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Kurt Gödel's Reading of Edmund Husserl: Seeking the Foundations of Mathematics in the Light of Phenomenology

Kurt Gödel'in Edmund Husserl Okuması: Matematiğin Temellerini Fenomenolojinin Işığında Aramak

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Abstract: In his later works, the great logician and mathematician Kurt Gödel concentrated his focus on philosophical problems such as the implications of set theory, the grammar and philosophy of language, objectivity and relativity, the ontological proof of God's existence, and phenomenology as an exact method. This essay explores how Gödel read the philosophy (of logic and mathematics) of his time and why he turned his attention to Husserl's phenomenology to describe the foundations of mathematics. To begin with, Gödel employs Husserl's significant distinction between Weltanschauung (worldview) philosophy and philosophy as rigorous science: According to the Weltanschauung philosophy, the spirit of time constantly changes so that the ideas discussed and goals attempted are meant to be temporal, and not for the sake of eternal truths, but for that of their own perfection; philosophy as rigorous science, on the other hand, is supratemporal so that its aim is to discover absolute and timeless values. As for the worldview of his time, Gödel saw the development of philosophy, and mathematics leaned toward skepticism, pessimism, and positivism. For instance, the antinomies of set theory have shaken the grounds on which mathematics and logic are founded. Gödel also used these paradoxes in his incompleteness theorems to prove that there are some statements that can neither be proven nor disproved within a system. This also means that arithmetic is not sufficient to prove consistency. From this, however, Gödel does not come to a conclusion for a nihilism in mathematics and logic: These mere antinomies of set theory do not "necessarily" lead us to logical positivism, and neither to such a materialism, nor to any kind of pessimistic theory of knowledge. The incompleteness theorems assert that there are arithmetical propositions that are true but neither provable nor unprovable within their own calculus, so that arithmetic is intrinsically incomplete. However, instead of Alfred Tarski's pathological view of examining the detections within the faulty system and then reforming the system all together, Gödel holds that we need to change our methods to find new patterns that describe the antinomies pointing to the unrecoverable reality of the mathematical world. Thus, Gödel does not follow any variation of the Weltanschauung philosophy of his time, either attempting to reduce mathematical realities to mathematical proofs in order to get rid of antinomies, or endeavoring to rescue a complete system of truths by a closed formal system, both Weltanschauung philosophies fail to set forth a realistic method. In this context, Gödel finds the task of phenomenology

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analogous to what he pursues, in terms of a systematic framework for the foundations of mathematics. Husserl's phenomenology, in Gödel's account, proliferates the intuition of (mathematical) essences and clarifies the meaning of undefinable concepts such as the antinomies of set theory. Applying phenomenological reduction to the objective reality of the mathematical world, Gödel believes that one obtains a clear experiential reality of the essential characteristics of (mathematical and logical) concepts. Briefly, what Gödel finds in Husserl's phenomenology that corresponds to his way of mathematical realism is a thoroughly designated method that gives us mathematical essences back again.

