

FORMAL LOGIC AND FORMAL ONTOLOGY IN
HUSSERL'S PHENOMENOLOGY

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It is not without reason that it has often been said that formal logic has let itself be led by grammar . . . provided that instead of being led by grammar . . . is substituted the fact of being directed by the *grammatical* itself.¹

The development of formal logic as well as the development of linguistics seem to cast doubt on the parallelism which this remark of Edmund Husserl implies. On the one hand, such works as Carnap's *Logical Syntax of Language* have argued that true statements about logical structure are independent of any historical language (i.e. they are analytically true). On the other hand, modern linguistics appears to have shattered the illusion that "there must exist a definite and unique system of the parts of speech, which is to be regarded as a necessary constituent of rational speech and thought."²

Nevertheless, rooted firmly in the foggy no-man's land between these two disciplines is the work of a man whose importance for the meaning of formal logic has not yet been measured, and whose students—men as diverse as Heidegger and Carnap—bear the marks of his decisive influence. It was Husserl who could write, "The disdain with which philosophical logicians love to speak of mathematical theories of deduction does not in the least affect that fact that . . . the mathematical form is the only scientific one, the sole one to offer a systematic closure and completeness, a dominance of all questions and of their possible forms of solutions."³ But it was also Husserl who wrote,

The greatest step our age has to make is to recognize that with the philosophical intuition in the correct sense, the *phenomenological grasp of essences*, a limitless field of work opens out, a science which, without all the indirect symbolical and mathematical methods, without the apparatus of premises and conclusions, still attains a plenitude of the most rigorous sort of decisive cognitions for all further philosophy.⁴

I propose to examine, first, Husserl's conception of a "pure grammar" and its relevance for the theory of meaning categories (in the *Logische*

Untersuchungen), and second his conception of the dual character of formal logic, as formal apophantic and as formal ontology (in *Ideen I* and the first half of *Formale und Transzendente Logik*).

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Ordinary language philosophers were not the first to notice that certain combinations of words make no sense (or worse, make nonsense), but they may be the first to find their linguistic restrictions on "idiosyncratic use" alone. Aristotle, for example, when he sets down some restrictions on predication in chps. two and three of the *Categories* appeals to the physical or metaphysical character of subject and/or predicate. Thus, 'aquatic' is not predicable of 'knowledge', first substance cannot be predicated of anything.⁵

Husserl, on the other hand, attempts—and he appears to have been the first to have done so—to enunciate some formal criteria for the exclusion of certain types of non-significance. In the fourth of his *Logische Untersuchungen*,⁶ he distinguishes two basic types of non-significance. The first falls within the scope of what he calls "pure-logical grammar" (*rein-logische Grammatik*) or "pure morphology of significations", and which deals with the simple possibility of judgments, i.e. as meaningful unified combinations of elements. If we start with a sentence having the form 'this *S* is *P*', e.g. 'this tree is green' and substitute in the subject-place 'thoughtless', we have a sentence which makes no sense (*Unsinn*)⁷

Now, Husserl asserts, any sentence having the same form as 'this thoughtless is green' will similarly make no sense. "Having the same form" here means a sentence in which an "adjectival matter" stands in the subject place. More generally, where a nominal matter stands, any other nominal matter may be substituted and the sentence will remain validly unified i.e. significant on this level, "but not an adjectival or relational or propositional (*ganze propositionale*) matter".⁸

The meaning of such a criterion of course turns on the specification of the semantic categories involved. As the quotation indicates, Husserl appears to employ simply the grammatical categories of the language (or languages—all indo-european) familiar to him.⁹ While he is aware of the danger involved in this, and admits that some grammatical categories are contingent e.g. the ablative, he insists that some are essential to all languages, *a priori* conditions of language as meaningful discourse. Hence, he argues, such a clarification of the ideal structure of the categorical proposition, the plural, the modalities of the possible, etc., is an essential prerequisite for the student of languages. He believes, then, that it is possible to transcend one's maternal tongue and attain the essential structures of a pure *a priori* grammar as such. The difficulty is that he provides no explicit criteria by which to discriminate the essential from the contingent structures of grammar, save by reference to "intuition".

