Gödel and Philosophical Idealism[†]

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Kurt Gödel made many affirmations of robust realism but also showed serious engagement with the idealist tradition, especially with Leibniz, Kant, and Husserl. The root of this apparently paradoxical attitude is his conviction of the power of reason. The paper explores the question of how Gödel read Kant. His argument that relativity theory supports the idea of the ideality of time is discussed critically, in particular attempting to explain the assertion that science can go beyond the appearances and 'approach the things'. Leibniz and post-Kantian idealism are discussed more briefly, the latter as documented in the correspondence with Gotthard Günther.

Kurt Gödel is often represented, and indeed often represented himself, as an archetypical realist about logic and mathematics. Affirmations of realism in other domains can also be found in his writings. However, compared with contemporary realists Gödel shows a high degree of engagement with philosophers who have in one way or another called themselves or been called idealists. About his general philosophical view, he is quoted by Hao Wang as saying, 'My theory is rationalistic, idealistic, optimistic, and theological.'[1] That raises the question how he understood the term 'idealistic' and how he reconciled this feature of his outlook with the realism he avows. It also raises the question what he found of interest and value in the idealist tradition.

In discussing Gödel as a philosopher, one has to exercise some caution. Gödel's claim to major significance rests on achievements in mathematics, especially mathematical logic. Probably his mathematical results, especially his proof of the incompleteness of arithmetic, have had a greater

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[1] [Wang, 1996, remark 0.2.2, p. 8]. Gödel's writings are cited according to his *Collected Works* (CW), [Gödel, 1986; 1990; 1995; 2003]. Quotations of writings in German are in the translations of CW.

impact on philosophy than his own properly philosophical writing. In his logical work, he took special care to formulate his main results so that they would be acceptable across the divisions in the foundations of mathematics that existed at the time. Although he argued in later years that a certain philosophical point of view made them possible, that point of view was not directly embodied in the content of the theorems or their proofs.[2] Gödel the philosopher often reveals consciousness of the importance of his mathematical achievement, and then his philosophizing consists of reflection on his own results or on the area of mathematics where his results would be placed. More generally, the most developed part of Gödel's philosophical work is in the philosophy of logic and mathematics.

However, Gödel had general aspirations in systematic philosophy. A great deal of his time and energy, especially after he settled at the Institute for Advanced Study in 1940, was devoted to the study of philosophical writings, especially of Leibniz, Kant, and, from 1959 on, Husserl. He was more influenced by historical figures than by the philosophy of his own time, with the exception of the Vienna Circle as he encountered it at the beginning of his career and the philosophy underlying the proof-theoretic program of the Hilbert school. The influence of both of these can be described as largely but far from entirely negative.

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I

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Something should be said at the outset about Gödel's knowledge of the idealist tradition. Kant's *Critique of Pure Reason* was evidently the first philosophical work that he studied seriously, beginning at the age of 16. Although many of the comments about Kant in his writings are critical, one can hardly doubt that Kant made an impression that stayed with him. His last major mathematical work, his discovery of rotating solutions to the field equations of general relativity, originated according to his own testimony in reflection on Kant's conception of the transcendental ideality of time. Part of the attraction that Husserl exercised on him in his late years was that he thought that Husserl's philosophy achieved more satisfactorily what Kant aimed at.

As a student in Vienna, Gödel was exposed to the history of philosophy through lectures of Heinrich Gomperz, but we do not know what particular figures most engaged him at that time. In view of his later avowals of 'Platonism', one would expect Plato to have been one of them. However, comment on ancient philosophy is infrequent in his later writing. Wang

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[2] See Gödel's letters to Wang of 7 December 1967 and 7 March 1968, published in edited form in [Wang, 1974, pp. 8–11]. The letters as originally received by Wang appear in CW V, 396–399, 403–405. Some issues about the letters and their editing for Wang's book are discussed in §§ 1.1, 1.2, and 2.1 of my introductory note in CW V to the Gödel-Wang correspondence.

nonetheless mentions Plato along with Leibniz and Husserl as one of Gödel's three philosophical 'heroes' [Wang, 1996, p. 297]. But of the remarks from their conversations that Wang includes in his book, only three mention Plato, and they are very general.[3] I conjecture that Plato offered Gödel a very general model of a conceptual realist view, but that he did not engage deeply with the details of Plato's philosophy.

According to Karl Menger, Gödel had a serious interest in Leibniz already in the early 1930s. But it was in the years 1943 to 1946 that he studied Leibniz's writings most intensely. It may be that it is primarily the Leibnizian aspects of his own view that prompted him to describe his theory as idealistic. I will say a little more later about what Gödel absorbed from Leibniz.

Gödel evidently devoted some time to reading the classical German idealists Fichte, Schelling, and Hegel, and his correspondence with Paul Bernays contains comments on one other figure of Hegel's generation, Jakob Friedrich Fries. Hegel is mentioned occasionally in the conversations with Wang, but I have not derived from the remarks a clear idea of any positive appropriation by Gödel of ideas from Hegel. The best documented engagement with post-Kantian idealism is his correspondence with Gotthard Günther in the 1950s.[4]

In what follows I will begin with Gödel's reflection on Kant and try to arrive at a picture of how he viewed Kant's philosophy. Since Kant is the philosopher of the relevant tradition about whom I know most, the largest part of this paper will be devoted to him. I will then make some briefer remarks about Leibniz. What I have to say about classical post-Kantian idealism will be limited to what can be learned from the correspondence with Günther and will therefore mainly summarize what I have already written about it.[5] I will omit Husserl, for reasons of space and because serious Husserl scholars have already written about Gödel's appropriation of Husserl.[6]

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[3] Two (5.3.5 and 9.2.3) cite with approval Plato's stipulation that no one not versed in geometry should be admitted to the Academy, an attitude that Gödel's positivist opponents would no doubt have sympathized with as well. The third, 5.4.6, cites the fact that Plato was followed by Aristotle in support of the claim that 'the spirit of time always goes to positivism and materialism'.

[4] One might expect Gödel to have found Bolzano congenial, but his name is not mentioned in the writings included in CW or in the remarks published in Wang's book. Bolzano could be described as anti-idealist. That might have repelled Gödel. But it may be that he did not come sufficiently to Gödel's attention.

[5] Introductory note to the correspondence, in CW IV 457–476.

[6] See some of the essays in [Tieszen, 2005], Dagfinn Føllesdal's introductory note to [Gödel, *1961/?], CW III 364–373, and [van Atten and Kennedy, 2003]. See also [Hauser, 2006], which focuses more specifically on set theory.