Keywords: Kurt Gödel, Mathematics, Logic, Edmund Husserl, Phenomenology

Öz: Büyük mantıkçı ve matematikçi Kurt Gödel, son dönem çalışmalarında küme teorisinin sonuçları, dilin grameri ve felsefesi, nesnellik ve görelilik, Tanrı'nın varlığının ontolojik kanıtı ve kesin bir yöntem olarak fenomenoloji gibi felsefi sorunlara odaklanır. Bu makale Gödel'in kendi zamanının (mantık ve matematik) felsefesini nasıl okuduğunu ve matematiğin temellerini açıklamak için neden Husserl'in fenomenolojisine yöneldiğini incelemektedir. Gödel, öncelikle Husserl'in *Weltanschauung* (dünya görüşü) felsefesi ile kesin bilim olarak felsefe arasında yaptığı önemli ayrımı kullanır: *Weltanschauung* felsefesine göre zamanın ruhu sürekli değişir, dolayısıyla tartışılan fikirler ve ulaşılmaya çalışılan hedefler zamansaldır ve ebedi hakikatler uğruna değil, kendi mükemmellikleri içindir; öte yandan, kesin bilim olarak felsefe ise zamanüstüdür, dolayısıyla amacı da mutlak ve zamansız değerleri keşfetmektir. Gödel, kendi zamanının dünya görüşünü değerlendirdiğinde, felsefe ve matematiğin gelişiminin şüphecilik, kötümserlik ve pozitivizme doğru eğildiğini görür. Örneğin küme teorisinin antinomileri, matematik ve mantığın üzerine kurulduğu zemini sarsmıştır. Gödel de tamamlanmamışlık teoremlerinde bu paradoksları, bir sistem içinde ne kanıtlanabilen ne de çürütülebilen bazı ifadeler olduğunu ortaya koymak için kullanır. Bu aynı zamanda aritmetiğin kendi tutarlılığını kanıtlamaya uygun olmadığı anlamına gelir. Ancak Gödel buradan matematik ve mantıkta nihilizme düşmek sonucuna varmaz: Küme teorisinin bu açık antinomileri bizi "zorunlu olarak" ne mantıksal pozitivizme, ne materyalizme ne de herhangi bir karamsar bilgi teorisine götürür. Tamamlanmamışlık teoremleri, kendi hesap sistemi içinde doğru olan ancak ne kanıtlanabilir ne de kanıtlanamaz olan aritmetiksel önermeler olduğunu, dolayısıyla aritmetiğin özünde tamamlanmamış olduğunu ileri sürer. Bununla birlikte, Alfred Tarski'nin bir sistem içindeki hataları tespit edip sistemi hep birlikte yeniden biçimlendirmeye yönelik patolojik görüşü yerine Gödel, matematiksel dünyanın telafi edilemez gerçekliğine işaret eden antinomileri betimleyen yeni kalıplar bulmak için yöntemlerimizi değiştirmemiz gerektiğini savunur. Dolayısıyla Gödel, döneminin *Weltanschauung* felsefesinin herhangi bir varyasyonunu takip etmez; ne antinomilerden kurtulmak için matematiksel gerçeklikleri matematiksel kanıtlara indirgemeye çalışır ne de kapalı bir biçimsel sistemle eksiksiz bir doğrular sistemini kurtarmaya çabalar, çünkü Gödel'e göre her iki *Weltanschauung* felsefesi de gerçekçi bir yöntem ortaya koyamaz. Bu bağlamda Gödel, fenomenolojinin görevini, matematiğin temelleri için sistematik bir çerçeve arayışına benzer bulur. Gödel'e göre Husserl'in fenomenolojisi (matematiksel) özlere yönelik sezgiyi çoğaltır ve küme teorisinin antinomileri gibi tanımlanamayan kavramların anlamının açıklığa kavuşturulmasını sağlar. Fenomenolojik indirgemeyi matematiksel dünyanın nesnel gerçekliğine uygulayan Gödel, (matematiksel ve mantıksal) kavramların temel özelliklerinin açık bir deneyimsel gerçekliğini elde ettiğine inanır. Kısaca ifade etmek gerekirse, Gödel'in Husserl'in fenomenolojisinde bulduğu ve kendi matematiksel gerçekçilik yöntemine karşılık gelen şey, matematiksel özleri bize geri veren, derli toplu bir yöntemdir.

Anahtar Kelimeler: Kurt Gödel, Matematik, Mantık, Edmund Husserl, Fenomenoloji

Introduction

> Now in fact, there exists today the beginning of a science which claims to possess a systematic method for such a clarification of meaning, and that is the phenomenology founded by Husserl. Here clarification of meaning consists in focusing more sharply on the concepts concerned by directing our attention in a certain way, namely, onto our own acts in the use of these concepts, onto our powers in carrying out our acts, etc. But one must keep clearly in mind that this phenomenology is not a science in the same sense as the other sciences. Rather it is [or in any case should be] a procedure or technique that should produce in us a new state of consciousness in which we describe in detail the basic concepts we use in our thought, or grasp other basic concepts hitherto unknown to us. I believe there is no reason at all to reject such a procedure at the outset as hopeless. Empiricists, of course, have the least reason of all to do so, for that would mean that their empiricism is, in truth, an apriorism with its sign reversed.
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> — Kurt Gödel[1]