This difficulty which has never ceased to be a source of controversy for phenomenologists is nevertheless a central one. It concerns the relation and distinction between the *Wesensschau* or insight into necessary structures of objects, and the classical notion of induction. Both processes involve the

commutation of elements of the whole under investigation, for Husserl by arbitrary imaginative variation, for Mill by experimental or observed variations. But the most that the latter can attain is an empirical generalization, while Husserl claims to arrive at the formal order, at eidetic intuition. Not that the intuition involved is easy: it does not supervene at the beginning of the investigation, but crowns it, much in the way that Plato's vision of the form crowns the upward dialectic. And in a sense the problem of Plato and Husserl is the same: even granting that one possesses the ability to *recognize* as necessary the formally invariant structure when it is revealed by the dialectical contrast of the variations of the contingent appearance, can we rely on our imagination to provide *all* of the possible contingent variations? Husserl's only answer to this lies in his emphasis on the absolutely *arbitrary* character of the free variation of the content.¹⁰

The second type of non-significance occurs when, although the meaning categories are properly concordant—they make sense—the sentence is formally unverifiable. As examples Husserl gives 'all squares have five corners', or more pertinently, '*Sp* is non-*p*', 'every *A* is *B* and some *A* is not *B*'. The laws which prevent combinations of terms and sentences of this sort will be the purely logical laws for avoiding contradiction, which exclude formal nonsense (*Widersinn*) and which correspond to Carnap's laws of transformation. (Similarly, the laws which prevent making no sense (*Unsinn*) correspond to Carnap's rules of formation.) Husserl calls this second level of logic the logic of consequences or pure analytic (*pure Analytik*).

The distinction of these two levels of logical analysis was novel, obvious as it may seem to us sixty years later, and even though Husserl himself wonders why no one had ever remarked it before. Indeed, it has been suggested that it was Husserl's early work which led Carnap into the exploration and more formal specification of these problems of logical syntax.¹¹

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I believe that with sufficient caution, the properties of language may help us to understand the structure of the world.

Bertrand Russell

When Husserl returns to questions of logic some thirty years later, it is in the context of a broader concern, deriving from his elaboration of "transcendental phenomenology" in the intervening period. His concern is to explore the philosophical foundation for the status of logic as logic of science, as *Wissenschaftslehre*. Traditional logic has long since abandoned this status, in fact if not in title, with respect to modern science. Its displacement began with the significantly titled *Discours sur la Methode*, and modern logic, mathematically formalized in its turn, has become simply one science among others.¹² Only Leibniz' *mathesis universalis* and the work of Bolzano have moved to close this gap.

Any discipline worthy of the name science must be a knowledge which can justify or furnish evidence for each of its assertions.¹³ Logic as *Wissenschaftslehre* has therefore the judgment or ἀπόφασις as its basic theme, and the levels of evidence for its structure. A science is composed of

judgments, which are systematically ordered without formal inconsistency (contradiction), and which are true. This threefold character is thus verified on three levels of evidence, and corresponding to them are therefore three levels of logic. To the minimal level of mere comprehension or grasping of sentences *as* sentences, as grammatically (logically) concordant wholes, corresponds the pure morphology of judgments. To the level of the distinct grasp of the logical coherence or consistency of single judgments and sequences of judgments, corresponds the logic (or analytic) of non-contradiction or of pure consequence. To the level of the evident clarity or adequation of the judgment to its object corresponds a formal logic of the truth of the judgment.

The last level seems puzzling, for we cannot know whether a judgment is true without taking into account its concrete reference to the world. But as we shall see, this third level does not add any new content to the logic of pure consequences. Nevertheless, its preoccupation or thematic interest is not in the judgments as such (as well-formed, as formally consistent, etc.) but in judgments as cognitive forms, as integral moments in the sciences' striving to know.¹⁴

The first two levels of logic recall the two types of meaning explored in the *Logische Untersuchungen*, and together they constitute a pure analytic, whose fundamental question is "When are judgments of any sort, just as such and according to their mere form, possible in the unity of a single judgment, and by reason of what relations?"¹⁵ The answer to this question will be an exploration of the abstract form of theories, and indeed of the theory of the possible forms of theories (*Mannigfaltigkeitslehre*). As such, it will define the necessary conditions of the possible truth of judgments, and thereby the *content* of the formal logic of truth, although the theme of the latter will be different, as we noted.