II

What seems paradoxical in Gödel's stance on questions of realism and idealism is quite directly expressed in a passage in his letter to Günther of 30 June 1954:

> The reflection on the subject treated in idealistic philosophy (that is, your second topic of thought), the distinction of levels of reflection, etc., seem to me very interesting and important. I consider it entirely possible, that this is 'the' way to the correct metaphysics. However, I cannot go along with the denial of the objective meaning of thought that is connected with it, [although] it is really entirely independent of it. I do not believe that any Kantian or positivistic argument or the antinomies of set theory or quantum mechanics has proved that the concept of objective being (no matter whether for things or abstract entities) is senseless or contradictory.[7] When I say that one can (or should) develop a theory of classes as objectively existing entities, I do indeed mean by that existence in the sense of ontological metaphysics, by which, however, I do not want to say that abstract entities are present in nature. They seem rather to form a second plane of reality, which confronts us just as objectively and independently of our thinking as nature. (CW IV 502, 504, trans. 503, 505)

I shall return to this passage in its own context. For the present I will note that it claims that certain insights of idealistic philosophy are compatible with a generally realistic point of view.

I think the key to this apparent paradox lies in a personal conviction of Gödel, his rationalistic optimism.[8] This is first of all a belief, probably held before any philosophical arguments for it were developed, in the powers of the human mind, especially in the sphere of pure reason. This may be the most essential kinship that he discerned with Leibniz. With respect to mathematics, he shared the conviction associated with Hilbert that for every well formulated mathematical problem there is in principle a solution, although his own incompleteness theorem implies that this might require introducing new axioms beyond those used in current mathematics.

The same conviction undoubtedly disposed him against any form of physicalism or materialism in metaphysics, as well as against empiricism

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[7] Gödel here has a footnote, which reads, 'I don't wish by that to claim that naïve thought already grasps objective being on all points, as ontological metaphysics often seems to suppose.' The term 'ontological metaphysics' had been used by Günther with a specific meaning that Gödel is probably not following and may not have grasped; I think he probably means classical rationalist metaphysics, such as is the target of Kant's Transcendental Dialectic.

[8] Cf. [Wang, 1974, p. 324]. But the phrase seems to be due to Gödel himself; see [Wang, 1996, p. 317] and the evidence cited in note 11 below.

in epistemology. It may also have motivated his probably early reaction against the views prevailing in the Vienna Circle. This conviction is in evidence in several of the theses that Gödel wrote as a statement of his philosophical viewpoint.[9] He therefore seems to have sought a metaphysics that will allow for the autonomy and power of mind. But in his more developed philosophical thought only certain elements of this metaphysics appear, in particular his realism about mathematical knowledge and, buttressing this, about concepts. In spite of his belief in systematicity in philosophy, we do not have evidence that he developed his metaphysical view at all fully. In conversations with Wang he describes his view as monadology, but he does not go into the problem of how, if underlying reality consists of monads, the physical world appears to us as it does. However, it is hard to believe that Gödel had not devoted some thought to this problem, since it is central to the philosophy of Leibniz.

Some theses of the above-mentioned statement are anti-naturalistic in the extreme, for example no. 4, 'There are other worlds and rational beings of a different and higher kind', and no. 5, 'The world in which we live is not the only one in which we shall live or have lived.' One might ask whether he had any arguments for these theses. They are not developed in the conversations with Wang, still less in even draft papers. Concerning no. 5, however, Gödel does discuss immortality in letters to his mother in 1961. But there is no indication that he was ever prepared to defend views of this kind publicly. He did work out a version of the ontological proof of the existence of God, which became known in his lifetime because he allowed Dana Scott to discuss it in a seminar in 1970.

There is, however, one publication in Gödel's lifetime where his conviction about the power of mind is expressed, the short section 'Gödel on minds and machines', in Wang's 1974 book *From Mathematics to Philosophy*. The now famous disjunction from the Gibbs Lecture of 1951 is stated there:

> Either the human mind surpasses all machines (to be more precise: it can decide more number theoretical questions than any machine) or else there exist number theoretical questions undecidable for the human mind.[10]

Wang's text goes on to say (no longer following the Gibbs lecture):

> Gödel thinks Hilbert was right in rejecting the second alternative: If it were true it would mean that human reason is utterly irrational by

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[9] *Ibid.*, p. 316.
[10] [Wang, 1974, p. 324]. The version in the Gibbs lecture (CW III 310) is slightly more specific.

asking questions it cannot answer, while asserting emphatically that only reason can answer them. (*Ibid*., pp. 324–325)

These statements are part of a text that can be seen from correspondence to have been finally revised by Gödel while Wang was on a trip to China; in spite of the third-person form, there can be no doubt that Gödel's views are being expressed in language that was very likely his and of which he certainly had final review.[11]

III

Now let us turn to Kant. The passage from the letter to Günther hints at a theme that recurs in his comments on Kant, that Kant's view is subjectivist in an objectionable sense, here that it rejects 'the concept of objective being'. But here Gödel may not mean to attribute such a view directly to Kant himself, since he speaks of a 'Kantian argument'. But he does express a subjectivist reading of Kant in a much quoted passage in the 1964 version of 'What is Cantor's continuum problem?':

> Evidently the 'given' underlying mathematics is closely related to the abstract elements contained in our empirical ideas.[12] It by no means follows, however, that the data of this second kind, because they cannot be associated with the actions of certain things upon our sense organs, are something purely subjective, as Kant asserted. (CW II 268)

Another passage is worth mentioning because it is much earlier and remains unpublished. In a footnote to some crossed-out text in his Gibbs Lecture, he comments on Kant's philosophy of mathematics. In particular he writes:

> Moreover, according to the Kritik of pure reason the mathematical concepts too are subjective since they are obtained by applying the purely subjective categories of thinking to the objects of intuition.

He contrasts this view with that of Kant's Inaugural Dissertation of 1770:

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[11] See § 2.3 of my introductory note to the Gödel-Wang correspondence (CW V 388–389) and Gödel's letter to Ted Honderich of 19 July 1972 (CW V 78). Gödel does speak in his own name in a paragraph on pp. 325–326 criticizing Turing, reprinted in CW V 576. An earlier version appears in CW II 306.

[12] Here Gödel has a footnote asserting a close relation of the concept of set to Kant's categories of pure understanding, in that 'the function of both is "synthesis".' It would take us too far afield to inquire how Gödel conceives this relation. The issue is discussed in §§ 3–4 of [Hallett, 2006].

> Not so according to Kant's earlier writing 'De mundi . . .' where
> only the world of the senses including its forms: space and time
> is considered to be [a] subjective phenomenon which [whereas]
> abstract thinking conveys knowledge of the things in themselves.[13]

Note that mathematical concepts are said to be subjective for Kant because
of their dependence on the 'purely subjective' categories; thus subjec-
tivism about mathematics is inferred from a more general subjectivism.[14]
These passages might suggest that what Gödel finds subjective about the
categories is that they do not give rise to *knowledge* of things in them-
selves, a hardly controversial interpretation. But all three passages suggest
something stronger, that the concepts of the understanding are subjective
in a sense that rejects the very idea of 'objective being', whether we have
knowledge of it or not.