It is quite understandable that a genius whose work in his earlier ages blazed a trail in mathematics or logic turns his interest toward philosophy in order to construe what he has accomplished. This is the case for Kurt Gödel as well, who in his later works concentrated his focus on the philosophical problems comprising the implications of set theory, the grammar and philosophy of language, objectivity and relativity, the ontological proof of God's existence, and phenomenology as an exact method. With regard to these inquiries, we know that Gödel was much exposed to Immanuel Kant's transcendental philosophy, Arthur Schopenhauer's idealism, and Edmund Husserl's phenomenology. This essay intends to scrutinize how Gödel read Husserl and attempts to elucidate the speculative relationship between Gödel's incompleteness theorems and what Husserl suggests in his phenomenological movement.

In order to make this relationship clear, the first part of the essay will go over one of Gödel's posthumous papers, "The Modern Development of the Foundations of Mathematics in the Light of Philosophy," which was initially thought as a lecture, whose main idea is basically to introduce Husserl's phenomenology as a well-conceived technique utilizable for not explaining but describing the foundations of mathematics. For Gödel believes, "there is no reason at all to reject such a procedure at the outset as hopeless."[2] Despite the fact that he does not give us so much information explaining Husserl's phenomenology or how his procedure of thinking becomes useful for the philosophy of mathematics, it would not be rather peculiar to speculate that Gödel understood Husserl's method well. Thus, the second

1 Kurt Gödel, "The Modern Development of the Foundations of Mathematics in the Light of Philosophy" (1961/?), in *Kurt Gödel: Collected Works, Volume III: Unpublished Essays and Lectures*, eds. S. Feferman, J.W. Dawson, Jr., W. Goldfarb, C. Parsons, R.M. Solovay (New York & Oxford: Oxford University Press, 1995), 383.

2 Gödel, 383.

part of the essay will shed light on the question of what Gödel saw in Husserl's phenomenology. Husserl's phenomenology, in Gödel's account, not only proliferates the intuition of essences for mathematical realism but also provides a rigorous method for clarifying the meaning of undefinable concepts, such as the antinomies of set theory.

Gödel's Critical Position in the *Weltanschauung* Philosophy

Gödel explicates the objective of the lecture on mathematics and philosophy in his first words: "I would like to attempt here to describe, in terms of philosophical concepts, the development of foundational research in mathematics since around the turn of the century, and to fit it into a general schema of possible philosophical world-views."[3] Here it is to be expected that Gödel will describe a general overview of recent tendencies in philosophy. By so doing, Gödel employs Husserl's significant distinction between *Weltanschauung* philosophy and philosophy as a rigorous science. According to the former —viz. *Weltanschauung* philosophy— the spirit of time constantly changes so that the ideas discussed and goals attempted are meant to be temporal, and not for the sake of eternal truths, but for that of their own perfection. Since René Descartes, to illustrate, modern philosophy as a world-view, or as an ideology, is a different one from medieval thought as well as from ancient Greek philosophy. Philosophy as a rigorous science, on the other hand, is supratemporal so that its aim is to discover absolute and timeless values; and yet, in Husserl's consideration, there has not emerged any attempt so far.[4]

To begin with, Gödel outlines the *Weltanschauung* philosophy of his time. The philosophical tendencies at hand, in this picture, can be divided into two categories: On the *right* side of the chart, so to speak, there are spiritualism, idealism, theology, apriorism, and optimism, whereas there appear skepticism, materialism, positivism, empiricism, and pessimism on the *left*. In the wake of the Renaissance and the upsurge of modernity, according to Gödel, the development of philosophy leaned from the right toward the leftward approach; there followed the downfall of conservative thinking and the rise of skepticism in the modern era. As for mathematics, even though philosophical trends became prone to the leftward view, it persevered its inclination toward the right until the second half of the 19th century. Nevertheless, the antinomies of set theory do indeed cut the branches of the robust arithmetic that Gottlob Frege initiated while mathematicians were still standing on them. As a result, these antinomies introduced by Bertrand Russell and his fiery followers led the last stronghold, *arithmetic*, to a more leftist view, that is, to skepticism, pessimism, and positivism in mathematics. That is to say, the superiority of arithmetic was on shaky ground, and this became the new portrait of the *Weltanschauung* in terms of mathematics and logic.

