The Rav's Uncompleted Grand Design

By: DAVID P. GOLDMAN

In 1947, Rabbi Joseph Dov Soloveitchik lectured on the philosophy of mathematics, the anti-Aristotelian turn in medieval Jewish philosophy, and Kabballah—not only the Lurian concept of *tzimtzum* to which he returns in *From There You Shall Seek* and other published writings, but also the Zohar, infrequently mentioned in his later work. The unification of Jewish thought with frontier issues in mathematics, he evidently believed, would bind the mystical speculation of Jewish thinkers to the fundaments of modern scientific thought and achievements of Western philosophy. We stand in awe at the boldness and compass of this exercise.

Three years earlier he had concluded his essay *The Halakhic Mind* with this enigmatic statement: "Out of the sources of Halakhah, a new world view awaits formulation." By this he meant a uniquely Jewish world view that addresses the unsolved riddles of the gentile philosophers and the frontier problems of science. It seems clear that the 1947 lectures reflect his attempt to formulate this new world view.

Well may we ask: Why do we need a "world view" in the first place? We have a *mesorah* that has sustained the Jewish people for thousands of years. The Rav sometimes was derided for devoting too much of his attention to gentile philosophy. I propose a paradoxical answer to this question: We need a distinctly Jewish world view in order to free ourselves of the influence of gentile philosophy.

Trotsky quipped, "You may not be interested in war, but war is interested in you." This also applies to philosophy and the Jews. There are metaphysical issues we cannot avoid. Consider the question of time. Time orders Jewish practice. But who can say what time is? The Greeks could not imagine creation *ex nihilo*, for that would imply that an omnipotent God had sat idle for an eternity before rousing Himself at length to make the world; an unchanging God thus would have suffered change. To this Maimonides replied that time itself is created. God created time in order to create the world, and man becomes God's partner

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in creation. But this is not a random, arbitrary, subjective act: It is a deliberate and measured expression of the ethical will; that is, a halakhic act.

The Rav wrote in *The Halakhic Mind*:

> …the religious time awareness is so paradoxical as to register both becoming and reversibility. As to becoming, the idea of Creation introduces it metaphysically; and the religious norm with its associate postulate of freedom sponsors it ethically. Nevertheless, the reversibility of time and of the causal order is fundamental in religious, for otherwise the principle of conversion would be sheer nonsense. The act of reconstructing past psychical life, of changing the arrow of time from a forward to a retrospective direction, is the main premise of penitence.[1]

By sanctifying Shabbat in partnership with God, man symbolically joins God in the act of creation. As Ḥazal said (*Shabbat* 119b), "A person who recites the *Va-yekhulu* on eve of Shabbat is considered as if he were a partner with God in the work of creation."[2] The first *mitzvah* given to Moses on the night we left Egypt requires us to make a calendar in order to observe the Pesach.

The Rav wrote:

> The purpose of reading the Torah aloud in the synagogue is not solely to teach the congregation, but also to arrange an encounter with God, as experienced by our ancestors at Mount Sinai. Every act of reading from the Torah is a new giving of the Torah, a revival of the wondrous stand at the foot of the flaming mountain. The reading of the Torah is a 'staging' of the giving of the Torah and a renewal of the awesome, sublime experience.[3]

Halakhah for R. Soloveitchik orders the ethical will that creates the world; it exalts every Jew to partnership with the Maker of Heaven. A higher order of creativity arises in the halakhic *ḥiddushim*. It demands the rigor and precision of mathematics.

> To whom may [halakhic man] be compared? To a mathematician who fashions an ideal world and then uses it for the purpose of establishing a relationship between it and the real world…The essence of the Halakhah, which was received from God, consists in creating an ideal world and cognizing the relationship between that

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1 *The Halakhic Mind*, p. 48.

2 D. Goldman, "The Jewish Idea of Freedom," in *Ḥakirah* 20, p. 110.

3 *Chumash Mesoras HaRav*, Arnold Lustiger, ed. (OU Press, 2014), p. 85.

> ideal world and our concrete environment in all our visible manifestations and underlying structures.[4]

The problem of time is one facet of the larger question of creation. Following rabbinic and kabbalistic authorities, R. Soloveitchik taught that God left Creation unfinished so that man might join the work of perfecting the world. The possibility of Becoming, therefore, must be embedded in the design of the world as it is understood by mathematical physics. That is why the Rav believed that foundational issues of mathematics and physics mattered to Judaism.

Had the Rav's project come to fruition, the Jewish world would be different. The great gulf fixed between the *homo religiosus* immersed in mysticism and the dry rationalism of scientific investigation would have been bridged; the mystical enthusiast would have recognized the hand of God beckoning through the paradoxes of mathematical abstraction; and the secular scientist would have confronted the Divine Presence at the frontier of human reason. The creativity of Majestic Man, the inquiring scientist, would draw on the humility of Covenantal Man who trembles before the numinous presence of his creator. Jewish intellectual and spiritual life would be united, and not only in our generation: Rambam's rationalism would be reconciled with Ramban's spiritual intuition. These and these words of the living God would reinforce each other.

Yet he failed to bring this design to fruition, and many of his later writings dwell on this failure. In a 1975 shiur in Boston he said:

> In studying the *parashiyos* in *Bamidbar* and *Devarim* dealing with the last month of Moses' life, we are confronted with a touching tragedy—the tragedy of a teacher who was too great for his pupils, of the master who is too exalted, too deep, too profound for his generation. It is the tragedy of the rebbe who is too exalted, too deep, too profound for his generation. It is the tragedy of the rebbe who has boundless knowledge, unlimited inspiration, sweeping erudition, is great in every respect, but whom his generation does not appreciate. Moses died because his nation was not worthy of him…
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> The failure of Moses to enter the land changed Jewish history, because had he entered *Eretz Yisrael*, the people never would have been exiled. Moses would have been anointed as the Messiah. Jewish history would have found its ultimate fulfillment and realization. If *Bnei Yisrael* had proven themselves worthy of communing with Moses, of being his disciples, of they would have had the re-

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4 *Halakhic Man*, pp. 19-–.

> ceptive intellectual and emotional capacity to absorb *Toras Moshe* immediately, then Moses would have entered and conquered the Promised Land.[5]

It is hard to dispel the feeling that the Rav was speaking not only of Moshe's tragedy but also his own. Despite his status as the *gadol ha-dor*, he thought himself a failure. He told Rav Yehuda Amital (as Rav Aharon Lichtenstein related):

> And therefore I affirm that I can identify one of those responsible for the present situation, and that is none other than myself. I have not fulfilled my obligation as a guide in Israel. I seem to have lacked the ability—the personal power—required of a teacher and rav, or perhaps I lacked some of the desire to fulfill the role completely, and I did not devote myself completely to the task. To a greater or lesser degree, as an educator and teacher on the plane of *gadlut ha-moḥin*, "mental greatness," my students have received much Torah learning from me, and their intellectual standing has strengthened and increased during the years they have spent with me – but I have not seen much growth on the experiential plane. I have not succeeded in living in common with them, cleaving to them and bestowing some of my personal warmth on them. My words, it would seem, have not kindled a divine spark in sensitive hearts. I have fallen short [in my role] as one who spreads the "Torah of the heart"—[a Torah] that is transmitted by the power [of the teacher's deliberate] diminishing of [of his own towering stature], to the point of *ḳatnut ha-moḥin*. And the failing lies with me.[6]

In what way did the Rav believe that he had failed? I asked this question of several of the Rav's prominent *talmidim*. Some thought that the Rav found his students lacking in the intellectual depth required to understand his teaching; others saw the deficiency in his students' experiential response to Judaism. Both responses are accurate, I believe; majestic man and covenantal man, Adam the First and Adam the Second, remain the same personality, whether he coaxes secrets from Nature, or prostates himself in humility. Even if finite mortal man remains divided, even if he triumphs one day with a *ḥiddush* that discloses something of the mind of the Creator, and on the next day offers his failure as a sacrifice to a God who transcends human comprehension, nonetheless he strives for unity on the affective and intellectual planes. Mortal anguish

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5 A. Lustiger, ed., *Chumash with commentary based on the teachings of Rabbi Joseph B. Soloveitchik, Sefer Bamidbar* pp. 164–165.

6 Aharon Lichtenstein, *Leaves of Faith: The World of Jewish Learning*, Vol. 1, p 202.

before our finitude drives us to create, and our greatest triumphs remind us that we rise up like grass in the morning and are mown down at night. The Rav demanded that the halakhist investigate Torah with the rigor of a mathematician, and asked the mathematician to ponder the infinite awe of the *Ein Sof*.

The dialectic of emotion and intellect begins with awe and humility on the experiential plane, as the Rav told Yehuda Amital in the citation above. The Rav's exegesis of *Shir ha-Shirim* "converted" me to Orthodoxy in an instant. It disclosed to me the Jew who is sick with love for the Holy One of Israel but stricken by fear, unable to rise up and unlatch the door when the Beloved knocks. There is no love without fear; our finitude confronts us from the depth of our longing for the infinite. This much the Rav taught me in the first few pages of *From There You Shall Seek*. His efforts to integrate aspects of Western philosophy into a Torah perspective seemed impenetrable to me after years of study; I had to re-learn Kant and his successors in order to begin to follow the Rav's train of thought. But I never doubted that this Rav was also a *Rebbe* whose deep insight into the heart also made him a faithful guide to the halakhic mind.

It is easy to put R. Soloveitchik on a pedestal, and less easy to follow his struggles to realize a program that remains incomplete. No one is more to blame for our difficulty in understanding the Rav than the Rav himself, who advanced pregnant conjectures about the relationship between Torah, science, mathematics and philosophy, but withdrew from teaching and writing about these issues for most of three decades (early 1950s to the early 1980s). During those years, he made his essays *Halakhic Man* and *The Halakhic Mind* available to English-speaking readers.