   Gödel does not develop this interpretation, and we can only speculate
about what further he had in mind. It is interesting to note that apparently
Hegel held that the categories themselves are subjective, so that there is
a factor additional to the forms of intuition driving Kant toward a sub-
jective form of idealism. The reason would lie in the legislating role of
the transcendental unity of apperception and the 'emptiness' of thought
by itself, leading to such conclusions as that 'the unity of consciousness
is that which alone constitutes the relation of representations to an object,
thus their objective validity' (B137).[15]

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[13] From footnote 22 in Gödel's numbering in the manuscript, which reflects (roughly)
the order in which he wrote them rather than the place in the text where they would be
flagged. *Cf*. CW III 466–467. This note and the following note 23, commenting on Kant
on analyticity, were not included in the published version of the lecture in CW III, in the
first case because the text in which it is flagged was crossed out by Gödel, in the second
because no flag for it could be found.
   These quotations are included here by courtesy of the Kurt Gödel Papers, The Shelby
White and Leon Levy Archives Center, Institute for Advanced Study, Princeton, N.J.,
U.S.A., on deposit at Princeton University. The notes are in document no. 040295.
[14] One would think that Gödel could make a strong case for the claim that Kant's
philosophy of mathematics is subjectivist because of the role of the forms of intuition in
mathematical cognition, since Kant talks in an emphatically subjectivist vein about the
forms in the Aesthetic, *e.g.*, B41 and A26/B42. In my view it is the context in which these
passages occur that leads Gödel to focus on the categories, in [1964] because of his analogy
between synthesis and the role of the concept of set, in the footnote from [*1951] because
of the contrast he makes with the view of the Inaugural Dissertation.
   Kant's writings are cited in the standard way: for the *Critique of Pure Reason*, by page
number in the first (A) and/or second (B) edition, for other writings, by volume and page
number of the Academy edition (Ak.).
[15] This Hegelian interpretation is developed and defended in [Bristow, 2001–02]. A
sharply contrasting evaluation (differing on interpretation of Kant, but not of Hegel's view
on this point) is [Ameriks, 1985]. I am indebted to Bristow for bringing this Hegelian line
of criticism of Kant to my attention some years ago.

Some evidence suggests that this is not Gödel's most considered reading of Kant. The best evidence comes from his most extensive discussion of Kant, in the paper 'Some observations about the relationship between theory of relativity and Kantian philosophy' [*1946/9], which he did not publish but of which five drafts were preserved, two of which appeared in CW III. This paper, which I will refer to as the Kant paper, is part of the project that includes the mathematical work on general relativity and the short paper, 'A remark about the relationship of relativity theory and idealistic philosophy' [1949a], which Gödel did publish in the volume [Schilpp, 1949] concerned with Einstein.[16] I will refer to this latter paper as the Einstein paper. Gödel's principal concern with Kant in these papers is with the thesis of the transcendental ideality of time.

However, what concerns me at the moment is Gödel's understanding of Kant's view about the objective character of *thought*. In a passage near the end of both versions B2 and C1 of the Kant paper, Gödel stresses Kant's view that concepts of things in themselves are meaningful and that we must assume the existence of the latter. He goes so far as to write that 'the impossibility of a knowledge concerning them [things in themselves] is for Kant by no means a necessary consequence of the nature of all knowledge, and perhaps does not subsist even for human knowledge in *every* respect' (CW III 245).[17] How much the (largely familiar) examples or passages he cites are really examples of knowledge (other than practical knowledge) would be disputed, but we are asking how Gödel read Kant, not what reading would be correct.

The background of these comments is a discussion that is more fully presented in the earlier now published version of the paper, version B2. Gödel begins Section II by saying that according to Kant there is 'an objective correlate in the things of our representation of time' (CW III 231). A little later he says that Kant 'really means that temporal properties are certain relations of the things to the perceiving subject' (*ibid.*). Gödel argues, citing passages from Kant, that our knowledge of spatial and temporal properties of appearances contains knowledge of *relations* of things to ourselves as perceiving subjects. Gödel reads 'things' in such a statement as referring to things in themselves. He gives two short passages particular emphasis. In the first, Kant speaks of 'dieselben Bestimmungen, die wir uns jetzt als Veränderungen vorstellen' (A37/B54), translated by Gödel as 'those modifications which we represent to ourselves as changes', and takes Kant to be talking of modifications of things in themselves. In

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[16] On the relation of the Kant paper and this paper, see Howard Stein's introductory note to [*1946/9] in CW III, especially §§ 1–2.

[17] I here follow version B2. Dagfinn Føllesdal pointed out to me that version C1 (p. 258) has 'nor subsists' instead of 'perhaps does not subsist', and that this is not quite grammatical. He suggests, reasonably, that Gödel intended simply to drop the qualification 'perhaps'.

another, Kant says that 'our representation of space is completely adequate to the relation which our sensibility has to objects' (*Prolegomena* § 13, Ak. 4: 289–290).[18]

Evidently Gödel takes Kant to be presupposing that we can have knowledge of the relation of things to our cognitive faculties. He is perhaps clearest in the following statement:

> That this actually is Kant's meaning not only follows indirectly from the general considerations just made, but also directly from the wording of some of the passages quoted, in particular the one speaking about 'those modifications which we represent to ourselves as changes' and that numbered (3) above, where certain relations of the things to us appear clearly as existing *besides* our 'mode of intuition'. Moreover, one may allege the passages (2), (4), (6), which . . . seem to imply that the relations in question are in some sense the object of our representations [and] hence cannot consist solely in the act or disposition of representing. (CW III 232)

Perhaps Gödel comes close to a view that has been advanced in Kant interpretation more recently, that our ignorance of things in themselves amounts to ignorance of the *intrinsic* properties of things.[19]

The reader will probably notice that the passages that express a subjectivist reading of Kant are later than the Kant paper of 1946–49, although the apparently abandoned footnote in the Gibbs lecture is only a little later. We cannot rule out the possibility that in the 1940s Gödel read Kant in a more realistic way than later, in the sense that he was more ready to admit that meaningful predications could involve reference to things in themselves, where these really are objects outside our minds, and that in some

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[18] The phrase from A37/B54 is rendered by Kemp Smith as 'the very same determinations which we now represent to ourselves as alterations'; 'determinations' is the more usual translation of 'Bestimmungen'. In the second remark, I give Gödel's translation.

[19] See [Langton, 1998]. However, contrasting somewhat with the picture we have presented of the Kant paper is the remark in footnote 24 of version B2:

> Unfortunately, whenever this fruitful viewpoint of a distinction between subjective and objective elements in our knowledge (which is so impressively suggested by the Copernican system . . .) appears in epistemology, there is at once a tendency to exaggerate it into a boundless subjectivism, whereby its effect is annulled. Kant's thesis of the unknowability of things in themselves is one example. (CW III 240)

Gödel does not say that Kant's view as a whole is an instance of 'boundless subjectivism', and from remarks already cited he evidently did not think Kant consistent in holding to the unknowability of things in themselves. But it is closer in tone to the remarks on Kant that we have cited from elsewhere.

cases such predications could express propositional knowledge, even if the objects referred to are unknown in the fuller sense. That he might have changed his mind would be suggested by one striking remark reported by Wang:

> For Kant, the mind is the transcendental ego which is subjective and separate from the outside world. [The] outer world is unknowable for Kant. But the unconscious accompanies sense perceptions: the ideas we form of sensations refer to the object itself. [Wang, 1996, remark 4.4.10, p. 149]