3 Gödel, 375.

4 Edmund Husserl, "Philosophy as Rigorous Science", in *Phenomenology and the Crisis of Philosophy*, trans. Quentin Lauer (New York: Harper & Row, 1965) 135-36.

Having said that, it is important to note that Gödel was at odds with this specific spirit of time. Though he appointed his incompleteness theorems on the basis of Russell and Whitehead's *Principia Mathematica*, Gödel believed their contribution was neither advanced nor original. The skeptical logic and arithmetic following the logical paradoxes and contradictions was not accepted in the Gödelian perspective. As he maintains,

> it was the antinomies of set theory, contradictions that allegedly appeared within mathematics, whose significance was exaggerated by sceptics [sic] and empiricists and which were employed as a pretext for the leftward upheaval. I say "*allegedly*" and "exaggerated" because, in the first place, these contradictions did not appear within mathematics but near its outermost boundary toward philosophy; and secondly, they have been resolved in a manner that is completely satisfactory and, for everyone who understands the theory, nearly obvious. Such arguments are, however, of no use against the spirit of the time, and so the result was that many or most mathematicians denied that mathematics, as it had developed previously, represents a system of truths.[5]

In other words, Gödel was not much impressed with the antinomies in the set theory, such as the liar's paradox, Russell's paradox of the set of all sets, or Grelling's paradox of the "heterological." Interestingly enough, in his early masterpiece, "On Formally Undecidable Propositions of Principia Mathematica and Related Systems," Gödel uses these paradoxes in his incompleteness theorems in order to prove that in each system, there are some statements which can neither be proved nor disproved within the same system.[6] This basically means that arithmetic is not eligible to prove its own consistency. Despite all the designable consequences of his own theorem, Gödel does not come to theorize a nihilistic approach to mathematics and logic. Rather, he is precautious to distance himself from those tendencies in mathematicians and not to sacrifice eternal truths for the sake of that spirit of time. Furthermore, he is so vigilant not to promote the rightward approaches whose aim is to conserve mathematical certainty. By the incompleteness theorems, he has already asserted that there are arithmetical propositions that are true but neither provable nor unprovable within their own calculus, so that arithmetic is intrinsically incomplete. Therefore, contrary to what David Hilbert will later faithfully strive to reinforce, "the rightward conception of mathematics as a complete system of truths cannot be rescued by appeal to a set of axioms and formal rules."[7]

The main purpose of Gödel's lecture —"The Modern Development of the Foundations of Mathematics in the Light of Philosophy"— seems to authentically position himself according to the question at hand, that is, what is to do with these antinomies in terms

5 Gödel, "The Modern Development of the Foundations of Mathematics in the Light of Philosophy" (1961/?), 377.

6 Kurt Gödel, *On Formally Undecidable Propositions of Principia Mathematica and Related Systems*, trans. B. Meltzer (New York: Dover Publications, 1930), 71.

7 Dagfinn Føllesdal, "Introductory Note to 1961/?", in *Kurt Gödel: Collected Works, Volume III: Unpublished Essays and Lectures*, eds. S. Feferman, J.W. Dawson, Jr., W. Goldfarb, C. Parsons, R.M. Solovay (New York & Oxford: Oxford University Press, 1995), 365.

of his incompleteness theorems: the mere antinomies of set theory, in this regard, do not *necessarily* lead us to logical positivism, and neither to such a materialism, nor to any kind of pessimistic theory of knowledge.

First of all, Gödel is at odds with logicism in which logical paradoxes are to be considered "impredicable"[8] while attempting to construct an all-embracing universal logic to which mathematics can be reducible.[9] To get back to the earlier history of logicism, as Frege conjures up such a complete system when he maintains "arithmetic would be only a further developed logic, every arithmetic theorem a logical law, albeit a derived one,"[10] Peano arithmetic and Cantorian set theory become the concrete models of logic in terms of completeness and self-sufficiency. Thus, all arithmetic truths are also provable as theorems within the same system. However, Russell's paradox and the following asserted paradoxes utterly devastate the consistency of the set theory. This catastrophic discovery leads the Vienna School, to which Gödel was a discreet participant, to constitute a theory escaping such antinomies and filtering out every possible statement analytically true and verifiable so that we can reach cognitively meaningful propositions. And yet, the verificationist theory of meaning (VTM) for such a hygienic and universal system is doomed to failure precisely because it is exclusively stuck into positivistic verifications and fails to see the incompleteness of man-made systems. As Gödel will show in the first incompleteness theorem proving the existence of undecidable propositions in a determined system, "no kind of mathematics is ever going to be comprehensive enough to express fully the everyday notion of truth; in linguistic terms, no amount of syntax will ever entirely eliminate semantics."[11] Simply put, just as the notion of the arithmetic truth is no longer arithmetically definable in the arithmetic system applied, so mathematics cannot be the syntax of language, as Carnap propounds.