What the Rav meant by "a new world view" is evident in R. Robert Blau's classroom notes on his 1947 lectures on Genesis, which aim at nothing less than a schema that integrated Chumash, Kabbalah, Jewish medieval philosophy and modern mathematical physics. Here, surely, is a sketch of this new world view tested in the laboratory of the classroom. This is a draft rather than a completed grand design, a set of well-considered but not fully realized ideas. The classroom notes available to us are sketch of a sketch. Nonetheless, they incorporate elements of the Zohar with nuances found nowhere else in his work; an original and fecund perspective on Jewish medieval philosophy; and foundational issues in the mathematics of the infinite. We have before us student notes, to be sure, not the first-person voice of the Rav, but the guidelines of the Rav's intellectual program are unmistakable. He envisioned a Torah Judaism that was both deeply traditional and thoroughly modern, informed by an understanding of God's creativity consistent with a rig-

orous and reticulated concept of human creativity. The Rav's Torah went far beyond the well-known apposition of the two Adams, of "Majestic Man" and "Covenantal Man." It penetrated into the problems of mathematical creativity and pushed at the frontier of scientific understanding.

R. Soloveitchik spent six years in Berlin in the midst of a revolution in science and mathematics that overthrew the materialistic determinism of the Newtonian world. After Newton, science made enormous strides in mechanics, astronomy, thermodynamics and other fields, and in its arrogance assumed that material forces could explain every phenomenon in nature. This arrogance persists in the efforts of some brain scientists to explain human consciousness as an electronic system that can be reproduced by a sufficiently large computer. Materialism dominated philosophy, starting with John Locke's "act of surrender…to the omnipotence of science," the Rav wrote. "The realist and the idealist, the metaphysical spiritualist and the materialist alike demonstrated loyalty to the empiricist and surveyed reality from scientific premises."[7] He added, ""Modern philosophy, likewise, from Descartes to scientific positivism and neo-Kantianism (the Marburg school) is nothing but an echo of the mechanistic physics which culminated in the Galilean-Newtonian interpretation of reality."[8] Nineteenth century science viewed the world as a big machine and human beings as yet-to-be-explained little machines. As the Rav argues, "idealists" like Hermann Cohen converged with the avowed materialists such as Eugen Dühring and Hermann von Helmholtz.[9]

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7 *The Halakhic Mind*, p. 7.

8 *The Halakhic Mind*, p. 6.

9 See *The History of the Calculus and its Conceptual Development* by Car. B. Boyer (Dover Books, 1959) pp. 306–309. Boyer writes: "Thoroughgoing empiricists and idealistic philosophers in particular have sought, since the time of Newton and Leibniz, to read into the calculus a significance beyond that of a formal postulational system…. Traces of the old scientific and metaphysical tendencies remained. Lord Kelvin… considered mathematics the etherealization of common sense…. His friend Helmholtz showed a similar tendency… Mach also felt strongly the empirical origins of mathematics and held with Aristotle that geometric concepts are the product of idealization of physical experience of space…. The attitudes of Helmholtz and Mach are representative of the influence in science of the positive philosophy of the nineteenth century…. Dühring… indulged in a polemic against Gauss, Cauchy, and others who would deny the absolute truth of geometry, and who would introduce into mathematics such figments of the imagination as imaginary numbers, non-Euclidean geometry, and limits. Marxian materialists will not grant mathematics the independence of experience necessary for its proper development…. If

With the discovery of quantum mechanics in the 1920s, science and philosophy entered a crisis from which they have found no recourse. I reviewed the crisis in Western philosophy as the Rav encountered it in a previous study,[10] but a closer look at some of the issues will help situate the new material available to us in the Genesis Lectures.

A brief mention of a seemingly technical issue in mathematical philosophy is required to put the Rav's presentation in context. Kant retained from Aristotle the dogma that all thought comes from sensory perception, and this element of empiricism was hard to reconcile with his epoch-making assertion that the subjective observer created the experience of perception. Hermann Cohen compounded the problem by attempting to equate the mind's understanding of infinitesimals in the calculus with naïve sensory perception. That made his system amenable to the materialists, but an object of ridicule among the most creative mathematicians. Cohen wanted to found the constitution of Being from the starting point of infinitesimal magnitudes in the calculus. At the same time, Cohen wanted to preserve Kant's insistence that everything in the mind ultimately derives from sense-perception. That required him to regard "infinitesimals"—a metaphysically-dubious sort of entity that mathematicians never had quite defined—as if they also were ordinary objects of perception. To be sure, perception had to be "intensive" to take in infinitesimal magnitudes, and it was on this stumbling-block that Cohen's critics focused their attention.

Nemeses came to this dubious alliance of empiricists and idealists from an unexpected direction, namely from the mathematicians. The rigorous formulation of the calculus by Bernhard Riemann and Karl Weierstrass exposed the neo-Kantian system to be in conceptual shambles. Some forty years after the mathematical revolution, with the advent of quantum mechanics, deterministic materialism utterly collapsed.

Gottlob Frege, the founder of modern mathematical logic, reviewed Cohen's 1883 breakthrough book on the infinitesimal calculus, asserting

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a number of philosophers were led by excessive realism to reject much of the mathematics of the nineteenth century, idealistic philosophers, following Kant, were likewise unwilling to accept the bare formalism of Cauchy and Weierstrass in the realm of the calculus…. Idealists attempted… to interpret the differential as having an intensive quality, resembling the potentiality of Aristotle, the impetus of the Scholastics, the *conatus* of Hobbes,or the inertia of modern science. They wished to view the continuum, not in terms of the discreteness of Cantor and Dedekind, but as an analyzable concept in the form of a metaphysical reality which is intuitively perceived."

10 D. Goldman, "Rav Soloveitchik's New World View," in *Ḥakirah* 24.

that Cohen "went over a cliff" thanks to his ignorance of mathematics. Especially illogical, Frege wrote, was Cohen's attempt to identify the "infinitesimals" of the calculus with "intensive perception," Cohen's device to reconcile the imperceptibly small elements of mathematical analysis with the intuition of the senses.[11] Edmund Husserl, Weierstrass' doctoral student, ridiculed Cohen's view of infinitesimals as "nonsensical profundity" and "profound nonsense."[12]

I earlier called attention to the Rav's observation in *The Halakhic Mind* that the rigorous formulation of the calculus had undone Kant's theory of sensory intuition.

> That mathematics is not synonymous with receptive intuition, as Kant thought, was amply demonstrated by modern mathematics. It is sufficient to consider the Weierstrass curve in order to convince oneself of the incommensurability of mathematical knowledge with 'sensuous' intuition. The development of non-Euclidean geometry refuted Kant's 'Transcendental Aesthetics' completely.[13]

Judging from his dissertation bibliography, the Rav was well aware

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11 See Gottlob Frege, *Kleine Schriften* (Olms 1990), pp. 99–100, "[T]he contrast between ordinary and infinitesimal numbers cannot be interpreted as a contrast between extensive and intensive numbers. There is insufficient distinction between arithmetic concepts and their application to geometry and mechanics. Infinitesimal calculation is in its essence purely arithmetic, and one cannot go back to geometry or mechanics to define or justify it, even if its historical point of departure lay in geometrical and mechanical tasks" (Author's translation). For additional background on Cohen's use of the concept of "intensity," see David P. Goldman, "Rav Soloveitchik's New World View," in *Ḥakirah* 24, pp. 99–100.

12 Quoted in Mormann, Thomas, and Mikhail Katz. "Infinitesimals as an Issue of Neo-Kantian Philosophy of Science." *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, vol. 3, no. 2, 2013, pp. 236–280. JSTOR, www.jstor.org/stable/10.1086/671348. Accessed 21 June 2020. Mormann and Katz observe, "Cohen's education in logic did not correspond to the state of the art at the beginning of the twentieth century. He apparently never took proper notice of Frege, Russell, or any other contemporary logician."

13 *The Halakhic Mind*, p. 126, fn. 76. Prof. R. Shalom Carmy conjectures that this footnote might have been added to the Rav's 1944 manuscript when it was published four decades later. R. Soloveitchik presumably refers to Weierstrass functions that are everywhere continuous but nowhere differentiable; the term "Weierstrass Curve" is misleading.

of these issues during his doctoral studies.[14] The last element of Aristotle that Kant failed to extirpate—the insistence that all human thought ultimately derives from sensory impressions on the brain—was a weakness in Kant's system that Husserl and others later sought to correct.

It should be emphasized that Kant's great insight—that perception does not merely register sense impressions on Aristotle's blank slate, but requires the active participation of the observer in constituting experience out of sensory data—remains the most fecund contribution to philosophy since Plato. Little of the detailed apparatus that Kant brought to bear on the problem has survived subsequent criticism. The notion of "intensive" vs. "extensive" magnitude, by which Hermann Cohen tried to turn the infinitesimal into an object of sense-perception, fell by the wayside when mathematics moved beyond the foggy metaphysical notion of infinitely small magnitudes. Synthetic *a priori* reason, Kant's characterization for mathematical judgments, failed to distinguish between the kind of intuition with which mathematics could not dispense, and the logical derivation of mathematical propositions from a fixed number of axioms in modern mathematical logic.[15]

Nonetheless, Kant bracketed the philosophical problem of sense-perception and experience such that subsequent philosophical investigation was enabled. Kurt Gödel, the greatest logician of the 20th century (and perhaps of all time) wrote, "I believe it to be a general feature of many of Kant's assertions that literally understood they are false but in a broader sense contain deep truths."[16] He added, "Just because of the lack of clarity and the literal incorrectness of many of Kant's formulations, quite divergent directions have developed out of Kant's thought—none of which, however, really did justice to the core of

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14 The brief bibliography of his dissertation includes D. Gawronsky's review of the Weierstrass-Cantor critique of Hermann Cohen's theory infinitesimals (*Das Urteil der Realität und seine mathematische Voraussetzungen*, Marburg 1909).

15 See Dagfin Fellesdal's notes to Kurt Gödel's discussion of Kant in Vol. 3 of Gödel's Collected Works (Oxford 1965), p. 367. Kant argued that geometric intuition was required to prove that the sum of the angles of a given triangle was equal to two right angles, implying that it could not be proven logically from a finite number of axioms. That is simply false; "the formal logic available to Kant is much weaker than modern logic," Fellesdal observes. Nonetheless Gödel—who proved that no formal system of mathematics could dispense with intuition—thought Kant was on the right track.

