and Judgement. It is not a pure world of experience, but a world that is determined and determinable in itself with exactitude, a world within which any individual entity is given beforehand in a perfectly obvious way as being in principle determinable in accordance with the methods of exact science and as being a world in itself in a sense originally deriving from the achievements of the physico-mathematical sciences of nature (ex. Husserl, *Experience and Judgement*, 1939, 11; Husserl, 1929, 26b).

Husserl was perfectly conscious of the extraordinary difficulties that this dual orientation of logic involved. Since, according to his theories, the ideal, objective, dimension of logic and the actively constituting, subjective dimension interrelate and overlap, or exist side by side, logical phenomena thus seem to be suspended between subjectivity and objectivity in a confused way. In *Formal and Transcendental Logic*, he suggested that almost all that concerns the fundamental meaning of logic, the problems it deals with, its method, is laden with misunderstandings owing to the very fact that objectivity arises out of subjective activity. He even considered that it was due to these difficulties that, after centuries and centuries, logic had not attained the secure path of rational development (ex. Husserl 1929, 8)." pp. 90-94

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Ontology in *Formal and Transcendental Logic*

"In his work *Formale und Transzendentale Logik* with its significant subheading "*An Attempted Critique of the Logic Reason*", Husserl formulates his final conception of logic.

We shall deal here only with the principal theses set forth in this work which, we feel, may introduce us into the core of Husserl's conception.

The formal character of logic. What specifically characterizes logic is the generality of its principles (its applicability to all the fields) an aprioristic or essential generality which is formal in nature. Moreover, according to Husserl, the mind itself is a formal concept. In order to define the most general of all concepts, i.e. that of form, which is extremely important in his system, he makes the following remarks: in a certain sense, any essential knowledge is a formation of "pure" reason, i.e. free from any empirical process, but in a second sense, that of principle form, any principle knowledge is not pure. An aprioristic sentence about sounds in general, thought of, hence, in "pure" generality, is pure in the first sense but it is an a priori contingent (*Formale und Transzendentale Logik*, p. 26). This sentence has in the eidos "sound" its concrete kernel, which transcends the realm of principle generalities and connects the sentence with the "contingent field of ideally possible sounds".

"Pure" reason exceeds not only what is empirical fact, but also any essential sphere related to hylé (the matter), to the concrete. Pure reason - writes Husserl - designates the system of pure principles closed in itself, which principles precede any a priori relating to the hylé (*ibidem*).

These two aspects of the general induce Husserl to accept two notions of formal: (1) the a priori formal, analytical in nature; (2) the a priori formal, material and contingent in nature.

Summing up, logic is formal for it is but the development of pure reason, which is a formal concept. Logic is thus the self-interpretation of pure reason (*die Selbstauslegung der reinen Vernunft*) which is a formal activity.

Formal logic is conceived as apophantic analytics. According to Husserl, Aristotle's logic was a formal logic in the above sense, but this was a specific sense. Aristotle was the first, he writes, to have fully brought out the concept of form meant to determine the fundamental sense of a "formal logic", such as we understand it at present and such as Leibniz understood in his synthesis of formal logic (as apophantic logic) and in his formal analysis of a unique *mathesis universalis*.

(...)

Formal logic, conceived in this way, will have a triple "stratification". Although Aristotle, says Husserl, foresaw this formal logic as an apophantic analytics, he still failed to discriminate all its strata or levels. Here are the three formal levels as conceived by Husserl:(a) Pure morphology of judgements, which is the first logical-formal discipline or the first formal level. It is concerned with the simple possibility of judgements as such without questioning their truth or falsehood. It deals with the generality of judgement forms, the fundamental forms and their variants.

Morphology will also be concerned with the concept of operation as the directing idea in the search for forms.

(b) Logic of consequences (logic of non-contradiction) is the second level of formal logic... This new level, which is one step higher than the first, is the science of the possible forms of true judgements. About these forms Husserl writes: "Particularly as regards the forms of deduction (complex forms of sentences in which correct as well as false deductions are to be found), it is clear that they are not arbitrary forms of sentences which may be associated in order to constitute forms of authentical deductions, of effectively consistent deductions" (op. cit., p. 47).

Thus it is obvious that some forms of deduction have at the same time the value of essential formal laws, especially of general truths relating to judgement consequences.

(c) Formal logic of truth. The third level of formal logic, superior to the other two, is the research of the formal laws of possible truth and its modalities.

Let us now see how logic proceeds from simple forms of the meaning of enunciations, i.e. from the forms of judgement, to become a logic of truth. It is clear that non-contradiction is the essential condition of possible truth. But it is equally obvious, that only by connecting concepts different in themselves can analytics become a logic of truth (op. cit., 49). "This stratification, writes Husserl, has remained alien to the usage of logic so far. It stands to reason that the separation of the formal logic of non-contradiction from the formal logic of truth is something essentially and fundamentally new, no matter how well this separation might have been known, if we only refer to words. For these expressions were themselves aiming at something else, namely at the distinction between the

problems of formal logic, taken generally, and in this way leaving out all the material contents of knowledge, and those problems which have to he posed in a wider sense through a logic which, however, is such that it brings into play this material content. This last logic raises questions relating to the possibility of knowing natural reality and to the configuration of truths concerning the real world" (op. cit., p. 63). (...)

Formal apophantic and formal ontology. Examining the relation between formal apophantics (which is concerned with true or false judgements) and formal ontology, Husserl makes an essential distinction. In formal analytics the object is regarded solely as an object of possible judgements, as an object of the forms of judgement attributed to it by analytics. This may also be the case in mathematics. In other words, a formal analytics, as well as a formal mathematics, may be conceived of as a game in itself, with an autonomous aim which does not consider any field whatever where it might be applied. This is formal analytics as a pure play of thought. "Consequently, writes Husserl, mathematics (formal) may remain indifferent to the fact that all these formations are intended to appear within any sort of judgement aimed at knowledge (remaining undetermined in their substance).

(...)

It is therefore necessary to make a clear distinction between these two formal ways of conceiving logic: one aimed at the possibility of sentences being true or false - a domain of apophantics - and another, the domain of formal ontology, which includes knowledge. The first distinction Husserl's makes is the following: formal apophantics is thematically directed towards judgement (which also implies a tendency toward syntactic configurations which appear as constituents in the judgement which has become a theme; formal ontology is directed towards objects and their syntactic forms which are taken as themes in the activity of the judgement, though they are taken in such a way that the judgements and their elements are not themes. The solution of this problem is given by Husserl in this way: the judging act is not directed towards judgement but towards the thematic object. However, when we are considering our own judgements, their constitutive elements, their connections and their relations, this takes place within a new to-judge-act, of a second degree, a judgement about judgements, in which judgements become thematic objects.

Analytics as formal ontology. Since every science has its own field, scientific knowledge is directed towards a thematic object and in this case analytics, being a formal doctrine of science, has, as all sciences have, a real direction, and because of its a priori generality, it may be said to have an ontological direction. It is a formal ontology (op. cit., p. 107). Its a priori truths enunciate what is valid and therefore endowed with formal generality for objects-in-general, for domains of objects in general. They enunciate in what form these objects in general exist or may exist; these enunciations are themselves judgements, for it is in judgements alone that objects-in-general "exist" in the form of categories." (pp. 362-366)

From: Anton Dumitriu, *History of Logic*, Volume III, Tunbridge Wells: Abacus Press 1977.