Furthermore, Hilbert's solution to eliminate the antinomies of the set theory is also in vain. According to his program, one should create an internally closed and *meaningless* framework in which all formal propositions that can be proved (i.e., syntax) are equated with what is actually true in the mathematical world (semantics).[12] Such a formal system will announce the denunciation of metaphysics and apriorism: "A mathematics done formally is a mathematics purged of any 'given' truths—those claiming an unquestionable source in the 'true nature of things,' in and of themselves."[13] Therefore, a formal system that is out of paradoxes will become

8 Rudolf Carnap, "The Logicist Foundations of Mathematics", in *Philosophy of Mathematics: Selected Readings*, Second Edition, eds. Paul Benacerraf and Hilary Putnam (Cambridge: Cambridge University Press, 1983), 46.

9 Carnap, 41.

10 Gottlob Frege, "The Concept of Number", in *Philosophy of Mathematics: Selected Readings*, Second Edition, eds. Paul Benacerraf and Hilary Putnam (Cambridge: Cambridge University Press, 1983), 153.

11 John L. Casti and Werner DePauli, *Gödel: A Life of Logic* (Cambridge, MA: Perseus Publishing, 2000), 11-12.

12 Johann Von Neumann, "The Formalist Foundations of Mathematics", in *Philosophy of Mathematics: Selected Readings*, Second Edition, eds. Paul Benacerraf and Hilary Putnam (Cambridge: Cambridge University Press, 1983), 61; Casti and DePauli, *Gödel*, 28-38.

13 Rebecca Goldstein, *Incompleteness: The Proof and Paradox of Kurt Gödel* (New York: W.W. Norton & Company, 2005), 133.

absolutely complete and consistent in itself, so that there will be no external truth outside of it.[14] Gödel thereby forms his completeness theorem for first-order logic. However, he does not stop here but proceeds to launch the first incompleteness theorem.

In a nutshell, Gödel establishes this theorem on the basis of Hilbert's formalism and asserts that for any system claiming to be complete and consistent, there must be some statements that are true yet undecidable in terms of whether they are provable or unprovable: For instance, the bracketed sentence [This sentence is false] is, in this regard, a proposition from which both A and ~A can be derivable. The sentence bracketed is undecidable within the system. Thus, the attempt to formalize a closed but complete system is necessarily obliged to be incomplete because of those sorts of sentences existing both within and without the framework. Therefore, we may draw a conclusion that a formal system cannot prove its own consistency from itself, within itself.[15] That is why Hilbert's attempt remains blind not only to the antinomies but also to its own foundation. With Gödel's explorations of the consequences of Hilbert's model, however, it has become obvious that "Gödel thus showed us the mathematical world is more complex (and hence stronger) than mathematical language. Language is itself sometimes more precise than thinking, but it is simultaneously weaker in that its syntax does not allow a reconstruction of all conceivable models."[16]

And finally, despite the fact that the idea of incompleteness in a system seems nihilistic enough, Gödel never buys into any pessimistic account in which the logical antinomies are regarded as chaotic diseases. To quote Alfred Tarski here,

> Personally, as a logician, I could not reconcile myself with antinomies as a permanent element of our system of knowledge. However, I am not the least inclined to treat antinomies lightly. The appearance of an antinomy is for me *a symptom of disease*. Starting with premises that seem intuitively obvious, using forms of reasoning that seem intuitively certain, an antinomy leads us to nonsense, a contradiction. Whenever this happens, we have to submit our ways of thinking to a thorough revision, to reject some premises in which we believed or to improve some forms of argument which we used. We do this with the hope not only that the old antinomy will be disposed of but also that *no new one will appear*. To this end we test our reformed system of thinking by all available means, and, first of all, we try to reconstruct the old antinomy in the new setting; this testing is a very important activity in the realm of speculative thought, akin to carrying out crucial experiments in empirical science.[17]