16 *Kurt Gödel, Collected Works*, Vol. III (Oxford University Press 1995), p. 355.

Kant's thought."[17] Gödel offered a correction of Kant which I will discuss later in this article.

R. Soloveitchik's doctoral dissertation looks backward to Hegel's objections to Kant and forward to Husserl's reconstruction of Kant.[18] He wrote:

> It is implicit in the consistent Idealistic view that Being only pertains to objects of judgment, but that by no means justifies our drawing an equivalence between the two concepts. The specific character of the object of judgment, to be sure, is embodied in its realization, but the formation of an object presumes a Category of Being in the first place. Otherwise we would miss what is singular and characteristic in the object of judgment. *It is the case that all psychic functions—not only cognitive judgments—are* intentional *acts that are directed at an object. Feeling and wanting indicate volitional and emotional objects. Emotional thinking as an intentional act consummates the formation of objects* [emphasis added].[19]

And at the conclusion of the dissertation, the Rav adds a distinctly Hegelian coda:

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17 Ibid, p. 372.

18 Much the same idea is referred to in *The Halakhic Mind*, p. 28: "Pragmatism and symbolism have never admitted an aspect of reality which might be grasped exclusively by a non-scientific method (as the phenomenologist and the neo-Hegelian said of the Absolute)."

19 'Daβ das Sein nur den Urteilsgegenständen zukommt, ist nach consequent-idealistischer Afuffasung eine Selbstverständlichkeit, aber das berechtigt uns noch lange nicht, die beiden Begriffe einander gleichzusetzen. Freilich besteht der spezifische Charackter des Urteilsgegenstandes in seiner Wirklichsetzung, aber um einen gegenstand zu formen, muβ bereits die Seinskategorie als vorausgesetzt gelten. Sonst würden wir das eigentümliche und Charakteristische an dem Urteilsegenstand vermissen. Denn die sämtlichen seelischen Funktionen, nicht bloβ das kognitive Urteilen, sind intentionale Akte, die auf einen Gegenstand gerichtet sind. Das Fühlen, das Wollen weisen auf volitive and affective Gegenstände hin. Das emotionale Denken als intentionaler Akt vollzieht gegenständliche Formung." J. Solowiejczyk, *Das reine Denken und die Seinskonstituierung bei Hermann Cohen* (Inaugural-Dissertation zur Erlangung der Doktorwürde, Friedrich-Wilhelms-Universität, Berlin 1932, p. 86.) Y.Y. Brafman calls attention to this remarkable aside in R. Soloveitchik's doctoral dissertation, with the keen observation that "much has been made of his influence by Cohen's Neo-Kantianism [but] a better way of describing Soloveitchik's philosophical *oeuvre* is as an effort to get out of its grips." Brafman's translation from the German, though, contains numerous errors.

> The reasons that motivate Cohen's interpretation of reality stem from the relationship of scientific Idealism to the positive sciences. But if one proceeds from the standpoint that thinking in general—which constitutes reality—goes beyond scientific thought as such, the immediate consequence of this premise is that reality is constituted by universal thinking. This thinking is not tied to the present situation of the sciences. It constitutes the entire universe. The task of the positive sciences is gradually to encompass this reality. Philosophy thereby is liberated from the hegemony of the positive sciences. Philosophy has at its command an independent method which singles out and determines the structure of reality from out of the flowing stream of the experiential sciences. Even if positive science and especially natural science in multiple ways shape the original form of thinking and intuition, there nonetheless remains the philosophical task of grasping the categories of perception in their primal form. And this is decisive for the interpretation of reality.[20]

Half of this programmatic declaration by the thirty-year-old Soloveitchik looks toward Husserl's phenomenology (in its emphasis on intentional acts), and the other toward Hegel's *Phenomenology of Mind* (in its emphasis universal thinking, including feeling and wanting).[21] Husserl

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[20] "Die Gründe, die Cohen zu dieser Wirklichkeitsinterpretation bewogen haben, liegen abermals in dem Verhältnis des wissenschaftlichen Idealismus zu den positive Wissenschaften. Geht man von dem Standpunkt aus, daβ das allgemeine Denken, das die Wirklichkeit konstituiert, über das tatsächliche wissenschatliche Denken hinausgeht, so ist die unmittelbare Folge dieser Voraussetzung, daβ die Wirklichkeit von dem universalen Denken gesetzt wird. Dieses Denken ist an den jeweiligen Stand der Wissenchaften nicht gebunden. Es konstituiert das gesamte Universum. Die Aufgabe der positive Wissenschaften besteht darin, allmählich diese Wirklichkeit zu erfassen. Dadurch wird die Philosophie von der Vorherrschaft der positive Wissenschaften befreit. Sie verfügt über eine selbständige Methode, die die Wirklichkeitsstructur aus dem flieβenden Strom der erfahurungswissenschaten heraushebt und bestimmt. Mag die positive Wissenschaft und in erster Linie die Naturwissenschaft die ursprünglichen Formen des Denkens und des Anschauens auf mannigfache Weise gestalten, so bleibt die philosophische Aufgabe, die Erkenntnisformen in ihrer Urgestalt zu fassen, die allein für die Wirklichkeitsdeutung ausschlaggebend ist." Dissertation, p. 109.

[21] The phenomenology of Hegel and Husserl, respectively, entail important differences. See George A. Schrader, "Hegel's Contribution to Phenomenology," *The Monist*, vol. 48, no. 1, 1964, pp. 18–33. JSTOR, www.jstor.org/stable/27901535, accessed 1 July 2020. What they have in common is the goal of bridging the gap that Kant postulated between what we

also appears in the dissertation's brief bibliography. Husserl modified Kant's dogma of sensuous perception, arguing that the objects of our perception are not mere sensations or combinations of sensations, but something that the mind conceptualizes as a distinct object which cannot be reduced to the sum of its parts. The sense-perception of computers programmed for image recognition is much keener than human eyesight, but tiny perturbations lead them to mistake pigs for airliners and bananas for spade-handles.[22] Gödel keenly observed that Husserl's notion of the object of perception made it possible to consider physical objects and mathematical objects in the same way.[23] If the object of perception is constituted by the mind of the observer rather than merely being perceived from sensation, it is unclear how we can avoid falling into subjectivity.

Even without the newly available material from the Genesis lectures, these brief but pointed statements in the Rav's 1931 dissertation raise doubts about the idea that the Rav had a "neo-Kantian" stage followed by a "phenomenological" or "Existentialist" stage. The Rav was not an academic philosopher subject to influences in the usual understanding of the term, but rather an outsider, an intruder from the Torah world who locked horns with Western philosophy in its moment of crisis. What he found was not a framework or frameworks that suited his requirements, but a set of unsolved problems. We could speak just as easily of an "Hegelian stage." The Genesis lectures set in relief R. Soloveitchik's 1931 critique of Cohen in his doctoral dissertation, and suggest a continuity in his thinking from 1931 through to 1947 and beyond.

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actually perceive, namely the phenomenon, and the "thing in itself," the noumenon, whose inner essence we can never penetrate.

22 See Jonathan Tennenbaum, "The Ultimate Root of AI Stupidity," in *Asia Times*, June 2020. https://asiatimes.com/2020/06/algorithm-approach-limits-artificial-intelligence/. Accessed July 10, 2020.

23 "That something besides the sensations actually is immediately given follows (independently of mathematics) from the fact that even our ideas referring to physical objects contain constituents qualitatively different from sensations or more combinations, e.g., the idea of object itself…. Evidently the 'given' underlying mathematics is closely related to the abstract elements contained in our empirical ideas. It by no means follows, however, that the data of this second kind, because they cannot be associated with actions of certain things upon our sense organs, are something purely subjective, as Kant asserted. Rather they, too, may represent an aspect of objective reality, but, as opposed to the sensations, their presence in us may be due to another kind of relationship between ourselves and reality." *Kurt Gödel, Collected Works*, Vol. III, p. 371.

Modern mathematical logic remains stuck on the problem of the continuum; within the existing framework of mathematical logic that underlies set theory, Gödel and Cohen proved that we neither can prove nor disprove the Continuum hypothesis. Creation itself presents a paradox of continuity and discontinuity. To the Greeks (and especially to Aristotle), R. Soloveitchik observes, the problem does not exist because creation *ex nihilo* is unimaginable. He states in Lecture I:

> In ancient Greek thought there was no understanding of change and transformation. In modern science the amount of matter is constant, evolution, taking place only in form. So when science speaks of evolution, it is morphological evolution. Exactly here Aristotle differed. He could not understand morphological evolution. For him all forms were eternal and could not change. Hence nature, for Aristotle, did not undergo any change.

And he adds in lecture VI: "בראשית is logically unthinkable to science." Creation *ex nihilo* is inherently paradoxical. The Rav adds in that lecture: "By the word of God the heavens were created," the same as on the days of creation. The reason, however, that the Torah omitted it is because logically it is incorrect. How can God say ויאמר? To whom shall He address Himself, when all was nihility? We therefore cannot understand it. Causality is a dynamic problem; to address oneself to nihility is a logical problem. This mystery is inexpressible.

Nonetheless, the Rav continues in Lecture VII, mathematics has something to say about how creation *ex nihilo* occurs. How does a line arise from a dimensionless point? How does a plane arise from a one-dimensional line, or a three-dimensional solid from a two-dimensional plane?

> The problem for [the medieval philosophers Asher Crescas and Shemtov] was, how can a dimensional line emerge from indimension. This was Zeno's problem. Modern calculus answers it by saying that a line is continuity. They said that sometimes we may speak of beginning to something, but not meaning a part of something, because a part must have the same dimensions as the whole.
> Not the beginning "of a line," which implies a part of it, but beginning "to a line," implying the origin of it—the same of *atah*, which is both *taḥlit le-avar* (the end of the past), and also *b-ha-ṯhalah le-atid* (the beginning of the future). But not being a part of this past or the future but, rather, the origins of the future. *Bereishit*, then, would mean the "beginning to reality," but not, the "beginning of reality," not *Bereishit ha-olam*, but *Bereishit le-olam*.