It is worth noting that the phrase 'transcendental ego' is not used by Kant himself. I confess I do not understand the last statement, but I think it likely that by 'the object itself' Gödel means 'the object as a thing in itself', so that he seems to attribute to Kant a view something like the one Kant finds and criticizes in Leibniz, that perception gives a confused representation of things in themselves. I say 'seems to', because one cannot rule out the possibility that the last remark was meant as an objection to Kant rather than an interpretation. In another remark Gödel says that Kant's epistemology 'proves that God, and so on, have no objective meaning, and to interpret them as objective is wrong'. He goes on to criticize Kant's moral argument for God as a postulate of practical reason because it is 'also one's duty not to assume things that are purely subjective'.[20]

A difficulty is that Gödel does not explain his use of the word 'subjective'. Kant's own usage is confusing enough, but about God, Gödel's use does not quite agree with Kant's. Kant does say that the 'moral necessity' of assuming the existence of God is subjective,[21] but he also says of the postulates of pure practical reason that they give 'objective reality' to the concepts involved, God in particular.[22] A more global difficulty is that Gödel does not seem to enter into the much discussed differences about the interpretation of the distinction of appearances and things in themselves. He tends to read the concept of things in themselves as just of things as they really are, and the result is that he comes close to a philosophically problematic interpretation, what I have elsewhere called the Distortion

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[20] *Ibid.*, 5.3.39, pp. 171–172. I think Gödel did have a genuine interest in Kant's postulates of practical reason, particularly in his approach to immortality. He does not seem to have had a great interest in Kant's moral theory properly speaking.

[21] *Critique of Practical Reason*, Ak. 5:125. Gödel says in the remark cited that according to Kant we are 'obliged to' believe in God, apparently meaning that this is a duty, but in this place Kant denies that. His statement that this moral necessity is subjective is explicitly contrasted with the objective necessity of duty.

[22] *Ibid.*, 5:132. 5:145–146 gives another formulation of how the assumption of God involves both subjective and objective aspects.

Picture,[23] according to which our representations of outer objects have as their objects things in themselves. But we represent them as being in space and time, whereas things in themselves are not spatio-temporal. Therefore our representations represent them falsely. But Gödel does not directly embrace this interpretation.

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IV

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In the last section I used the Kant paper as a clue to how Gödel understood some rather global features of Kant's view. But the main theme of the paper is the analogy he saw between Kant's thesis of the transcendental ideality of time and what relativity theory (particularly general relativity) implies about time. He begins the Einstein paper by noting the relativity of simultaneity that is already fundamental in special relativity, with the consequence that only a partial ordering of events as before and after can escape this relativity. But then he says

> Following up the consequences of this strange state of affairs, one is led to conclusions about the nature of time which are very far reaching indeed. In short, it seems that one obtains an unequivocal proof for the view of those philosophers who, like Parmenides, Kant, and the modern idealists, deny the objectivity of change and consider change as an illusion or an appearance due to our special mode of perception. (CW II 202)

The phrase 'illusion or appearance' leaves ambiguous whether Gödel wishes to say that change is an illusion. This would agree with the view of Parmenides and such idealists as McTaggart, but of course not with the view of Kant.[24] I will say later why Gödel may have intended the more radical view.

Gödel introduces into the discussion an idea that is not prominent in Kant but is central to McTaggart's famous argument, the distinction between the A series, the representation of events as past, present, and future, and the B series, the representation of events as ordered in time, without any distinguishing of the present. Evidently special relativity poses a serious obstacle to the objectivity of time in the A-series sense. Gödel puts the matter as follows:

> Change becomes possible only through the lapse of time. The existence of an objective lapse of time, however, means (or, at least, is equivalent to the fact) that reality consists of an infinity of layers of

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[23] See my [1992, pp. 84–85].

[24] Earlier in the paragraph, Gödel cites McTaggart's famous paper [1908]. Kant denies at B69 that objects in space and time are 'mere illusion'.

> 'now' which come into existence successively. But, if simultaneity is
> something relative in the sense just explained, reality cannot be split
> up into such nows in an objectively determined way. Each observer
> has his own set of 'nows', and none of these various systems of
> layers can claim the prerogative of representing the objective lapse
> of time. (*Ibid.*, CW II 202–203)

In a footnote Gödel remarks that one may hold that 'the idea of an objective
lapse of time (whose essence is that only the present really exists) is
meaningless'. He considers that such a view gives the idealist what he
wants regarding change. That would suggest (as Palle Yourgrau [1991] has
argued) that Gödel would not regard as a defense of the reality of time the
view of those like D.H. Mellor [1981] who maintain that the reality of time
amounts to that of the B series.[25]

So far, Gödel is taking up a case against time that had been around for
some time and finding it reinforced by a rather basic feature of special
relativity. In the Einstein paper he shifts ground immediately and gives an
argument in which he makes use of his own results on rotating solutions
of the field equations of general relativity. That argument also appears in
the later versions of the Kant paper.

Gödel observes that in earlier cosmological solutions 'there does exist
something like an absolute time', because there is a one-parameter system
of three-spaces everywhere orthogonal to the world lines of matter,[26] thus
reinstating a version of absolute simultaneity. Evidently this plays the
role of an objection to the claims made on the basis of special relativity.
Gödel distinguishes the physical conclusion that such a cosmic time can
be defined from the further conclusion he attributes to James Jeans that
'there is no reason to abandon the intuitive idea of an absolute time lapsing
objectively' (CW II 204). In a footnote he sketches objections to Jeans's
claim not based on his rotating solutions, so that it is probable that he
already objected to it before he obtained them. This is also suggested by
remarks about how he came to search for such solutions in a lecture to the
IAS [*1949b, CW III 274].

In the solutions Gödel discovered, what he called rotating universes,
where in a certain sense matter as a whole rotates, a criterion of simultane-
ity of the sort he has mentioned does not exist. But the situation proved to
be worse than in special relativity, because Gödel went on to show that such
worlds contain closed timelike curves. In fact they contain 'smooth, every-
where timelike, everywhere "future-oriented" world-lines, connecting any
point in space-time to any other point' (*ibid.*). This makes it impossible to

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[25] Yourgrau deserves credit for emphasizing the role of the A series in Gödel's discus-
sion. But how central it is in the end is at least disputed.

[26] [*1949b, CW III 274]; *cf.* [1949a, CW II 204].

define even an arbitrary global temporal ordering, because it could not be a linear ordering or even a partial ordering such as special relativity allows.