But this conception of formal logic, of the function of a pure analytic, is too narrow. It must be expanded by being brought into union with "formal mathematics".¹⁶ This union will recover for us the ancient idea of a *mathesis universalis* and bring us to the threshold of formal ontology.

The reason that, traditionally, mathematics was considered a distinct discipline from logic is that the predicative judgment was not its fundamental theme. On the other hand, so long as the notion of number, for instance, was not emptied of its reference to quantity, the ideality of mathematical objects was not grasped. It was not seen that formal mathematics had for its field the *etwas überhaupt*. When this is recognized, when the formal categories of set, number (cardinal and ordinal), relation, succession, whole and part, etc., are seen to be derivations of this fundamental notion and not to be specified by a particular class of objects, viz. quantitative, then "one is prepared to consider the whole of mathematics as an *ontology* (a priori doctrine of the object) but as a *formal ontology*".¹⁷

But precisely at this point, where logic and mathematics appear clearly separated by their domains, a fundamental similarity becomes manifest. For to judge is always to judge about objects, and all the derived forms of "something in general" must thus intervene in the formal apophantic itself.

Ultimately, every mode of objectivity exists for us "only insofar as it intervenes in judgments".¹⁸ While it is true, for example, that the judgment 'a, b, and c are P' ('Pa and Pb and Pc') is not a judgment on this set {a, b, c}, it can be transformed into the latter by the "nominalisation" of the plural subject.^{18a}

So long as we direct our attention toward the first form of judgment, we will deal with the various meanings constituted by the various syntactical operations, and these meanings Husserl calls categories of signification, belonging to the "region of meaning" as distinguished from objects. The syntactical operations give rise to the elementary (and by iteration, complex) forms of liaison between elements of judgments and between judgments themselves. Thus, e.g., the operations of attributing, conjoining, disjoining, concluding, give rise to the "syntactical categories" of property (or predicate), conjunction, disjunction, forms of inference and so forth.¹⁹

But correlative to these are the formal categories of the objects judged about, which are disengaged by nominalisation: the categories of *sachverhalt*, unity, multiplicity, relation, number, etc. "It is precisely in this manner" writes Husserl, "that formal logic is clearly characterized as at once an apophantic and as a formal a priori doctrine of the object."²⁰

It should be clear that the division of formal logic just referred to does not mean that the apophantic is distinguished from formal mathematics by its technique of analysis. For modern developments have clearly shown that the forms of propositions can be treated mathematically i.e. symbolically, and moreover that "this is the only way in which we can construct a universal theory of propositions as an essentially deductive theory".²¹ Formal logic must be a "mathematical logic", but it does not thereby become mathematics, for as logic it retains its thematic orientation toward the judgment as the vehicle of scientific knowledge. The joining of mathematics and logic has been on the level of the "theoretical technique" by which their structure is methodically elaborated, with, so Husserl contends, a concomitant confusion in the sense of the two disciplines. There is, one might say, a single domain of study but with two distinct themes. This must however be further clarified, in particular the claim to the term 'ontology'.

For it may seem that in the foregoing we have rather disallowed the apparent orientation of formal mathematics toward objects in general, by insisting that its categories arise from the predicative apophantic. True, logic itself is limited in its range of syntactic configurations, if the objects of judgments "must be able to exist truly, correlatively if predicative judgments must be able to be true".²² But these configurations are forms of the judgment, and not of the objects "beyond" them.

All of the problems at this point come to focus in the meaning of the judgment, and Husserl turns to the elucidation of a phenomenology of judgment. Certainly logic is concerned with the forms of judgment, but judging is not a game. The intrinsic orientation of judgment is toward knowing, toward cognitive determination of the unities studied by each science. This is why logic deals with predicative judgments as its fundamental

theme. This does not imply that Husserl would reject the study of non-interpreted calculi by the logician, but that he would insist on their implicit logical sense. "The reference to a completely undetermined application, ideally possible, is implied by its [mathematics] proper logical-formal meaning. . . . Consequently, mathematics can remain indifferent with respect to the fact that all of its formations have the sense of formations which must occur in judgments, of any sort whatever, which aim at knowledge."²³ Formal mathematics is not a "game of symbols", but derives from analytic logic: every category of pure mathematics arises originally in and takes its meaning from judgments.