> The great problem for Maimonides is where is the bridge between nihility and reality. Science answers it by seeing the world as a continuum without a beginning. However, for Judaism it is a problem. *Hatechilat ha-zeman* (the beginning to time) meant to Crescas: "position," which precedes the beginning. We can demonstrate from the classical example of "point," which is not a part of time but a position from which to view time in retrospect and anticipation. In regard to our problem, there is no bridge between nihility and Being. God did not convert nihility into Being, but conditioned nihility into non-Being, gaining a position for nihility and then negating it.

The mathematical cognate of this metaphysical statement is that:

> God introduced the system of a continuum. The transformation was not made in an instantaneous leap but by conditioning. Nihility became positioned into non-Being, which is in the boundary of Being. Non-Being is the boundary condition of Being. The point is the boundary position of a line. Non-Being is not beyond Being but a boundary condition of Being and following a continuum. In non-Being there is the positionality of Being, as in rest—there is the positionality of motion (Newton). Boundary condition means that there is no instantaneous leap. As in calculus, we go from the infinitesimal to the circle in a slow continuum little by little.[24]

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[24] R. Soloveitchik evidently is referring in the final sentence to the classical problem of the quadrature of the circle. The perimeter of a regular polygon of n sides inscribed in a circle increases as n increases, as Archimedes knew, and the area of a circle can be approximated by a polygon with a very large number of sides. Rigorously speaking, R. Soloveitchik's statement is misleading. A n approaches infinity, the perimeter of an n-sided polygon inscribed in a circle differs from the circumference of the circle by an arbitrarily small amount. Nonetheless, the perimeter a regular polygon of an arbitrarily large number of sides will never be equal to that of a circle. The perimeter of a regular polygon is always an algebraic number, while the circumference of a circle is a multiple of π, a transcendental number. Algebraic and transcendental numbers are incommensurable. The rigorous proof of this was provided Ferdinand von Lindemann in 1882 and Karl Weierstrass in 1885. There is no gradual and continuous way to proceed from an n-sided polygon to the circle, because they are characterized by incommensurable types of numbers.
Carl Boyer observes, "Formerly, when illustrations of the notion [of the limit] were desired, the one most likely to be called to mind was that of a circle defined as the limit of a polygon. Such an illustration immediately served to bring up questions as to the manner in which this was to be interpreted. Is it the approach to coincidence of the sides of the polygon with the points representing the circle? Does the polygon ever become the circle? Are the properties of the polygon and the circle the same? It was questions such as these that retarded

> This is the basis of Newton's differential equation which Zeno could not understand. Rest and motion are not two separate situations as Zeno thought, and, therefore he could not understand the leap from one to the other. But Newton solved it by saying that it followed in a slow continuum.
> That is what Maimonides did with non-Being and Being. Via the principle of Bereishit, God created heaven and earth. Meaning that there is a continuum from infinity to finitude. Bereishit is not Beginning but positionality of nihility into non-Being delineating the boundary line leading into Being.

Remarkably, the Rav paraphrases here G.F.W. Hegel's *Science of Logic*,[25] a work to which we find no reference elsewhere in his writing. With

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the acceptance of the limit idea, for they were similar to those of Zeno in demanding some sort of visualization of the passage from the one to the other by which the properties of the first figure merge into those of the second…. Such an appeal to geometrical intuition is quite irrelevant in the case of the limit concept." Carl B. Boyer, *The History of the Calculus and its Conceptual Development* (Dover Books, 1959) p. 272.

25 "The Limit: Being-for-other is indeterminate, affirmative association of something with its other; in limit the non-being-for-other is emphasized, the qualitative negation of the other, which is thereby kept out of the something that is reflected into itself. We must see the development of this concept – a development that will rather look like confusion and contradiction. Contradiction immediately raises its head because limit, as an internally reflected negation of something, ideally holds in it the moments of something and other, and these, as distinct moments, are at the same time posited in the sphere of existence as really, qualitatively, distinct. Something is therefore immediate, self-referring existence and at first it has a limit with respect to an other; limit is the non-being of the other, not of the something itself; in limit, something marks the boundary of its other. – But other is itself a something in general. The limit that something has with respect to an other is, therefore, also the limit of the other as a something; it is the limit of this something in virtue of which the something holds the first something as its other away from itself, or is a non-being of that something. The limit is thus not only the non-being of the other, but of the one something just as of the other, and consequently of the something in general. But the limit is equally, essentially, the non-being of the other; thus, through its limit, something at the same time is. In limiting, something is of course thereby reduced to being limited itself; but, as the ceasing of the other in it, its limit is at the same time itself only the being of the something; this something is what it is by virtue of it, has its quality in it. – This relation is the external appearance of the fact that limit is simple negation or the first negation, whereas the other is, at the same time, the negation of the negation, the in-itselfness of the something…. To apply this to the preceding example, the one determination is this: that something is what it is only in its limit. There-

Hegel, he understands that "non-Being" isn't a mysterious metaphysical void, much less a jaundiced view of the world (as in Heidegger's "What is Metaphysics?") but rather a reflection of the *act* of delimitation and differentiation.

Hegel's departure from Kant began with his assertion—inspired by the poet-philosopher Friedrich Schiller[26]—that human experience could not be reduced to the mere processing of information, and that philosophy also must embody man's affective dimension, as Hegel proclaimed in his introduction to *The Phenomenology of Mind*.[27] That is the "Hegelian"

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fore, the point is the limit of line, not because the latter just ceases at the point and has existence outside it; the line is the limit of plane, not because the plane just ceases at it; and the same goes for the plane as the limit of solid. Rather, at the point the line also begins; the point is its absolute beginning, and if the line is represented as unlimited on both its two sides, or, as is said, as extended to infinity, the point still constitutes its element, just as the line constitutes the element of the plane, and the plane that of the solid. These limits are the principle of that which they delimit; just as one, for instance, is as hundredth the limit, but also the element, of the whole hundred."
GWF Hegel, *The Science of Logic*, translated and edited by George di Giovanni (Cambridge University Press, 2010) pp. 98–99.

26 "Es muss Schillern das grosse Verdienst zugestanden werden, die Kantische Subjektitivaet und Abtsraktion des Denkens durchgebrochen and den Versuch gewagt zu haben, ueber sie hinaus die Einheit und versoehnung denkend als was Wahre zu fassen und kuenstlerich zu verwirklichen." Quoted in Böhler, Michael J. "Die Bedeutung Schillers Für Hegels Ästhetik," *PMLA*, vol. 87, no. 2, 1972, pp. 182–191. JSTOR, www.jstor.org/stable/460875. Accessed 12 Apr. 2020.

27 "In positing that the true shape of truth lies in its scientific rigor—or, what is the same thing, in asserting that truth has the element of its existence solely in concepts—I do know that this seems to contradict an idea (along with all that follows from it), whose pretentiousness is matched only by its pervasiveness in the convictions of the present age. It thus does not seem completely gratuitous to offer an explanation of this contradiction even though at this stage such an explanation can amount to little more than the same kind of dogmatic assurance which it opposes. However much, that is to say, the true exists only in what, or rather exists only as what, is at one time called intuition and at another time called either the immediate knowing of the absolute, or religion, or being—not at the center of the divine love, but the being of divine love itself – still, if that is taken as the point of departure, what is at the same time demanded in the exposition of philosophy is going to be instead the very opposite of the form of the concept. The absolute is not supposed to be conceptually grasped but rather to be felt and intuited. It is not the concept but the feeling and intuition of the absolute which are supposed to govern what is said of it." G.F.W. Hegel, *The Phenomenology of Spirit,* trans. Terry Pinkard (Cambridge University Press 2018), p. 6.

dialectic between scientific man and emotional man which the Rav drew upon in later , such as "Majesty and Humility".[28] The Rav focuses here on an aspect of Hegel's work known only to a few specialists, but which nonetheless has great relevance. Hegel's reputation as a philosopher of mathematics suffered in the English-speaking world from an inaccurate and tendentious evaluation by Bertrand Russell.[29] Recent scholarly research, though, ranks Hegel's contribution highly, as I will explain below.

Hegel's discussion of non-Being stems from the pre-Socratic philosopher Parmenides (circa 475 B.C.), who argued that change and differentiation were impossible. To say that something changes is to say that it has Being now that it did not have before, or that it previously had non-Being with respect to what it has become. But we can neither think about nor talk about non-Being, because then non-Being would be a Something, and we would be talking about a Something that has no Being.[30]

Here the Rav takes Hegel's side against Hermann Cohen, who naively adopted Parmenides' formulation and vehemently rejected Hegel's resort to non-Being. In his last major work on epistemology, Cohen claimed that Parmenides "inscribed a doctrine" (with an "iron stylus," no less) rather than identified a paradox.[31] Parmenides' slightly older contemporary Heraclitus famously quipped that Being is non-Being, by which I understand simply that if we actually were presented with Parmenides' unchanging, undifferentiated, featureless, all-encompassing One, we could not distinguish it from Nothingness, because it has no distinguishing features. This notion of the One (or the "Absolute" as Hegel's contemporary Friedrich Schelling called it) is "a night in which all cows are black," Hegel famously wrote in the Introduction to its 1806 *Phenomenology of Mind*. A simple way to think of this is to imagine Par-

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28 *Tradition Magazine*, Vol 17 No. 2 (Spring 1978).

29 See Pinkard, Terry. "Hegel's Philosophy of Mathematics," *Philosophy and Phenomenological Research* 41, no. 4 (1981): 452–64.