Whether this is true of the actual cosmos is, of course, an empirical question. In the Einstein paper Gödel himself concluded that it could not be one of his original models (CW II 206). It was not excluded that it might be one of the 'expanding' models that Gödel discovered a little later. In the later development of general relativity, it seems to be an extremely complicated question whether closed timelike curves can be regarded as physically impossible and even whether they exist, and models other than Gödel's that contain them have been discovered and considered.[27]

To return to Gödel: given his solutions, he could argue that it is a contingent matter whether a cosmic time exists. He makes clear that he does not regard this as sufficient for the metaphysical conclusion of the reality of time:

> For, if someone asserts that this absolute time is lapsing, he accepts as a consequence that whether or not an objective lapse of time exists (i.e. whether or not a time in the ordinary sense of the word exists) depends on the particular way in which matter and its motion are arranged in the world. This is not a straightforward contradiction; nevertheless, a philosophical view leading to such a conclusion can hardly be considered as satisfactory. (CW II 206–207)

In using the phrase 'lapse of time' Gödel is probably thinking of the A series, but the matter is no different for someone who rests his case for the objectivity of time on the B series.

Perhaps surprisingly, Gödel maintains in the Kant paper that it is not incompatible with relativity theory to hold that there is an *a priori* intuition of time and space that yields a Euclidean geometry:

> In the case of geometry, e.g., the fact that physical bodies surrounding us move by the laws of a non-Euclidean geometry does not exclude in the least that we should have a Euclidean 'form of sense perception', i.e., that we should possess an a priori representation of Euclidean space and be able to form images of outer objects only by projecting our sensations on this representation of space, so that, even if we were born in some strongly non-Euclidean world, we would nevertheless invariably imagine space to be Euclidean.[28]

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[27] See [Earman, 1995, chapter 6]. The issue has a Kantian aspect different from what Gödel explores, because conditions having to do with causality have been proposed that would exclude space-times like Gödel's.

[28] Version B2, CW III 241. Gödel also attributes to us a 'Euclidean space intuition' in a letter to Marvin Jay Greenberg of 2 October 1973. He describes it as really not mathematical but *a priori* physical intuition. He does not say anything about its epistemic

Gödel indicates how we might represent space as a model of Euclidean geometry even in a non-Euclidean world. But more fundamental is Gödel's view that the Euclidean and Newtonian picture of the physical world that Kant presupposes is a natural and perhaps inevitable idealization of the picture of the world of our ordinary experience, the *Lebenswelt* or, in Wilfrid Sellars's terminology, the manifest image. Thus Gödel can write:

> A real contradiction between relativity theory and Kantian philosophy seems to me to exist only in one point, namely, as to Kant's opinion that natural science in the description it gives of the world must necessarily retain the forms of our sense perception and can do nothing but set up relations between appearances within this frame. (CW III 244)

Modern physics in Gödel's view (and surely that of many others) breaks with the manifest image in a much more radical way. That is the context of a much quoted remark, that 'it should be assumed that it is possible for scientific knowledge, at least partially and step by step, to go beyond the appearances and approach the world of things' (*ibid.*). (In a footnote he seems to identify 'things' with things in themselves.)

From these considerations we can see why Gödel might have wanted to say, in opposition to Kant, that time and change are an *illusion*. According to Kant, the limitation of our theoretical cognition of objects to conditions of space and time implies that the representation of them as spatio-temporal meets the highest standard of objectivity that we can apply. Evidently Gödel's view was that modern physics, in breaking with the idealized version of the manifest image given by classical geometry and physics, does offer a higher standard of objectivity. But then it is not at all clear that Gödel is in a position to agree with Kant about the *empirical* reality of time. He might well have found what I call the Distortion Picture of the relation of appearances and things in themselves less problematic philosophically, and perhaps even as an interpretation of Kant, than other readers of Kant would.

It is obvious that Gödel did not regard the considerations he advances as an argument for the ideal or illusory character of *space-time*. On the contrary, such an advance as modern physics has made from the appearances to the 'things' essentially involves the relativistic conception of space-time.

V

How strong are Gödel's arguments for the ideal or illusory character of time and change? One should consider separately considerations that primarily

weight, although he says that 'in its purely mathematical aspect . . . it is perfectly correct' and 'even physically, it is correct "in the small"' (CW IV 454).

touch the A series, or more broadly 'change' or 'passing',[29] and those that would also affect the B series. Gödel's core argument based on his cosmological models belongs in the latter category.

What he calls 'the standpoint that the idea of an objective lapse of time is meaningless' (CW II 202 n. 4) is apparently the rejection of the A series, since he says that the essence of an objective lapse is that 'only the present really exists'. That is certainly a contentious assumption: so-called 'presentism' is at best a disputed view in the philosophy of time. One could object: Yes, only the present really exists *now*, but without that qualification the claim seems to assimilate a tensed and a tenseless way of speaking. Gödel also objects to the idea that 'the lapse of time is something relative':

> A relative lapse of time, however, if any meaning at all can be given to this phrase, would certainly be something entirely different from the lapse of time in the ordinary sense, which means a change in the existing. The concept of existence, however, cannot be relativized without destroying its meaning completely. (CW II 203 n. 5)

It seems to me simply wrong to say that existence cannot be relative to anything. Gödel might easily admit that in the case of mathematical existence, but that is not especially relevant here.[30] But the A series is talked of in a language with tenses and indexicals, and this introduces from the beginning a relativity to context. For example 'The World Trade Center exists' is true relative to a context of utterance in 2000, but not relative to such a context in 2002. (The sentence is assumed to be in the present tense used with its common temporal meaning, not with the timeless meaning it assumes in mathematical statements and in many non-mathematical statements.) If that is incompatible with the objectivity that Gödel aspires to, then the A series would not pass muster even in a Newtonian world. However, one can reply on Gödel's behalf that although what is said by 'The World Trade Center exists' varies with context and is to that extent relative, what matters is the proposition expressed.

I shall not try to assess the force of this reply, because what Gödel is most concerned to reject is surely the idea that existence could be relative to an observer, and to more than his temporal position, in particular his location and state of motion. Imagine an observer A, who is located at a place in space-time that is spacelike separated from events on Earth at least from

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[29] Gödel uses the term 'change' in both the Kant and Einstein papers.

[30] Compare the concept of *bezogene Existenz* in [Bernays, 1950]. The idea that Bernays is exploring is that the existence of mathematical objects is relative to a structure. Gödel, in spite of his long-standing relationship with Bernays, is almost entirely silent on issues relating to structuralism.

September 2001 on, but close enough so that much of the earlier history of the World Trade Center is in his past light cone. So we will assume that he knows of the World Trade Center and can say, speaking tenselessly, that the World Trade Center exists. A cannot know of the WTC's destruction. Using different definitions of simultaneity, A could truly say either 'The WTC exists now' or 'The WTC does not exist now'. Thus even with the addition of 'now', existence appears to be made relative.

Gödel's main argument, however, concerns the status of cosmic time and affects the B series as well as the A series, 'tenseless' as well as tensed conceptions of time. Clearly, if the actual structure of space-time contains closed timelike curves, then no global time ordering can be defined. This would, I think, be agreed among those who have discussed Gödel's argument. What is contentious is how he argues on the assumption that the actual universe is not like his own models and, in particular, admits the sort of global time admitted by the models available before his own work. With that assumption, Gödel writes that someone who asserts that time is lapsing 'accepts as a consequence that whether or not an objective lapse of time exists . . . depends on the particular way in which matter and its motion are arranged in the world' (CW II 207). Thus the claim is that the existence of an objective lapse of time is contingent in such a way that 'a philosophical view leading to such consequences can hardly be considered as satisfactory' (*ibid.*).