Once again: does this mean that there is no distinction between formal apophantic and formal ontology? Is there not an essential difference, despite the identity of domain, between the two thematic orientations?

Phenomenologically, "objects are for us and are what they are only insofar as they are objects present to our consciousness".²⁴ To judge is to judge about objects, it is to be aware not of judgments, but by means of judgments to be aware of objective determinations. We do not grasp a state of affairs and then silently assert it to ourselves, to grasp it as determinately structured *is* to judge it. We know the thing itself (or the situation, or relation, etc.), although under some determinate aspect: when we reflect on what we have judged (as distinguished from that about which we judged) we turn our attention to the judgment itself, to what Husserl calls the noema of the act of judging.²⁵ The central point is that the judger is oriented toward the object, and hence has to do with it only under categorical (syntactical) forms, "which are therefore ontological forms".²⁶

It is essential to realize that 'ontology' as Husserl uses the term does not mean metaphysics in the Aristotelian sense. Ontology he characterizes as an a priori doctrine of the object, but 'object' means that of which one is aware, and while one is aware of things themselves, they present themselves to awareness only under determinate and limited aspects. Thus, *what* I judge really presents to me *that about which* I judge, although only under certain of its aspects or meanings. Surely, I am aware that there are other aspects, other meanings which present the same object, but I grasp these only insofar as I attain them in other judgments, and I *know* them only insofar as those judgments are verified by evidence. Thus the "object in itself" (to speak in Kantian fashion), really attained in judgment (to speak in unKantian fashion), is attained only through the series of judgments in which I am aware of it, whose syntactical forms "are therefore ontological forms", i.e. forms of the object in the only meaning that "object" can have for me.

The reflection which returns to the judgment as such—the noema of the noetic act of judging, *what* is judged—is motivated by the critical attitude of science (or at a less sophisticated level, in the experience of error, where I realize that "things are not as I thought they were"). The scientist has a more stringent conception of evidence, he is aware that the "evidence of clarity" can be deceptive, and by reason of his vocation and its ideal of critically verified judgments he habitually distinguishes between his opinion

(*Meinung*) or hypothesis and the facts themselves. But this "opinion" is precisely the apophansis of traditional logic, and this is why that logic was always an organon, a logic of science. The treatment of propositions by symbolic analysis, i.e. by the techniques of formal mathematics, have tended to make logic be regarded as a separate discipline, on the same level as physics, astronomy, etc. As we have seen however, Husserl considers this a confusion since the categories of mathematics arise only in and draw their meaning from the syntactical categories of the predicative judgment.

This return to their origin enables us to see that since it is in actual judgments that the world is originally given to ("constituted for") us, logic is necessarily a doctrine of being. The return to the judgment itself is only a theme of mediation,²⁷ a *means*—necessary to exercise a critical control over knowledge, but which is posterior, both in meaning and in time, to that immediate grasping of the real which judging originally and essentially is. "The problem of the passage from the evidence of distinction to the evidence of clarity—in ordinary terms: the problem of the passage from the "formal" signification of logic to its "real" signification—does not pose itself therefore: distinction is only a moment artificially separated from clarity."²⁸

Recall that this contention does not compromise the technical analysis of the mathematician nor of the logician (in the now extended sense of formal logic as a *mathesis universalis*). There is absolutely no need for the mathematician to concern himself with whether the elements about which he reasons really exist or not.²⁹ Frege's assertion that the "train of thought" (reference to meanings) which can accompany formal analysis must accompany it in order for it to be "interesting" and "profitable"³⁰ is either a psychological remark or else ambiguous from Husserl's point of view, in that Frege confuses what one might call the *intentio operantis* and the *intentio operis*.