30 See D. Goldman, "The Jewish Idea of Freedom," in *Ḥakirah* Vol. 20, pp 101-3.

31 In his last major philosophical work, *Die Logik Der Reinen Erkentnis* (Bruno Cassirer, 1906), p. 94, Cohen writes: "Parmenides showed himself to be prophetic for the whole future of speculation, when with an iron stylus he engraved the statement: 'The existent is. The non-existent is nothing. As Hamlet said, 'To be or not to be—that is the question.' (p. 94) This has been regarded as overwrought speculation and as dry formalism. The inner history, the inner justification of the system, especially of those who did not want to be a system, can be tested against this critical statement of Parmenides. Here the abyss of Hegel's logic is brought to the surface in the light of day" (my translation).

menides' eternal, unchanging, and undifferentiated One, with no motion and no distinguishing characteristics. How could we tell the difference between this and Nothing?

In the context of passive contemplation, the Parmenides paradox is insoluble; Hegel proposes to resolve the matter by speaking of the Limit as an *act* of separation that differentiates one thing from another. As an ontological concept, non-Being is meaningless, just as Parmenides said; it is the *act* of negation, the setting of a limit, that achieves differentiation. The affinity of Hegel's dialectical generation of Being and the Lurian Kabbalah should be clear.[32] God "negates" His own infinity in order to make room for the world. R. Soloveitchik wrote:

> This entire matter is explained in R. Isaac Luria's doctrine of *tzimtzum*. In this view, God "constricted" His glory in order to create the world, leaving an open, empty "space in the middle"—that is, the act of creation is composed of separation and advance. God separated himself from the world when He had the idea of creating it, and this separation is the beginning of the act of creation, since the world cannot exist in the bosom of the Holy One, Blessed Be He, as His infinite being precludes any other existence.

"The point is the boundary position of a line," we read in R. Blau's notes. Compare this to Hegel (per footnote 26): *"Therefore, the point is the limit of line, not because the latter just ceases at the point and* has existence outside it; the line is the limit of plane, not because the plane just ceases at it; and the same goes for the plane as the limit of solid. Rather, at the point the line also begins; the point is its absolute beginning, and if the line is represented as unlimited on both its two sides, or, as is said, as extended to infinity, the point still constitutes its element, just as the line constitutes the element of the plane, and the plane that of the solid."

The definition of higher spatial orders (point to line, line to plane, plane to solid) by the setting of a limit leads directly to the problem of the infinite. The question of how finite man encounters an infinite God—how finite humans stand with respect to the *ein sof*—bridges the

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[32] (*From There You Shall Seek*, p. 172). A brief summary of Kabbalah is found in Vol. 2 of Hegel's *Lectures on the History of Philosophy*, citing the 15t-century kabbalist Abraham Cohen de Herrera (Irira). There is no reason to believe that Jewish sources exercised any direct influence on Hegel. His contemporary Schelling employed the concept of *zimzum*, which he learned from Christian sources. See Schulte, Christoph. "Ẓimṣum in the Works of Schelling," *Iyyun: The Jerusalem Philosophical Quarterly* / עיון: פילוסופי רבעון, vol. 41, 1992, pp. 21–40. JSTOR, www.jstor.org/stable/23350713. Accessed 26 June 2020.

seemingly irreconcilable realms of scientific investigation and mystical speculation. The Rav believed that this was the intent of the medieval kabbalists. One might mention in this regard Christian philosophers influenced by the kabbalists, including Cardinal Nicolas of Cusa (1401–1464), whose theological and mathematical ponderings helped prepare the ground for the formulation of the calculus two centuries later[33].

Whatever the gaps in his mathematical expertise, the Rav focused on the decisive philosophical issue; that is, the concept of the limit in the context of creation. Creation from a Torah standpoint is an act of differentiation, that is, delimitation, and the concept of the limit as a means of ordering infinite series into finite entities parallels the Rav's theological premise. He sought a parallel between the divine act of creation and the natural order of the world as disclosed by mathematics. This impelled him to turn away from the neo-Kantians and instead to turn to Hegel, as I will explain.

Kant set out to revise philosophy to accommodate the revolution in mathematical physics associated with Newton's and Leibniz' formulation of the differential and integral calculus.[34] Because it deals with arbitrarily small increments of change (confusingly called "infinitesimals" by many early writers and by Hermann Cohen), Kant required a new theory of perception that somehow preserved the sense-data of empirical observation ("sensuous intuition") within the framework of the abstract conceptual apparatus of the new mathematics. Kant's own presentation of this is obscure. He postulated that perceptions that could not be quantified, such as the degree of redness of a red object, were "intensive" rather than "extensive" magnitudes.[35] The Lithuanian Talmudist-turned-secular-philosopher Salomon Maimon proposed that infinitesi-

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[33] See Boyer op. cit. pp. 90–91. Cusa also wrote extensively about divine contraction (contraction) as the mode of differentiation of the One, anticipating by a century the Lurian concept of *tzimtzum*. See for example Schulte, Christoph. "Ẓimẓum in the Works of Schelling." *Iyyun: The Jerusalem Philosophical Quarterly / עיון: פילוסופי רבעון*, vol. 41, 1992, pp. 21–40. JSTOR, www.jstor.org/stable/23350713. Accessed 26 June 2020. See also D. Goldman, "Rav Soloveitchik's New World View," in *Ḥakirah* 24, p. 92.

[34] See D. Goldman, in *Ḥakirah* 24, pp. 98–102.

[35] Kant, *Critique of Pure Reason*, p. 169: "Accordingly every sensation, thus also every reality in appearance, however small it may be, has a degree, i.e., an intensive magnitude, which can still always be diminished, and between reality and negation there is a continuous nexus of possible realities, and of possible smaller perceptions. Every color, e.g., red, has a degree, which however small it may be, is never the smallest, and it is the same with warmth, with the moment (is the word "moment" correct?) of gravity, etc."

mals (or "fluxions" in Newton's terminology) should be considered "intensive" rather than "extensive" magnitudes.[36] Maimon's thesis is mentioned by R. Soloveitchik in his 1931 doctoral dissertation,[37] a detail that shows how thoroughly the Rav had studied the background to the issue.

Hermann Cohen, as the Rav noted, embraced Maimon's application of Kant's "intensive magnitudes" to infinitesimals. As we have seen, Gottlob Frege thought it nonsense. R. Soloveitchik comments in his dissertation that Cohen fell back on "intensive" perception in order to reconcile the fuzzy notion of the infinitesimal with perception. The Rav argued that Cohen thus

> attempted to repurpose the concept of anticipation of perception, and to bring it into the idea of the infinitesimal. In line with this, intensity is supposed to represent not the qualitative facts of sensation, but the infinitely small in mathematics…. The coherence of sensation and reality is not quite clear, and for the simple reason that reality is an object of judgment, which depends on a transcendence. The relationship between pure thought and sensation was not specified by Cohen with sufficient logic.[38]

Hegel rejected Kant's formulation as meaningless, and proposed an entirely different way to think about the infinite. The Rav addressed this in discussing the boundary between finite and infinite in the context of creation. As Marco Giovanelli explains:

> To grasp the sense of Hegel's discourse, one must refer to Kant. Behind the discussion of infinitesimal calculus lies the critique of the Anticipations of Perception. The return from quantity into quality does not assume the form of a transition from extensive

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36 "Eben so wird sie in der Exhaustionsmethode, in der Methode der Untheilbaren, in der Fluxions- oder Differentialmethode u. s.w. gedacht. Die Fluxionen oder Differentiale aber sind in verschiedenen Größen, nach Verschiedenheit ihrer Entstehungsart verschieden, und können selbst als Größen mit einander verglichen werden. Sie find keine extensive Größen, die durch eine Synthesis der gleichartigen Theile entstehen. Aber dennoch sind sie intensive Größen, die als solche nicht an sich, sondern im Verhältnisse zu einander bestimmbar sind. dx, dy, sind als Größen an sich betrachtet, = 0, und doch kann dx=2dy sein. Die Geschwindigkeit der Bewegung in einem Punkte kann mit der Geschwindigkeit derselben in einem andern Punkte verglichen, und durch dieselbe als Größe bestimmt werden. Sie sind also intensive Größen." Salomon Maimon, *Kritische Untersuchungen über dem menschlichen Geist oder das höhere Erkenntniß- und Willensvermögen* (Leipzig, 1797) pp. 209–210.

37 Dissertation, p. 105.

38 Dissertation, p. 105.

> magnitude to intensive magnitude as in Kant…For Kant, and for Schelling as well, the transition from quantity to quality ultimately corresponds to the transition from extensive magnitude to intensive magnitude… For Hegel, in contrast, this "conversion of the one-sided form of extensive magnitude into its other, intensive form, makes no difference to the nature of the fundamental determination."[39]

The Rav's turn to Hegel in his discussion of creation shows how fundamentally he rejected the neo-Kantian picture of reality. Hermann Cohen founded his philosophy on the infinitesimal as the starting point for the mind's constitution of being. To Hegel, the idea of the infinitesimal was just another "bad infinity." Hegel scholar Terry Pinkard explains:

> Hegel heaps nothing but scorn on this view, calling it "*Bilder der Vorstellung*," only 'fog' and 'shadows of thought.' It is a notion, besides, with too much imprecision (*Ungenauigkeit*). To hold to the doctrine of the infinitesimal would be like holding that there is a midpoint between being and nothing…The notion of the infinitesimal is only another example of one form of the bad infinite, i.e., treating the infinite as an 'entity' which is reached by following out an infinite series.[40]

The Rav's turn towards Hegel was motivated by his consideration of creation. How can Something come from Nothing? The infinitesimal as a static concept led to the absurd notion that an intermediate state exists between Being and Nothing, as Hegel wrote in the *Science of Logic*:

> Now when the mathematics of the infinite [i.e., the infinitesimal] still maintained that these quantitative determinations were vanishing magnitudes, that is, magnitudes which no longer are any Quantum but also not nothing, it seemed abundantly clear that such an intermediate state, as it was called, between Being and Nothing did not exist…The unity of Being and Nothing is indeed not a state; for such a state would be a determination of Being and Nothing such as might have been reached by these moments only contingently, as it were through disease or external influence, and through erroneous thinking.[41]

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39 Marco Giovannelli, *Reality and Negation: Kant's Principle of Anticipations of Perception* (Springer 2010) pp. 135–136.