One writer on time, D.H. Mellor, responds rather contemptuously to this argument.

> One [argument], made famous by Gödel (1949), infers the possibility of timelike loops from their consistency with the equations of general relativity. But this consistency proves nothing: all it shows is that general relativity does not rule them out, not that nothing does. [1998, p. 127]

Gödel may be presuming more about his cosmological models than that they satisfy the equations of general relativity, *i.e.*, that they satisfy at least some conditions for being physically realistic. But what Mellor says indicates that he would think little better of the argument if further physical laws were invoked. He himself appeals to his own theory of causation to conclude that timelike loops are impossible. He does not note that in the discussion of these matters by physicists causal conditions have been considered that have the same effect.[31] It seems that they are regarded as reasonable criteria for being physically realistic. However, they do not seem to be regarded as such by everyone. Since there is a lot of strangeness about causal relations in contemporary physics, it would be hasty to accept

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[31] See [Earman, 1995, § 6.3].

the proposed criteria as the metaphysical truth. But in a world without closed timelike curves, it is hard not to accept the protest of Earman that the existence of cosmic time is no less real for being contingent.

Michael Friedman has proposed serious reasons why Gödel himself would not have been moved by this reply. However, since his argument is connected with Leibnizian echoes that he finds in the Kant paper, I will postpone considering it until the next section. But the upshot of it is that if time is to be a metaphysically fundamental aspect of the world as it really is (of things in themselves in a terminology Gödel used), then its existence must be necessary and thus obtain in all models of the equations of general relativity that meet physical conditions of an equally fundamental nature.

Friedman's reading enables us to revisit the question of Gödel's view about the *empirical* reality of time. For if, as Gödel is prepared to allow and many who have discussed his views assume, the space-time of our actual universe is like one of the earlier solutions to Einstein's equations and excludes closed timelike curves and admits a global time order, then that would give a sense in which time is empirically real. Gödel's apparent indecision as to whether to say that change is an illusion or is an appearance in something like Kant's sense could be explained by his either not being sure whether the actual universe admits a global time order or not wishing to commit himself on the question.

Up to now we have followed Gödel in treating as the fundamental issue the existence and status of cosmic time. But it can be questioned whether this is really the most fundamental issue. If time is unavoidably local and in important respects perspectival, how gravely should we regard this? Gödel seems to affirm the local significance of time even in theoretical physics, in his argument that in his own models one can make a consistent distinction between the positive and negative direction of time [*1949b, CW III 285]. Basic notions of physics, such as motion, velocity, and acceleration, involve time. This fact obviously does not contradict anything Gödel says about cosmic time or about the independence of time of observers. But it might lead us to conclude that the significance of time in our thought and representation of the world, even in science, does not depend on the existence of the sort of cosmic time that concerns Gödel, still less on its existence being necessitated by the laws of nature.

It is true that relativity theory changed more local notions involving time in important ways, first by the conclusion that the proper time between two events in space-time depends on the path between them. According to John Stachel, this fact diminishes the physical significance of a global time even if it can be defined.[32]

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[32] [Stachel, 2007, p. 867]. Stachel presents a physically informed discussion whose point of view seems in harmony with what I am trying to say here.

Gödel suggests a reply to this sort of argument in some passages of the Kant paper. For example he remarks

> . . . what remains of time as an objective characteristic inherent in the events themselves, namely, the relation 'A is before B for all observers' and its quantitative specification, is quite different from what we imagine by temporal sequence. (CW III 234)

By its 'quantitative specification', he seems to have in mind the length of a maximal path between two space-time points that are timelike separated, evidently in Minkowski space-time.[33] He observes that this relation lacks significant properties of time in common sense and pre-relativistic physics, in particular not being a total ordering. He also presents a slightly longer version of his criticism of the A series.[34] The discussion seems to me to show a resistance to viewing time as local, and in these remarks he uses temporal language and thus leaves himself open to the reply that he is simply noting features of the conception of time that are very different once one takes account of relativity theory.

No doubt the significance of time in human life depends on the fact that we do not find closed timelike loops in our actual experience, so that, for example, life proceeds from birth to death, and probably even human history proceeds from the beginning of *homo sapiens* to the eventual extinction of the species. The actual existence of such loops *would*, as Stachel notes, have a bearing on local concept of time. He remarks that it would be an extreme example of path-dependence. It would show that along some paths, time can have a very peculiar structure. But it would not abolish time.[35]

Of course relativity theory even before Gödel's results and arguments challenges a picture deeply embedded in the philosophical tradition, which projects time as we experience and measure it on earth onto the whole of existence, with the possible exception of an eternal God. It was a lucky break for this picture that the development of mathematical natural science

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[33]   See CW III 234, note 13, but note also the editorial note (by Howard Stein) analyzing what is pretty clearly a slip in what Gödel writes. *Cf.* also CW III 251 (in version C1), where, however, the focus is on Gödel's own models rather than on Minkowski space-time.

[34]   One feature of the A series, the idea that the past is fixed and determined in a way that the future is not, has been defended in the context of Minkowski space-time, in particular in [Stein, 1968], criticizing [Putnam, 1967]. But the point of view is once again local, since what might be fixed and determined is what is in the past light cone of a given point. See also [Stein, 1991] and the literature cited there.

[35]   *Ibid.* Stachel does not comment on the question of time travel, possibly because he apparently believes that there is 'not a shred of evidence' that Gödel's models apply to any physical phenomena (*ibid.*, p. 868). I say 'apparently', because he may be referring to the state of knowledge at the time Gödel wrote rather than the present.

and even its being brought to maturity by Newton did not undermine it. It is of course preserved in Kant's 'metaphysics of experience', his account of what is known *a priori* about the world as it appears. It was finally undermined only by developments in physics of a couple of centuries after Newton, in particular those that concern Gödel. One might well regard this projection as resting on an illusion, something like the transcendental illusion that Kant claimed to arise in cosmological reasoning. Gödel would be right in exposing it, but he is still in a way in its grip, in insisting that the 'reality of time' requires not only the existence of a cosmic time but that its existence be necessitated by fundamental laws of physics.

VI

I now turn to Leibniz. Gödel's appropriation of and interpretation of Leibniz's philosophy have not been studied in any systematic way so far as I know, although the Leibnizian background of his version of the ontological proof has been detailed by an eminent Leibniz scholar.[36] Though Karl Menger thought that Gödel had 'boundless admiration' for Leibniz in the 1930s [Menger, 1994, p. 210], and Wang regards Leibniz as one of Gödel's three philosophical heroes (see above), Gödel's own comments on Leibniz in his known writings (apart from untranscribed shorthand notes) are more sparse and less informative than one would expect. But one can hardly doubt that Leibniz was a primary model for the rationalistic optimism that was characteristic of Gödel's outlook. A belief in something like Leibniz's principle of sufficient reason shows up in a number of contexts. As noted above, he described his metaphysical view as monadology. It appears that apart from special contexts like the ontological proof, Leibniz had more influence on Gödel's general outlook than on the further development of his philosophical views, in particular about mathematics and logic. In fact at one point Gödel told Wang, 'I have never obtained anything definite on the basis of reading Leibniz'.[37]

In his most intensive study of Leibniz in the 1940s, Gödel seems to have been particularly interested in the idea of a universal characteristic. In the famous final paragraph of his paper [1944] on Russell, he appeals to statements of Leibniz about the universal characteristic to buttress the hope that mathematical logic might come to meet 'the high expectations of Peano and others' not only as an instrument for foundational research but for solving mathematical problems (CW II 140–141). But he does not tell us much about what he understood the universal characteristic to be. In

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[36] Robert Merrihew Adams, Introductory note to 'Ontological proof', CW III 388–402. There is of course much other commentary on the argument.