What Tarski suggests is to *examine* the nature of language as a whole, detect the symptoms of the diseases (i.e., the antinomies and paradoxes), and finally, reform our system in order

14 R.B. Braithwaite, "Introduction", in Kurt Gödel, *On Formally Undecidable Propositions of Principia Mathematica and Related Systems* (New York: Dover Publications, 1992), 23.

15 Braithwaite, 25-26.

16 Casti and DePauli, *Gödel*, 73.

17 Alfred Tarski, "Truth and Proof", *Scientific American* 220, no. 6 (1969), 66.

to overcome them. Instead of this *pathological* view, Gödel holds that if our methods do not allow us to comprehend the complexity of mathematical reality, then we need to change our methods to find new patterns that describe the antinomies pointing to the unrecoverable reality of the mathematical world.

Briefly put, in contrast to the positivistic denunciation of metaphysics, to Hilbert's conservative attempt to create a closed formal system, and to Tarski's pathological approach to the antinomies, Gödel's *metamathematics* announces that we always escape the limitations of man-made systems by grasping the independent truths of abstract reality. In other words, we do not invent our mathematical or logical proofs and theorems in a well-designed system that is closed and sealed. Rather, we make discoveries by surpassing our boundaries. As Goldstein states succinctly, "Gödel believed our expressible knowledge, demonstrably our mathematical knowledge, is greater than our systems. Whereof we cannot formalize, thereof we can still know."[18] Ascertaining the limits of formal systems, Gödel indicates that the mathematical language is always insufficient to cover the mathematical world. The truths of mathematics are always awaiting to be found by the human mind and always greater than what we can find.

Gödel and Husserl's Phenomenology

From what has been so far outlined, we come to highlight that the most significant theme Gödel elaborates is that the incompleteness theorems necessarily reinforce neither the leftward tendencies enhancing skepticism, positivism, and pessimism, nor the rightward conservative approaches promoting idealism, apriorism, and optimism. Rather, he holds that the incompleteness theorems are never contradictory with the completeness theorem proving the equilibrium of syntax and semantics. This is the most key conclusion precisely because what Gödel proposes is not to explain but to describe this enigmatic state with its own intricacies. For the first incompleteness theorem itself —neither A nor ~A is provable— seems a self-contradictory arithmetical proof asserting its own unprovability within the same arithmetical system. In this regard, it would not be wrong to say that Gödel's theorem speaks both from within and outside mathematics. That is why, either attempting to reduce mathematical realities to mathematical proofs in order to get rid of antinomies, or endeavoring to rescue a complete system of truths by a closed formal system, both *Weltanschauung* philosophies fail to set forth a realistic method. To put it another way, Gödel does not follow any variation of the *Weltanschauung* philosophy of his time. Instead, he underlines that "the truth lies in the middle or consists of a combination of the two conceptions."[19] He finds a ground between these two extremes, which is the same point, he concludes, to which Husserlian phenomenology has been headed: a rigorous method that provides a significant procedure establishing the midway between the idealistic metaphysics (i.e., the rightward view) and the positivistic rejection of metaphysics (i.e., the leftward view). Notwithstanding

18 Goldstein, *Incompleteness*, 193.

19 Gödel, "The Modern Development of the Foundations of Mathematics in the Light of Philosophy" (1961/?), 381.

this brilliant yet unexpected encounter, Gödel in the lecture does not thoroughly go over Husserl's philosophy, but we may proceed to speculate from where he inaugurated.