There is indeed a constraint which logic exercises upon the logician (see the statement of Lee quoted in note (22)). So long as it is logic and not a game with signs, the logician has limits on the free variation of his formulas and connectives. In terms of his preoccupation, these limits merely define for him the *pure Konsequenzlogik als reine Sinnslehre*.³¹ But to the philosopher reflecting on the necessity of those limits, as the conditions of possible truth, i.e. of the possible adequation of judgments to reality, that necessity translates the formal isomorphism which must exist between the judgment as such and the assertions of the scientist about the objects of his domain (i.e. in his phenomenal field).

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It may be well to note some of the differences between Husserl's position and that of Kant, since the similarities are, perhaps deceptively, apparent.

One obvious difference is in the conception of logic; for Kant, this is coextensive with the traditional Aristotelian logic which he never called into question, while for Husserl, formal apophantic must be integrated into a mathematical logic in order to achieve its fullest development. More

importantly, Kant failed to distinguish the question of formal logic from that of the sciences of nature, in the sense that he did not recognize the relation of logic to a "prescientific" world. Here, Husserl believed, Hume was more radical than Kant in his analysis of experience.³²

This theme of the pre-scientific world, the *Lebenswelt*, grows in importance in Husserl's last period, and in *Erfahrung und Urteil* (1939) he undertook the analysis of the relation of judgment to original (pre-predicative) experience. It is the *Lebenswelt* which became the focus of interest for the existentialists, but unfortunately at the expense of Husserl's concern with logic.

As a result, the kind of phenomenology which now flourishes on the continent tends to ignore his contributions to the clarification of the meaning of formal logic, and to manifest a quite un-Husserlian blindness to the values of formalism.³³ It is to be hoped that this will not be true elsewhere, for it is quite possible that the "Platonism" of logicians and mathematicians such as Frege and Cantor finds its most defensible form in the *idealen Sinngebilde* of Husserl's phenomenology.³⁴

This dimension of his thought cannot be entered into here, but it must be noted at least that the preceding discussion of his conception of formal logic has remained at what he called a "naive" level. We have not examined the transcendental foundation of those objects of awareness which are called judgments. We have assumed, for example, that judgments are in some sense simply "there": that, for example, when I return to my thoughts of yesterday, it is to the same judgments that I return. But what guarantees this identity of meaning, what guarantees the objectivity of the signification? On the one hand, we are not dealing with elements or contents of the mind, for then we would be forced to say with Hume that such identity is impossible,³⁵ or at least impossible to ascertain. To be aware of the sameness is to recognize that the object (here, the meaning of the judgment) transcends each temporally distinct thinking of it, i.e. that the meaning is not a constitutive ingredient of the thinking, but that it is the common focus of indefinitely many acts of thinking. (Consciousness is intentional.) On the other hand, the meaning does not impose itself on me as do the objects of perception. In some sense, clearly, I "produce" the judgment, I render it present to me, for without that act it does not present itself. The "syntactical categories" are constituted in the "syntactical operations". (Consciousness is intentional.)

It is within the circle of this paradox—a genuine objectivity essentially related to subjectivity—that Husserl undertakes to reestablish the sense of Leibniz' *vérité-en-soi*. Like the thing-in-itself of Kant's philosophy, mathematics and logic do not appear to be able to live with or without such a category. Husserl's work bears examination as a significant effort to mediate this classical dilemma.

NOTES

1. *Formale und Transzendente Logik*, Halle; Niemeyer, 1929, p. 62. This book will be designated by 'F. T. L.'