Another study of a specific topic is [van Atten, 2009].

[37] [Wang, 1996, p. 87]. The rest of the quotation suggests that he indeed found Leibniz's ideas important for his ontological proof, but he emphasizes the fact that he modified them.

other places he maintains, apparently on the basis of undecidability results, that the project of a universal characteristic cannot be carried through.[38]

Gödel seems to have believed that in many domains of knowledge, in particular metaphysics, there are fundamental primitive concepts, and Leibniz's own conception of analysis offers a likely model for that view. But he clearly thought that uncovering the right primitive concepts and coming to perceive them clearly would yield axioms of metaphysics rather than definitions, even infinitary ones.[39]

At this point I should return to the Kant paper. Gödel's work on it followed pretty directly on the period during which he studied Leibniz most intensely. In version B2, CW III 238, Gödel connects the nonexistence of Newtonian space 'which is supposed to exist beside and in complete independence of matter', with the 'principle of the objective equality of states which cannot be distinguished by observation', exactly the principle that Leibniz uses in his correspondence with Clarke to argue against the Newtonian view of space. The first hint that physics might go beyond the appearances in Kant's sense comes shortly thereafter, although he says that the space-time scheme of relativity theory may be 'only one step beyond the appearances and toward the things (*i.e.*, as one "level of objectivation", to be followed by others)' (CW III 239). Toward the end of the paper, Gödel says more emphatically that it should be possible for science to go beyond the appearances (CW III 244, quoted above). He ends by saying:

> ... relativity theory (especially general relativity theory) owes its origin, perhaps more than any other physical theory, to the consistent application of certain very general principles, and was only subsequently verified in its consequences by experience. (CW III 246)

Thus there are hints that Gödel sees *a priori* considerations as a driving force in the development of relativity theory, but in a Leibnizian rather than Kantian spirit as leading physics beyond the appearances 'toward the things'. It should not be surprising that he would not accept the reality of time as depending on genuinely contingent factors.[40]

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[38] [Wang, 1996, remark 6.3.16, p. 202]. Van Atten and Kennedy [2003, p. 433] quote an emendation of the statement by Gödel to say that the universal characteristic 'if interpreted as a formal system' does not exist. In commenting on this remark and its relation to the remark in [1944], Wang proposes that Gödel thought a systematic procedure that was not a formal system might accomplish something close to what Leibniz might have envisaged; see *ibid*. and [Wang, 1987, p. 174].

[39] On this issue see also [van Atten and Kennedy, 2003, § 4.2].

[40] This paragraph is very heavily indebted to comments by Michael Friedman on an earlier draft of this paper.

   I turn now to Gödel's ontological proof, probably the most direct de-velopment of Leibnizian ideas in his work. It is not easy to be sure exactly how Gödel viewed it. He would surely not have allowed Scott to discuss it in a seminar if he had not thought it a logically correct argument. Oskar Morgenstern, however, reported in his diary that Gödel hesitated to publish the proof 'for fear it would be thought "that he actually believes in God, whereas he is only engaged in a logical investigation (that is, showing that such a proof with classical assumptions ... correspondingly axiomatized, is possible)"'.[41] From many of Gödel's remarks to Wang and private notes on philosophical matters, one can conclude that he *did* believe in God.[42] But it does not follow that he believed that his argument *proves* the exis-tence of God. For that, it would be necessary for him to have confidence in the specific conceptual apparatus and premises of the proof. I suspect that if questioned about that, he would have said that he had not developed his philosophical views to a sufficient extent to have that level of certainty.

   I will leave the subject of Leibniz and Gödel by quoting a striking remark that belongs to *Weltanschauung* more than to philosophy proper:

> Our total reality and total existence are beautiful and meaningful—this is also a Leibnizian thought. We should judge reality by the little which we truly know of it. Since that part which conceptually we know fully turns out to be so beautiful, the real world of which we know so little should also be beautiful. Life may be miserable for seventy years and happy for a million years: the short period of misery may even be necessary for the whole [Wang, 1996, remark 9.4.20, p. 317].

VII

On Gödel and classical post-Kantian idealism, I will confine myself to what can be learned from the correspondence with Gotthard Günther. Günther was of German birth and had written a dissertation on Hegel, completed just as Hitler was coming to power. He was interested in formal logic but did not have mathematical training or very good opportunities for

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[41] Quoted by Adams, CW III 388. The inner quotation is presumably a direct quotation from the diary entry of 29 August 1970. It seems quite possible that by what Morgenstern calls a 'logical investigation' Gödel had in mind an experiment in applying the axiomatic method in metaphysics. On the basis of his conversations with Gödel, Wang concluded that Gödel thought that ideally philosophy should proceed by the axiomatic method; see for example [1996, p. 244].

[42] A.P. Hazen [1998, p. 369] suggests for this reason that Morgenstern might have misunderstood Gödel. However, Gödel may well not have wished to have it known in the philosophical world that he believed in God. I agree with Hazen that Gödel did not obviously believe that his argument proves the existence of God. In fact, Hazen sees it as primarily an attempt to reconstruct Leibniz's proof.

instruction, either in the few years he remained in Germany or in his life as an emigré, from 1940 in the United States.[43] He did come into contact with the 'cybernetics' movement and developed an interest in questions about artificial intelligence, a subject that he mentions in letters to Gödel. Günther first wrote to Gödel in 1953, and their exchange continued until the beginning of 1959. Günther continued to write through 1960 but received no further replies. His last communication, in July 1961, informs Gödel of his moving to take up an appointment in electrical engineering at the University of Illinois.[44]

Günther seems to have formed early in his career the conviction that insights of German idealism called for a revision of logic. From his publications of the time and his letters to Gödel one can obtain some idea of the basis of this view.[45] What it led him to was constructions in many-valued logic that are difficult to understand in relation to other constructions either in traditional or in modern logic. Gödel's replies to his letters indicate that he also had a lot of difficulty making sense of Günther's logical ideas and did not find Günther receptive to his suggestions for making them clearer. But Gödel did find suggestive Günther's philosophical starting point, as well as a logical suggestion that he had thrown out without developing.