In order to discover what this aforementioned midway refers to, we need to look over Husserl's rendition of the notion of "philosophy as rigorous science." To begin with, taking account of Husserl's mathematical background, it should be noticed that his project implicitly follows Leibniz's idea of the universal characteristics of mathematics. Philosophy as an exact science, in this regard, has been placed as opposed to the *Weltanschauung* philosophy with respect to a new scientific manner of philosophizing about the constitution of the ideas.[20] Succinctly put, the fundamental task of this new line of thought is "to establish philosophy on a basis of unimpeachable rationality"[21] in order to achieve the genuine purpose of saving human reason from the sickness of craving for ultimate perfection and infinity regardless of human limitedness and finitude.[22]

Gödel finds the task of phenomenology quite analogous to what he pursues in terms of a systematic framework for the foundations of mathematics. In this so-called scientific foundation, philosophy becomes a science in a different way from positive sciences simply because the chief goal of the latter does not cover the objective validity of cognition on which the former mainly focuses:

> It is the philosopher's task to penetrate to the deeper validity rooted in the very essence of the object under investigation, which essence, of course, is also ultimate explanation for the way things act—because they are what they are. More importantly, from Husserl's point of view, the essences of things will be the truth of knowledge about them. *Absolute being and absolute truth become identified, then, and they are identified in the absolute knowledge to which only philosophy can lay claim*—absolute being is philosophically known being.[23]

It has become clearer that the attempt to introduce philosophy as a rigorous science is indeed the historical purpose of philosophy, that is, to reach pure and absolute knowledge of the essences.[24] To quote from Husserl's *Ideas I*, "Phenomenology purports to be nothing other than a doctrine of essences within pure Intention."[25] Thus, the phenomenological method poses genuine questions concerning the foundational origins in order for grasping the essences through intuition.[26] That is why the phenomenological method in search of essences sharply differs from the natural sciences of the facts.[27] Here it should be noted that Husserl's rejection

20 Husserl, "Philosophy as Rigorous Science", 129-30; Richard Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", *The Bulletin of Symbolic Logic* 4, no. 2 (1998), 184.

21 Lauer, "Introduction", 4.

22 Lauer, "Introduction", 7; Husserl, "Philosophy as Rigorous Science", 134 and "Philosophy and the Crisis of European Man", in *Phenomenology and the Crisis of Philosophy*, trans. Quentin Lauer (New York: Harper & Row, 1965), 158.

23 Lauer, "Introduction", 45; my italics.

24 Husserl, "Philosophy as Rigorous Science", 71.

25 Edmund Husserl, *Ideas for a Pure Phenomenology and Phenomenological Philosophy; First Book: General Introduction to Pure Phenomenology*, trans. Daniel O. Dahlstrom (Indianapolis & Cambridge: Hackett Publishing, 2014), §66, 120.

26 Husserl, "Philosophy and the Crisis of European Man", 145-47.

27 Husserl, "Philosophy as Rigorous Science", 121-22; Richard Tieszen, "Kurt Gödel and Phenomenology", *Philosophy*

of natural sciences saliently corresponds to Gödel's rejection of any formal system reducing the arithmetical truths (i.e., the essences of reality) to a purely mechanical system of provability. "It might even be suggested that," as Richard Tieszen claims boldly, "the incompleteness theorems and related results on decidability and consistency are in fact examples of philosophy as rigorous science. They are, that is, supported by a particular philosophy and they show in a rigorous way the limits of a purely formal, syntactical, or mechanical conception of mathematics."[28]

Tieszen outlines in this passage what Gödel understands by mathematical realism, or —to call it in a merging way of Husserl and Gödel— *phenomenological realism*, "cultivating (deepening) knowledge of the abstract concepts," i.e., proliferating the intuition of (mathematical) essences.[29] Thus, phenomenological realism, in Gödel's account, provides a clarification of meaning. As he maintains in the lecture, Husserl's phenomenology provides a precise technique allowing us to elucidate the meaning of undefinable concepts, such as the antinomies of the set theory.[30] The propositions that are neither provable nor unprovable within a system, in this way, cannot be formally defined because our abstract concepts (and our perceptions) are constrained and limited, and because our mathematical (and also perceptual) intuition can always be under illusion.[31] These undefinable and undecidable propositions are, however, only perceived and described by the phenomenological method, prescribing a new state of consciousness as we intuit the extensions of the axioms of the set theory.[32]

Hence, a better understanding of mathematical reality is based on the idea that mathematical proofs and unprovability of some statements have an essential effect on meaning. This intricate nature of mathematical reality, which exists as *given* quite independently of us, can be exhausted neither by a syntactic nor any semantic system; however, following the Husserlian path of phenomenological thinking, we are in a position, that is limited and constrained, only to perceive and describe, i.e., only to *bracket* the objective reality (of concepts) present to consciousness in order to obtain a clear experiential reality of the essential characteristics of concepts.[33] As Gödel concisely writes in "Some Basic Theorems

of Science 59, no. 2 (1992), 179.