40 Terry Pinkard, "Hegel's Philosophy of Mathematics." *Philosophy and Phenomenological Research* 41, no. 4 (1981): 452–64. Accessed July 8, 2020. doi:10.2307/2107251.

41 Hegel, *Science of Logic*, pp. 269–270.

The historian of mathematics John Lane Bell comments,

> In Hegel's subsequent review of how the infinitesimal has been conceived by mathematicians of the past, those who regarded infinitesimals as fixed quantities receive short shrift, while those who saw infinitesimals in terms of the limit concept (which in Hegel's eyes fell under the appropriate category of Becoming) are praised.[42]

Treating the infinitesimal as a vanishing or "evanescent" object leads to absurdities; for example, the notion of summing an infinitely large number of infinitely small objects to calculate the integral in the calculus. Hegel drew on the work of Cauchy, who introduced the modern concept of the limit calculus that would be given its final rigorous formulation by Karl Weierstrass in 1872.[43] Hegel was reaching for (and in some ways inspired) this solution, which prepared the ground for Georg Cantor's discovery of the transfinite numbers.[44] The limit concept removed the metaphysical fog that beclouded the notion of the infinitesimal. Continuity no longer was taken for granted as a property of lines or curves but rather was a property to be determined. As Hegel intuited, it is the limit that determines continuity.

Boyer explains:

> In this definition the view of the preceding centuries is reversed. Newton (implicitly) and Leibniz (explicitly) based the validity of the calculus on the assumption, which Greek thought had avoided, that, by a vague sense of continuity limiting states would obey the same laws approaching them Cauchy made the notion of continuity precisely mathematical and showed that this depends on the limiting idea and not vice versa. Furthermore, its essence does not lie in

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42 John Lane Bell, *The Continuous and the Infinitesimal in Mathematics and Philosophy* (Polimetrica 2005) p. 134.

43 See Michael Wolff, "Hegel und Cauchy: Eine Untersuching zur Philosophie und Geschichte der Mathematik," in Hosrtmann, Rolf-Peter and Petry, Michael J. (eds), Hegels Philosophie der Natur Bezehiungen zwischen empirischer und spekulativer Naturerkenntnis (Stuttgart: Keltt-Cotta), pp 197–263.

44 Bell op. cit. p. 133. Georg Cantor discovered that the infinite universe of real numbers encloses different orders of infinity. The natural numbers (1, 2, 3, 4…) constitute one order of infinity, to which the rational numbers also belong, because the rational numbers can be put into one-to-one correspondence with the natural numbers. The real numbers including the irrationals, Cantor proved, cannot be put into one-to-one correspondence with the natural numbers, and thus constituted a higher order of infinity (in Cantor's terminology, they have a higher transfinite cardinality).

> a vague blending or unity or contiguity of parts, as intuition seems to imply and as Aristotle had stated, but in certain formal arithmetical relationships, elaborated later in the theory of sets of points, which in turn led to the definition of the continuum.[45]

The rigorous formulation of the concept of the limit in the calculus by Cauchy, Bolzano and Weierstrass had epochal consequences for mathematics and philosophy. It led to Bolzano's and Weierstrass' discovery of functions that were everywhere continuous but nowhere differentiable, and thence to Cantor's discovery of different orders of infinity and transfinite numbers that embody them. R. Soloveitchik, we learn from the Genesis lectures, was keenly aware of the significance of infinite numbers both for medieval religious philosophy and for the philosophy of Kant, Hegel and their successors. The theological implications of Cantor's transfinite numbers were recognized almost as soon as he published his work. A theologian whom Cantor approached warned that such a result would vindicate Spinoza's pantheism. Cantor's biographer Joseph Dauben reports,

> Spinoza, a philosopher Cantor had studied carefully, used the natura naturans/natura naturata distinction in a form similar to that of his heretical forerunner Giordano Bruno. Both had been led to advocate a monistic philosophy of substance identifying God with the natural world. The question of the infinite was an easy touchstone identifying pantheistic doctrines. Any attempt to correlate God's infinity with a concrete, temporal infinity suggested Pantheism."[46]

Cantor had conjectured that the rational numbers constituted the first transfinite cardinal number ($\aleph_0$) and the real numbers of the Continuum the second transfinite cardinal number ($\aleph_1$). With the work of Gödel and Cohen on the Continuum Hypothesis, we know that we can neither prove nor disprove Cantor's conjecture within the logical framework of existing set theory. Two and a half millennia after Zeno, we still do not understand infinite numbers. We know that there are an infinite number of infinities (in Cantor's terms, an infinite number of

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45 Boyer, p. 277.

46 Joseph W Dauben. "Georg Cantor and Pope Leo XIII: Mathematics, Theology, and the Infinite," *Journal of the History of Ideas,* vol. 38, no. 1, 1977, pp. 85–108. JSTOR, www.jstor.org/stable/2708842. Accessed 9 July 2020. See also D. Goldman, "The God of the Mathematicians," in *First Things* August 2010.

transfinite cardinal numbers) but we do not know what they are or in what order they appear.

In the Genesis lectures, the Rav employs the Hegelian dialectic of Being and non-Being in his presentation on creation. In his published work we find approving mentions of Hegel, but no reference to the details of Hegel's argumentation. At the outset of *Halakhic Man*, R. Soloveitchik states that "there is much truth to the fundamental contention set forth by the dialectical philosophies of Heraclitus and Hegel" pertaining to "the soul of cognitive man" that "contradicts all of the desires and strivings of the religious soul."[47] Elsewhere he wrote,

> Modern theology and philosophy of religion in their exposition of the supreme experience, draw continually upon the Heraclitean-Hegelian dialectical wisdom. If 'faith is divine madness' and religion the great 'paradox' of the crisis (Kierkegaard, Barth, Brunner, Otto) then the paradoxical present day conflict of science and philosophy may yet give birth to a new religious world perspective."[48]

Oddly, not one scholarly article is devoted to the Rav's relationship to Hegel. To characterize R. Soloveitchik as an "Hegelian," to be sure, is just as misleading as calling him a "neo-Kantian." He wrote in the 1978 essay "From Majesty and Humility:"

> Judaic dialectic, unlike the Hegelian, is irreconcilable and hence interminable. Judaism accepted a dialectic, consisting only of thesis and antithesis. The third Hegelian stage, that of reconciliation, is missing. The conflict is final, almost absolute. Only God knows how to reconcile; we do not. Complete reconciliation is an eschatological vision. To Hegel, man and his history were just abstract ideas; in the world of abstractions synthesis is conceivable. To Judaism, man has always been and still is a living reality, or may I say, a tragic living reality. In the world of realities, the harmony of opposites is an impossibility.[49]

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47 *Halakhic Man*, p. 4.

48 *The Halakhic Mind*, pp. 3–4. Here the Rav inserts a footnote referring to Ferdinand Lassalle's 1858 monograph *Herakleitos der Dunkle*, observing that Lassalle's view (that Heraclitus' dialectic anticipated Hegel's) "was not adopted by the historians of philosophy." That was, however, Hegel's view as stated in his *Lectures on the History of Philosophy*.

49 Joseph B Soloveitchik. "Majesty and Humility." *Tradition: A Journal of Orthodox Jewish Thought*, vol. 17, no. 2, 1978, pp. 25–37. JSTOR, www.jstor.org/stable/23258673. Accessed 12 Apr. 2020.

Here the Rav's characterization of the Hegelian dialectic echoes a common misrepresentation of Hegel's views. Nowhere in Hegel's writing do we find the notion that "thesis" and "antithesis" come to reconciliation in a "synthesis."[50] But this is a minor issue; R. Soloveitchik's disagreement with Hegel's optimism parallels the objections of Hegel's student and critic Kierkegaard. For Kant and Schiller, the concept of the "sublime" captures our fear in the face of the infinite as well as the "inner self-sufficiency" of our "rational powers" which allow us to "elevate ourselves above [this fear] morally, namely through ideas."[51] In different ways, Kierkegaard and Nietzsche rejected the premise that reason can lift us above the existential dread of death.[52] R. Soloveitchik emphasizes that Man "is caught like Abraham's ram in a thicket of antinomies and dichotomies."

> His intellectual curiosity is of cosmic, universal dimensions…mesmerized by the infinite number of opportunities with which his fantasy presents him. He forgets the simple tragic fact that he is finite and mortal, and to reach out for infinity and eternity is a foolhardy undertaking.[53]

Despite this profound difference with Hegel, R. Soloveitchik nonetheless drew upon the German philosopher's exposition of the infinite. The brief comments we find in the Genesis lectures on the problem of the limit and the infinitesimal in the calculus show a clear grasp of the philosophical background, but limited expertise in the mathematical issues as such. Hegel's lengthy discussion of the calculus in *The Science of Logic* has historical importance, pointing toward the revolution in mathematical philosophy accomplished later in the 19th century by Cauchy, Riemann, Weierstrass and Cantor, as developed in the 20th century by Gödel.[54]

Regarding the mathematical issues that the Rav addresses in the Genesis lectures, I can only offer a conjecture about the Rav's subsequent silence. He pursued his interest in mathematics and ontology to a

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50 See Gustav E Mueller, "The Hegel Legend of 'Thesis-Antithesis-Synthesis,'" *Journal of the History of Ideas*, vol. 19, no. 3, 1958, pp. 411–414. JSTOR, www.jstor.org/stable/2708045. Accessed 14 July 2020.

51 Friedrich Schiller, *Essays*, D. Dahlstrom and W. Hinderer, eds. (Continuum 1993), p. 22.

52 See D. Goldman, "The Superman and the Knight of Faith" in *Ḥakirah* 27, pp. 77–82.

53 "Majesty and Humility."