Günther thought in terms of Aristotelian logic, and he thought that at least in its classical form the vast development of logic that we call modern or mathematical logic did not break with Aristotelian logic in the sense he thought essential. But this view was based on a particular conception of the metaphysical tradition and on the relation of logic to metaphysics. He thought of the matter in terms of the relation of thought or consciousness to objects, a way of putting things that is quite alien to most analytical philosophers and was not especially congenial to Gödel either. Günther thought that the tradition before Descartes and even before Kant presupposed what he called the identity of thought and being. He took this to imply that the difference of individual subjects, and the subject's consciousness of itself and other subjects, is not fundamental to metaphysics and therefore not to logic.

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[43] He does seem to have spent some time in the Boston area; the letters to Gödel twice mention encounters with W.V. Quine (CW IV 506, 508, and 528). These probably occurred in the middle or late 1940s.

[44] After his retirement from Illinois he returned to Germany and lectured at the University of Hamburg until about a year before his death in 1984.

[45] For a fuller discussion and more references to Günther's writings, see my introductory note to his correspondence with Gödel (CW IV 457–476). However, neither there nor here do I undertake to trace the later development of Günther's thought. On many-valued logic and its significance, it seems to have undergone significant change early in his time at Illinois.

What is new in Kant and his successors is what Günther calls 'reflection'. Evidently this includes self-consciousness, a central theme in Kant and already a theme in Leibniz. More generally, it is a feature of thought about objects in which the conception of the objects takes into account the subject's thought about them.[46] Thus it comes to subsume semantic reflection, that is the passage from the straightforward use of words 'taken at face value' to discourse in which words are mentioned and something is said about their reference, truth, or meaning.

Whatever reflection is, it is characteristic of it that it can be iterated. It would be natural to assume, as Günther sometimes does, that at any stage something is missed; one is at a given level of reflection not yet conscious of the relation of self to objects that level comprises, so that the way is open to an ascent to a higher level. In that sense, self-consciousness does not quite take in itself.

This situation is quite analogous to what arises in systems of logical types, where with variables and other expressions of a given type there is always something that cannot yet be expressed and thus a natural requirement to ascend to the next higher type. Günther had found an analogue of the problem faced by the idea that the theory of types is a universal logic, that it is thereby debarred from talking about itself as a whole.

Günther entertained an idea of a total reflection that would have the kind of closure that would obviate the ascent that concerns us. Idealism had posed the task of developing such a conception of self-consciousness. It would represent true self-consciousness, which would represent a subject's consciousness of itself as conscious of itself and of objects and not simply represent itself as another object.

We need not dwell on Günther's attempts to model levels of reflection in a many-valued logic, since Gödel did not make a lot of sense of them and found something else in Günther's thought suggestive. That was the idea,

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[46] The opening sentences of the passage from Gödel's letter of 30 June 1954 quoted at the beginning of section II above clearly refer to Günther's exposition of these ideas in the letter to which Gödel is replying, of 23 May 1954; see especially CW IV 486–489. Van Atten and Kennedy quote two passages from Leibniz about the importance of self-consciousness and assert that Gödel 'has such passages as these in mind' in the remarks quoted above from the letter of 30 June 1954 [2003, p. 460]. That may well be true, but the authors are misleading in not mentioning the more immediate reference of Gödel's remark.

The affirmation of realism with which the passage continues may have been prompted by remarks of Günther near the end of the letter, in particular:

> My point of departure was that both Kant and modern positivism demonstrate that the concept of a transcendent, absolute Being, is contradictory. With that ontological metaphysics comes to an end (CW IV 498, trans. p. 499, corrected).

advanced in a manuscript that he sent Gödel but which was not published and which has not been located later, that total reflection might be captured by a type-free theory.[47]

Rather late in their correspondence, Gödel reminded Günther of this suggestion, implying that it was more promising than the efforts in three-valued logic:

> I would like to remark that a couple of years ago I read a manuscript of yours about the foundations of logic that contained a very interesting thought I now miss in your more recent works on the topic. For, back then, you interpreted total reflection as something that goes beyond all formation of types. It is a plausible view that the implementation of *this* idea must lead to a non-Aristotelian logic, since in this way one immediately runs up against the antinomies of set theory. Now you seem rather to lean towards the view of identifying double reflection with the second logical type and giving up Aristotelian logic for the extended functional calculus, which I regard as unjustified.[48]

The context of Gödel's interest in Günther's suggestion is his preoccupation, already for some years, with issues about the notion of concept. His conception of concepts was similar to Frege's; like Frege he regarded concepts as central to the subject matter of logic. However, he repudiated the idea that concepts are extensional and does not advance a view like Frege's that concepts are 'unsaturated' and so irremediably distinct from objects. But it is clear in everything Gödel writes about concepts that they are to be distinguished from sets. He evidently thought that set theories like ZF and NB and the underlying iterative conception of set offered a completely adequate 'solution' to the paradoxes of set theory. But he thought that concepts were also among the 'objects of set theory'. However, he found constructing a philosophical view of concepts a struggle. At the time of the correspondence with Günther he was working on his paper 'Is mathematics syntax of language?' intended for the Library of Living Philosophers volume on Carnap. In February 1959 he wrote to the editor, Paul Arthur Schilpp, that he would not submit it. One reason he gave was the difficulties he was having in the theory of concepts.[49] It is difficult to

[47] Probably this was the manuscript 'Der metaphysische Hintergrund der Logik und die absolute Rationalität', which Günther sent with his letter of 2 August 1953.

[48] Letter to Günther, 4 April 1957, CW IV 526, 528 (trans. 527, 529). Günther's reply expresses enthusiasm about Gödel's interest in this idea. He writes (emphasized), 'I am still of the opinion that total reflection is one which unites all types that are at all possible.' But he says he had become timid in articulating this idea, because an earlier formulation of it had been demolished by Quine. (Letter of 7 April, CW IV 528.)

[49] Letter to Schilpp, 2 February 1959, CW V 244. Of the six extant drafts of the paper, versions III and V are included in CW III.

tell how important he found the task of constructing a formal theory of concepts. Sketches toward such a theory have not so far been found in his papers, and only a few remarks are found in his known writings. But evidently he found Günther's suggestions based on the idealist tradition suggestive in this direction, and it would have interested him if Günther had gone on to create such a theory or even to explain more fully what a philosophical basis for it might be. This theme is repeated in what turned out to be Gödel's parting shot to Günther:

> As for the logical part of your work, it seems to me that the most interesting and promising point of view is the one that you took in your earlier work. At that time you identified iterated reflection with type theory and total reflection with a type-free logic, that is one comprehending all types into one. One should think that from philosophical insights about the nature of reflection the correct axioms of a type-free logic would result *with necessity*, which would be an enormous advance compared to the procedure of 'trial and error' applied today.[50]

It was about this time that Gödel began his serious study of Husserl. Clearly he found Husserl very helpful with his problems about concepts, and it may well be for this reason that he lost interest in what the tradition that Günther inherited might have to offer. But it does not seem that he found in Husserl suggestions for a formal theory of concepts.

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[50] Letter to Günther, 7 January 1959, CW IV 534 (trans. 535).

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[51] The word 'philosophical' was in Gödel's title but was omitted in the version published in CW III. See CW IV 637.

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