28 Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", 197.

29 Gödel, "The Modern Development of the Foundations of Mathematics in the Light of Philosophy" (1961/?), 383.

30 Gödel, 383; Tieszen, "Kurt Gödel and Phenomenology", 181.

31 Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", 193; Tieszen, "Kurt Gödel and Phenomenology", 186.

32 Føllesdal, "Introductory Note to 1961/?", 366; Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", 197.

33 Kurt Gödel, "Russell's Mathematical Logic" (1944), in *Philosophy of Mathematics: Selected Readings*, Second Edition, eds. Paul Benacerraf and Hilary Putnam (Cambridge: Cambridge University Press, 1983), 456; Gödel, "Some Basic Theorems on the Foundations of Mathematics and Their Implications" (1951), in *Kurt Gödel: Collected Works, Volume III: Unpublished Essays and Lectures*, eds. S. Feferman, J.W. Dawson, Jr., W. Goldfarb, C. Parsons, R.M. Solovay (New York & Oxford: Oxford University Press, 1995), 320; Gödel, "Is Mathematics Syntax of Language" (1953/9), in *Kurt Gödel: Collected Works, Volume III: Unpublished Essays and Lectures*, 354; Føllesdal, "Introductory Note to 1961/?", 369-70; Lauer, "Introduction", 27-48; Tieszen, "Kurt Gödel and Phenomenology", 178; Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", 193.

on the Foundations of Mathematics and Their Implications," "Our knowledge of the world of concepts may be as limited and incomplete as that of the world of things. It is certainly undeniable that this knowledge, in certain cases, not only is incomplete, but even indistinct."[34]

Conclusion

Notwithstanding this incomplete and indistinct state of our cognition, the essences of which we are in search are ideally objective and always remain to be discovered by the act of human consciousness. That is also to say that the consideration of Gödel's incompleteness theorems with regard to stirring up relativity is but an abuse of their results. And yet, what the theorems unravel is that the essences intuited by our incomplete and imperfect cognition transcend our experience of the objects. This is, in Gödel's account, not a denunciation of reality but a manifestation of *how* humans think in terms of grasping the essences of the objects. Therefore, Gödel's incompleteness theorems do not lead us toward a leftward worldview in terms of losing the objective reality of the essences; on the contrary, they are managed to unfold a well-established robust kind of objectivity in which (mathematical) reality exceeds all human attempts to formalize.[35] In this regard, just as Husserl's phenomenological method reviving philosophy as a rigorous science,[36] so Gödel's incompleteness theorems in virtue of this highly Platonic mathematical realism are properly situated against naturalism, positivism, materialism, empiricism, formalism, or any other reductionist approaches related to the essences.

In a word, what Gödel finds in Husserl's phenomenology that corresponds to his way of mathematical realism is, a thoroughly designated method "that gives mathematical essences their due without necessarily denying the usefulness or importance of formalization. That would be the method of a phenomenological or critical realism in which the epistemological role of categorial intuition is not eliminable."[37] In conclusion, we can say that Gödel, in his later works, finds a promising method in Husserl's phenomenology for his incompleteness theorems. Although he does not offer any in-depth analyses and considerations of Husserl's philosophy in his short essays and lectures, we can argue that when determining his own position in relation to the philosophy of his time, Gödel is close enough to phenomenology's project of grounding philosophy as an exact science. For Gödel, like Husserl, pursues a realism in which we can reach (mathematical) essences rather than adopting a positivist or nihilist attitude toward science.

34 Gödel, "Some Basic Theorems on the Foundations of Mathematics and Their Implications" (1951), 321.

35 Tieszen, "Kurt Gödel and Phenomenology", 188.

36 Husserl, "Philosophy as Rigorous Science", 74-79, 88.

37 Tieszen, "Gödel's Path from the Incompleteness Theorems (1931) to Phenomenology (1961)", 201.

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