54 For a summary of the mathematical issues see Joseph Dauben, *Georg Cantor: His Mathematics and Philosophy of the Infinite* (Princeton 1979) pp. 1–19.

point past which he lacked the resources—personal as well as collegial—to go further. The Rav, we can infer from the Genesis lectures, well understood the ontological issues implicit in the mathematics of the infinite as they had been developed by German critical philosophy, above all in Hegel's response to Kant. Reading his doctoral dissertation on Hermann Cohen with the hindsight of the 1947 lectures, we can see how keenly his critical eye was turned to the neo-Kantians' deficiencies. But he could not go forward alone. Not until the work of Kurt Gödel (1938[55]) and Paul Cohen (1963[56]) did mathematical philosophy solve many of these riddles, only to add on even more riddles, as Mephistopheles told Faust. Philosophy of mathematics remains in a cul-de-sac, with some possible egress indicated in Gödel's posthumous works and the conjectures of some mathematicians in his tradition. The Rav had neither the specialist training nor easy access to the still fragmentary and enigmatic results then being produced by the mathematicians.

Bold and inventive as was the Rav's approach in the Genesis lectures, he encountered obstacles in all three prongs of his thesis: His interpretation of Jewish medieval philosophy, his account of the mathematics of the infinite, and the relationship of Kabbalah to philosophy and mathematics. We glimpse here a work in progress towards the "new world view" that the Rav envisioned three years earlier when he wrote *The Halakhic Mind*, but one that is incomplete and problematic.

Evidently the Rav abandoned some of lines of investigation he had presented to the 1947 class. His discussion of Maimonides' philosophy takes a different direction in a 1950–1951 class of which we have student notes, transcribed and annotated by Prof. Lawrence Kaplan.[57] There is nothing remotely like his presentation of the mathematics of the infinite in the rest of the Soloveitchik *corpus*. In medieval Jewish philosophy, the Rav's attention turned from Crescas to Solomon Ibn Gabirol, whom he cites along with Maimonides as an expounder of "the obligatory nature of the creative gesture, of self-creation as an ethical norm, which Judaism introduced into the world."[58] The Rav's reading of

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55 K. Gödel, 1938a, "The consistency of the axiom of choice and of the generalized continuum-hypothesis," *Proceedings of the U.S. National Academy of Sciences*, 24: 556–7.
K. Gödel, 1938b. "Consistency-proof for the generalized continuum-hypothesis," *Proceedings of the U.S. National Academy of Sciences*, 25: 220–4.

56 P. Cohen, 1963, "The independence of the continuum hypothesis," *Proceedings of the U.S. National Academy of Sciences*, 50: 1143–48.

57 Lawrence J. Kaplan, ed. *Maimonides between Philosophy and Halakhah: Rabbi Joseph B. Soloveitchik's Lectures on the Guide of the Perplexed* (New York: Ktav/Urim, 2016.)

58 *Halakhic Man*, p. 58.

ibn Gabirol is quite different than the standard scholarship on the 11th-century Iberian philosopher.[59]

What the Rav said of Maimonides in his 1950–1951 lectures at Yeshiva University well might have been a self-description:

> There are two aspects to creativity in the realm of philosophy. The first is philosophical creativity, whereby one brings new thoughts to the totality of man's historical treasures. The second is creativity in the realm of philosophical style. Philosophical style refers to one's philosophical formulae and terminology, the choice of one's words, the literary categories one employs. If a philosopher is both philosophically creative and, as well, creates a new philosophical style, he will revolutionize philosophy.
>
> Sometimes, however, a philosophical genius is handicapped by the routine philosophical jargon that prevails in a particular climate…. Some may be exceedingly creative in the area of philosophical analysis, but lack creativity in the field of literary inventiveness. They are unable to find a new medium or instrumentality to present their

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[59] See Sarah Pessin, *Ibn Gabirol's Theology of Desire* (Cambridge, 2013). Pessin banishes the term "will" from Gabirol's system and replaces it with the weaker word "desire," in keeping with her understanding of ibn Gabirol as an exponent of neo-Platonic emanation theory in the tradition of Plotinus. Pessin rejects the earlier reading of Solomon Munk and other Jewish scholars read ibn Gabirol in the context of Kabballah. In the Genesis lectures, R. Soloveitchik says of neo-Platonism: "For Plotinus, in his pantheism, there was a gap between the world and God. God slowly emerged Himself into the lower matter. However, for the Jews such a pantheism is impossible."

Prof. Pessin writes in her entry on Ibn Gabirol in the Stanford Encyclopedia of Philosophy: "In his elaboration on the metaphysics of matter, Ibn Gabirol frequently uses the Arabic term 'al-'unsur' (instead of the more common Arabic terms 'al-hayûlâ' and 'al-madda') for matter. In fact, as outlined in section 1, this is one of the key pieces of evidence for identifying a uniquely 'Empedoclean' strain in his thinking. That said, many readers instead simplistically fall into a Kabbalistic reading of Ibn Gabirol since the Arabic 'al-'unsur' is correlated to the Hebrew term 'yesôd' both in Ibn Gabirol's own Hebrew poetry as well as in Falaquera's 13th century Hebrew translation of the Fons Vitae. While to be sure, the Hebrew term 'yesôd' (literally "foundation") is a cornerstone term and concept in Jewish mysticism, the desire to read Ibn Gabirol Kabbalistically (as a proto-Zoharian) is simply under-supported by the mere fact that he (and his Hebrew translator) use the term 'yesôd'. While there might be Kabbalistic traces in Ibn Gabirol, it is methodologically inadvisable—and distorting—to simply start out assuming there are." Prof. Pessin is right to warn against assuming a correspondence between ibn Gabirol and Kabbalah, but surely that is a question of great importance for the Torah world.

> thoughts. Maimonides was such a genius…. In the Guide there is sterility as to the form of presentation. He used the old, routine, Aristotelian philosophical jargon.[60]

The Rav was such a genius as well. His terminology draws extensively from Hegel (and Heraclitus) in the concept of the dialectic; from the neo-Kantians in his comparison of Halakhah to an idealized mathematical system; from Kierkegaard in his understanding of confrontation and the absurd; from Husserl in numerous regards; from Heidegger in his distinction between the ontic and the ontological; from Rudolf Otto in his account of the numinous; from Henri Bergson in his description of time; and from Max Scheler, and many others.

The Rav's dependence on borrowed terminology leads to endless problems of attribution: Was he a neo-Kantian, or an a Hegelian, a Phenomenologist, an Existentialist in the sense of Kierkegaard, or even (as some recent academic articles have argued) a Heideggerian—a loathsome thought considering the latter's prominent association with National Socialism[61]? In my view, Heidegger is the most overrated modern philosopher, derivative and devious, and a self-confessed failure by his own criteria. It is easy to say, "None of the above," but not so easy to characterize the Rav's philosophy in contradistinction to his influences. His new world view remains a goal to be achieved, not a *factum* to be reconstructed from his writings.

A number of the Rav's students and close associates argue that religious-conservative opposition deterred the Rav from pursuing his interests in Western philosophy. This was the view of the late Michael Wyschogrod, who attend the Rav's Talmud shiur at Yeshiva University for eight years, and I have heard it repeated (but never published) from other students of the Rav. Rav Lichtenstein relates that the Rav said, "You know, I have devoted *talmidim*—very devoted *talmidim*. If I were to announce a *sh'iur* at two o-clock in the morning, they would come *en bloc*. And yet, deep in their hearts, they think I'm an *apikoros*."[62] Evidently the Rav encountered a pervasive hostility to secular philosophy among his students and colleagues. The scope of the Rav's grand design was such that no single scholar could execute it alone. He would have required graduate students with expertise in mathematics as well as medieval and modern philosophy to pursue the lines of investigation he indicated in

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60 Kaplan pp. 75–76.

61 See D. Goldman, in *Ḥakirah* 24, pp. 108–110.

62 Lichtenstein op. cit., p. 201.

the Genesis lectures. The remark reported by R. Lichtenstein suggests that his students were unwilling to engage with *apikoros* philosophy.

The fact that R. Soloveitchik was unable to realize his grand design does not in any way imply that he was wrong to attempt it. The most important part of his bequest to us is an uncompleted task. He envisioned a Judaism in which scientific understanding strengthened tradition, and Torah insights inspired science, where the duties of the heart and the obligations of the mind cleave together in the personality of halakhic man. It is not our duty to complete the work, but neither are we at liberty to neglect it.

There are several areas of investigation that we have in fact neglected.

The first is the position of Torah with respect to the state of Western philosophy itself. The JSTOR database lists seventy-two scholarly articles that mention R. Soloveitchik along with the search term "neo-Kantian." There is only one that mentions the Rav together with Gödel: a 1999 review of Moshe Koppel's book *Meta-Halakhah*.[63] Like certain Ḥasidim, we worship, figuratively speaking, at the Rav's tomb, instead of continuing his life's work. As noted earlier, the Rav offered withering criticism of the neo-Kantians in his dissertation and throughout his later writings, and—starting with his dissertation—sought a more productive line of inquiry in Hegel and Husserl. Neo-Kantianism in retrospect was a long and sterile detour, a slumber from which critical philosophy was awakened by the mathematical advances of the 19th century.

Husserl, a doctoral student of Weierstrass, proposed to repair Kant's theory in order to preserve his broader premise. That was Gödel's understanding of Husserl.[64] What is the significance for Torah Judaism of the crisis in mathematical philosophy that began with the publication of Gödel's Incompleteness Theora in 1931, and deepened with his and Paul Cohen's work on the Continuum Hypothesis? R. Soloveitchik assigned high importance to these foundational issues, and the most productive path may be to engage the new antinomies of logical philosophy.

Another area of investigation is the cross-fertilization of Kabbalah and Western philosophy. There is an enormous scholarly literature on Kabbalah, but little clarity. R. Soloveitchik may or may not have overestimated the originality of Asher Crescas or Solomon ibn Gabirol. Some recent scholarship, though, gives us strong reason to believe that Kabbalah had an important influence on the great turn in Western thought that

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63 R. Klapper, (1999), *Tradition: A Journal of Orthodox Jewish Thought*, 33(4), 70–80. Retrieved July 10, 2020, from www.jstor.org/stable/23262261.