2. E. Cassirer, *Essay on Man* New York: Anchor, 1953 p. 164. This does not mean that the idea of a "grammaire générale et raisonnée" is bankrupt. At least, many linguists (e.g. Sapir, Jespersen, Hjelmsten) maintain that there are universal categories realized in all languages. For a discussion, see *ibid.* pp. 164-5.
3. *Logische Untersuchungen* Halle: Niemeyer, 1928 (4th ed.) I, p. 253.
4. "Philosophy as a Strict Science" trans. Q. Lauer in *Cross Currents* vol. 6 (1956) p. 344.
5. It may be that if this section of the Categories had been rewritten after the *Prior Analytics* he would have grounded his restrictions on a more purely logical basis.
6. *Log. Unt.* II, §§10-14.
7. As distinguished from *Unsinn, Widersinn* will be translated by 'non-sense', as meaning something other than 'no sense'. Thus 'no sense' means not having any sense, i.e. not asserting anything for lack of unified meaning. On the other hand, 'nonsense' means asserting something, having unified meaning, but asserting something which is formally impossible. See the 3rd Appendix to F. T. L. where *Widersinn* is related to Wittgenstein's characterization of tautologies and contradictions in the *Tractatus*.
8. *Log. Unt.* II p. 319.
9. The same difficulty, if I am not mistaken, manifests itself in P. F. Strawson's attempt to elaborate a "category criterion" for the logical distinction between subject and predicate. See *Individuals* London: Methuen, 1959, ch. V pt. 2.
10. Cf. Charles Hartshorne, "The Method of Imaginative Variation" in *Journal of Philosophy* vol. 36 (1939) pp. 233-4.
11. Y. Bar-Hillel, "Husserl's Conception of a Purely Logical Grammar" in *Philosophy and Phenomenological Research* vol. 17 (1956) p. 366.
12. F. T. L. p. 4.
13. On the idea of an authentic science, see *Cartesian Meditations* trans. D. Cairns, The Hague: Nijhoff, 1960, §§3-6.
14. F. T. L. p. 57.
15. *Ibid.*
16. "Only those who do not know mathematics under its modern form, in particular formal mathematics, can remain attached to the widespread prejudice that the essence of mathematics lies in number and quantity." *Log. Unt.* I p. 252.
17. F. T. L. p. 68.
18. *Ibid.* p. 69.

- 18a. *Ibid.* pp. 69-70. On the operation of nominalisation, cf. the references to Husserl's earlier writings in F. T. L. *ad loc.* For this particular example, see p. 95.
19. This parallelism is a special case of the general correlation between noesis and noema in phenomenology, which applies to perception, imagination, axiology, etc. In particular, it also gives rise to the logical modalities: cf. *Ideen zu einer reinen Phänomenologie und phänomenologischen Philosophie* Part One, The Hague: Nijhoff, 1950 §134.
20. F. T. L. p. 78.
21. *Ibid.* p. 67.
22. *Ibid.* p. 95. Compare, "What choices may be made in the principles of inference depend on what choices are consistently possible, and although it is not known at the present time with full clarity what this means, it is clear enough that it does not admit of arbitrary choice." H. N. Lee, *Symbolic Logic* New York: Random House, 1961 p. 347.
23. F. T. L. p. 97.
24. *Ibid.* p. 98.
25. *Ibid.* p. 112.
26. *Ibid.* p. 102.
27. *Ibid.* p. 115
28. Tran-duc-Thao, *Phénoménologie et Matérialisme Dialectique* Paris: Minh-Tan, 1951 p. 192. Compare Gilbert Ryle, *The Concept of Mind* New York: Barnes & Noble, 1949 p. 264: "We have to learn to give verdicts before we can learn to operate with suspended judgments. . . [L]ogicians and epistemologists sometimes assume, what I for a long time assumed, that entertaining a proposition is a more elementary or naive performance than affirming that something is the case." This is also the reason behind the quotation from Husserl with which this article began: the judgmental nature of language, if not its contingent forms, is relevant for logic.
29. F. T. L. p. 123.
30. *Translations from the Philosophical Writings of Gottlob Frege* trans. Geach and Black, Oxford: Blackwell, 1952 p. 186.
31. F. T. L. p. 121.
32. F. T. L. p. 234.
33. The only notable exceptions known to me are Suzanne Bachelard's *La Logique de Husserl*, Jean Cavaille's short essay *Sur la Logique et la Théorie de la Science* and some articles of Jean Ladriere.
34. See the brief remarks by H. P. Neisser on phenomenology and the foundations of mathematics in "Phenomenological Approaches in the Social Sciences", *Philosophy and Phenomenological Research* vol. XX (1959) pp. 203-4.

35. For a comparison of the meaning of identity in Hume and Husserl, see Aron Gurwitsch, "On the Intentionality of Consciousness" in *Philosophical Essays in Memory of Edmund Husserl* ed. M. Farber, Cambridge: Harvard U., 1940.

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