64 *Kurt Gödel, Collected Works* Vol. 3, p. 376 et. Seq.

began with the 15thncentury Renaissance and produced the scientific revolution of the 17th century. [65] Western thought may be more "Jewish" than we suspect; by the same token, elements of Kabbalah may have drawn on Western sources; for example, R. Isaac Luria's concept of *tzimtzum* (see note 30 above) bears more than a superficial resemblance to Nicolas of Cusa's *contractio* in *Docta Ignorantia* (1440).[66] Cusa made important contributions to the discovery of the calculus.[67]

More than anything else, we must assert the centrality of Torah in every engagement with Western thought. Hegel's quest for the Absolute, like Schiller's pursuit of beauty, produced at its best a refined aesthetic culture. Kant's attempt to derive ethics from reason produced a brittle set of standards that Nietzsche was right to ridicule, in the voice of the madman in the marketplace (in *Thus Spake Zarathustra*) who declared, "God is dead. We have killed him." Neither the ethics nor the aesthetics of German philosophy impeded Germany's descent into pagan horror, and Husserl's subjectivity, as the Rav observed, incubated Heidegger and

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65 See for example Alison Coudert, *Leibniz and the Kabbalah* (Springer 2013). Coudert quotes a 1706 letter from Leibniz to Foucher de Careil: "It is utterly true that Spinoza abused the Cabala of the Hebrews. And a certain person, who converted to Judaism and called himself Moses Germanus, followed his perverse opinions, as is shown in a refutation in German by Dr. Wachter, who knew him. But perhaps the Hebrews themselves and other ancient authors, especially in the East understand the proper meaning. Indeed, Spinoza formulated his monstrous doctrine from a combination of the Cabala and Cartesianism, corrupted to the extreme. He did not understand the true nature of monads." See also Efron, Noah J. "Jewish Thought and Scientific Discovery in Early Modern Europe." *Journal of the History of Ideas*, vol. 58, no. 4, 1997, pp. 719–732; Coudert, Allison P. Shofar, vol. 18, no. 3, 2000, pp. 154–155; Copenhaver, Brian P. "Lefevre D'Etaples, Symphorien Champier, and the Secret Names of God." *Journal of the Warburg and Courtauld Institutes*, vol. 40, 1977, pp. 189–211.

66 See for example Hans Blumenberg, *The Legitimacy of the Modern Age* (MIT Press, 1985), p. 661 n. 95. Blumenberg writes of "the 'restriction' that the Cusan conceives the Infinite and Indefinite as undergoing, in order to become a universe, a *maximum contractum* that, although it is an 'everything,' a universe, still only represents a *possibilitas contracta* with its *gradus contractionis*; the *posse fieri contractum ad id quod fit* (*De venatione sapientiae* 38, 114; also see *De docta ignorantia* II 4–8). A century later the concept of *contractio* recurs in the 'Zimzum' of the Kabbalist Isaac Luria, the self-restriction of God in which 'of His own accord he draws Himself into Himself' and thus makes it possible for something to exist that is not Himself." The possibility that the pivotal idea of the Lurian Kabbalah was first enunciated by a Christian philosopher is balanced by the fact that Cusa himself was influenced by Kabbalah.

67 Boyer op. cit. pp. 91–93.

his ilk. Jewish institutions should not take Western philosophy at face value (apart from training in logic, which strictly speaking is a branch of mathematics). The curriculum should focus rather on continuing problems in Western philosophy, which solves one riddle only to raise another.

R. Soloveitchik, I noted at the beginning, proposed a philosophy of ethical action rather than passive contemplation; that is the *pshat* of his declaration that a new world view awaits formulation out of the sources of *Halakha*. In several discussions of the nature of Jewish time, the Rav set forth what such a philosophy must accomplish. Through the performance of *mitzvoth*, Jews recreate the Exodus and *Matan Torah*, and anticipate the Messianic Era. The Rav's explication of Jewish time provides pointers toward a distinctly Jewish philosophy. But this is not yet a fully realized world view with its own terminology, its own critique of past philosophy, and its own accounting of the natural universe.

It may be helpful to refer back to the example of Kant. As noted, none of the detailed apparatus of his system has survived subsequent criticism. His assertion that space and time are *a priori* forms of intuition crashed against the discovery of geometries of more than three dimensions that have a distinct reality in science (as in Einstein's space-time manifold). "The development of non-Euclidean geometry refuted Kant's 'transcendental aesthetics' completely," the Rav observed.[68] Nonetheless he believed that Kant's effort to integrate empirical experience and a priori judgments was fundamentally sound, as noted above. Kurt Gödel agreed. He suggested that Euclidean space and Newtonian time may condition our perception of a reality that is characterized by non-Euclidean extension and non-Newtonian temporality:

> In the case of geometry, e.g., the fact that the physical bodies surrounding us move by the laws of a non-Euclidean geometry does not exclude in the last 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, but material objects to change their size and shape in a certain regular manner, when they move with respect to us or we with respect to them. Nor does the non-Euclidicity of physical

[68] *The Halakhic Mind*, p. 126, note 76.

> geometry (defined by the behavior of rigid bodies) mean that this Euclidean pure intuition, if it exists, is simply wrong.[69]

Physics has demonstrated that natural phenomena follow non-Euclidean geometries, but, Gödel suggests, the forms of intuition by which we perceive them nonetheless may map onto an inborn Euclidean perception. He added that the question of whether we have an "innate (and therefore a priori) intuition of Euclidean space…has not yet been decided." I cite Gödel's remarkable comments to indicate how little philosophy knows about the interplay of reality and perception nearly a century and a half after Kant published his *Critique of Pure Reason*. Physics and philosophy have even less to say about the nature of time, Kant's other a priori form of intuition. In the framework of Special Relativity time is subjective, that is, in the mind of the observer. The equations of General Relativity, Gödel showed in a contribution to Einstein's Festschrift, can under special conditions produce a solution in which time runs in reverse. To Gödel, this proved that time itself is an illusion.[70]

If I may stretch an analogy, we might think of the *mitzvot* as the instruments by which we project past and future—*Matan Torah* and *Olam haBa*—into the Jewish present. Time is not experienced; rather, it is constituted by action directed by the ethical will. The reliving of the past and the anticipation of the future enrich every moment of Jewish life with an infinite density of time-experience. St. Augustine dismissed the moment as evanescent and insubstantial. By contrast, the moment constituted by the mitzvoth is rich with memory and expectation. The mitzvoth fuse the past and future in the Jewish present. To Augustine, time is a paradox and eternity is an abstraction; to Jews, time is a construct of infinite richness, and eternity is built into the moment that the mitzvoth made.

In the framework of Relativity theory, time is subjective; that is, in the perception of the observer. The equations of General Relativity, Gödel showed in a contribution to Einstein's Festschrift, can under special conditions produce a solution in which time runs in reverse. As noted, R. Soloveitchik had written of the reversal of time's arrow in *The Halakhic Mind*.

To Gödel, the clock-time of the Newtonian worldview is an illusion. But we knew this already. Something like this was said by the Psalmist 3,000 years ago: "For a thousand years in your sight are but as yesterday

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69 Kurt Gödel, op. cit., p. 241.

70 See Palle Yourgrau, *Gödel Meets Einstein: Time Travel in the Gödel Universe* (Open Court, 1999).

when it is past, and as a watch in the night." Kohelet says (3:14–15), "I know that whatever God does, it shall be forever; nothing can be added to it, nor anything taken from it; and God does it, so that men should fear before him. That which is, already has been; and that which is to be has already been; and only God can find the fleeting moment."

Jewish time is no illusion; on the contrary, it a sign to the world set by God's intervention into human history. As Franz Rosenzweig said, "Revelation is the first thing to set its mark firmly into the middle of time; only after Revelation do we have an immovable Before and Afterward. Then there is a reckoning of time independent of the reckoner and the place of reckoning, valid for all the places of the world."

The Rav reminds us how much of Jewish practice is the constitution of Jewish time. The first mitzvah given to Moses before we left Egypt requires us to make a calendar in order to observe the Pesach. "The purpose of reading the Torah aloud in the synagogue," the Rav wrote, "is not solely to teach the congregation, but also to arrange an encounter with God, as experienced by our ancestors at Mount Sinai. Every act of reading from the Torah is a new giving of the Torah, a revival of the wondrous stand at the foot of the flaming mountain."

Without the irruption of the Creator God into human history, time must devolve into the subjectivity of Husserl and Heidegger. To Heidegger, time merely is the harbinger of death, and man in his despair responds by trying to grasp past and future in the ecstatic moment. The emotional side of the human character is dangerous without the discipline of scientific thinking, as the Rav wrote in The Halakhic Mind:

> It is no mere coincidence that the most celebrated philosophers of the Third Reich were outstanding disciples of Husserl. Husserl's intuitionism (*Wesensschau*) which Husserl, a trained mathematician, strived to keep on the level of mathematical intuition, was transposed into emotional approaches to reality. When reason surrenders to dark, equivocal emotions, no dam in the world is able to stem the rising tide of the affective stream. The modern philosopher-mystic is a disguised apostle of Dionysus (Nietzsche's life-affirming God).[71]

What distinguishes the Rav's constitution of time from Heidegger's? Heidegger works backwards from death, while the Rav works forward from Creation. God's creation of time and the perpetual re-creation of Jewish time are inseparably bound together. The constitution of Jewish

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71 *The Halakhic Mind*, p. 53.

time by the *mitzvot* is not an exercise in mystical subjectivity, but an continuation of the creation of the world itself. The inner life of the Jew in dialogue with the Maker of Heaven corresponds to the experience of the scientist probing the foundations of the universe.

The formulation of a new world view out of the sources of Halakhah requires both an account of time as it is constituted by the ethical will, and a coming to grips with the paradox of time as it is presented by physics. If space is a conundrum, time remains an impenetrable mystery. The collapse of Newtonian physics and with it the tyranny of Newtonian time, what R. Soloveitchik called "the paradoxical present day conflict of science and philosophy… may yet give birth to a new religious world perspective." That implies a breach in the absolute barrier that separates the banal clock-time of the Newtonian observer and the rich and recreated time of Jewish experience. But the Rav's "new religious world perspective," his "new world view," remains to be born. We may find it in the interplay of the world-creating ethical will and the yet to be disclosed secrets of the natural world. ☙