

Book Review

Gödel and Einstein: The War Against Empiricism

by Mike Billington

Incompleteness: The Proof and Paradox of Kurt Gödel

by Rebecca Goldstein

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Rebecca Goldstein's remarkable book on the life and work of Kurt Gödel is a very useful contribution to a very old debate, and is even a call to arms in some respects, for the world to re-engage in that debate. Drawing on her experiences as a graduate student in the philosophy of science and mathematics at Princeton University in the 1970s, while Gödel was still at Princeton's Institute for Advanced Studies, and extensive personal contact with several of Gödel's associates more recently, the book presents Gödel, together with his closest friend, Albert Einstein, engaged in a life-long battle against the increasingly predominant ideology in American and European academia and the scientific community: that of empiricism, positivism, and related reductionist notions.

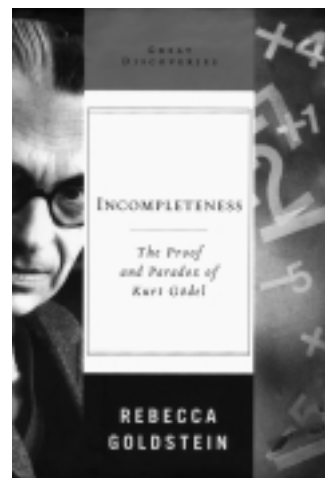
Gödel and Einstein defended and advanced the Platonic scientific tradition, insisting on a commitment to the search for truth and universal principles, rejecting the degenerate existential notions of randomness peddled by the positivists. This battle engaged the creative passions of both Einstein and Gödel, but it is a battle which has been nearly lost today. Lyndon LaRouche and those associated with him long ago joined that fight, placing it at the forefront of the political campaign to pull the nation and the world away from its current path toward economic collapse and global war.¹

1. For example, LaRouche wrote in "Obtuse Angles in Post-Soviet Ideology: Russia's Dark Side of the Spoon" (*EIR*, Sept. 16, 2005): "The essential evil of empiricism and its modern positivist and 'religious-fundamentalist' offshoots, is expressed by the ignorant individual's belief in the absolute authority of sense-certainty. Thus, what every Texas barroom philosopher would kill to defend, his brutish, materialist's faith in sense-certainty, is actually . . . a way of defending his underlying deeply religious faith in the

While Einstein's concept of relativity is well known (although often, even usually, misunderstood; see forthcoming article by Bruce Director in *Fidelio* magazine, Winter 2005/Spring 2006), Gödel's work is less widely known, and a brief description of the character of his Incompleteness Theorem will be necessary for many readers. Gödel's theorem, released in 1931, intersected an intellectual climate in Europe increasingly dominated by the logical positivism of Ludwig Wittgenstein, Karl Popper, and the so-called Vienna Circle (in which Gödel himself had participated, while rejecting its conclusions, in the 1930s), and by Wittgenstein's leading supporter, Bertrand Russell.

Russell and his collaborator Alfred North Whitehead were engaged in an effort to reduce all mathematical knowledge to a precise set of axioms, which they published as the *Principia Mathematica*. Russell and his positivist circle rejected as essentially meaningless any concept which could not be demonstrated to be true by purely mechanical means, based on nothing but sense perception—the "shadows on the wall" of Plato's famous cave. In other words, they rejected reason altogether, or simply defined reason to be

existence of unearthly powers ruling his universe from 'under the floorboards' of reality. The mechanisms of such ideological perversions work as follows. By insisting that he knows nothing except the evidence of sense-experience, he creates for himself the problem that such evidence, by itself, does not explain the way in which the universe actually works. Thus, he believes in the efficacy of something beyond comprehension by means of sense-certainty. He is susceptible of being induced to believe in a substitute for sense-certainty, called statistics. Thus, he views himself as a mere animal, and, worse, views his neighbor as like a mere dog, or an object of the hunt." On the web at www.larouchepub.com/lar/2005/3236dark_side_spoon.html



nothing more than a logical/mechanical process which could just as easily be performed by a computer as by a human mind.

Gödel's discovery of 1931 proved by mathematical means that the entire enterprise undertaken by the logical positivists in Vienna, and by Russell and Whitehead in London, was an exercise in futility. Gödel first developed a formal system which subsumed any mathematical system broad enough to include arithmetic. He then devised a means for generating a well-defined theorem within that system, which said *about itself* that it could not be proven within the system. By showing the necessary existence of such a self-reflexive theorem within any such system, he created a paradox, when looked at "from above," from the meta-mathematical perspective of the human mind: If a proof were to be found for that theorem, then the theorem (which says of itself that it cannot be proven) would thus be false. And yet, we recognize with our reason that the theorem is in fact true—i.e., that it cannot be proven, except by means that would render all mathematics inconsistent and meaningless. Therefore, unless we accept that the whole of mathematics is inconsistent (that a false statement can be proven to be true), we must conclude that no proof exists, and the system is thus "incomplete," in that it does not have the capacity to generate all the true theorems that exist within the system.

Thus, Russell's efforts to show that all mathematics can be reduced to a formal, axiomatic system were demolished. Had Russell, Wittgenstein, and their positivist friends simply retired at that point to nurse their ideological wounds, the world might have been spared many of the horrors which unfolded through the rest of the 20th Century. Unfortunately, the battle against the positivists had just begun.

Goldstein's narrative displays a delightful capacity to capture the cult-like adulation of Ludwig Wittgenstein by the positivists, both in Vienna and in London (a psychosis that spread across Western university studies generally in the 1960s). The Vienna Circle undertook a study of the only book published by Wittgenstein during his lifetime, *Tractatus Logico-Philosophicus*, an obscure philosophic argument organized as an extended Aristotelian syllogism, concluding: "Of what we cannot speak, we must remain silent." The Circle, in fact, read through the book twice, concluding that the meaning of the text was different than that intended by Wittgenstein! When Wittgenstein occasionally attended their meetings, Goldstein reports, "he often just turned himself to the wall and read aloud the poetry of Rabindranath Tagore." Circle member Rudolf Carnap wrote about Wittgenstein as if he were a religious guru: "The impression he made on us was as if insight came to him as through a divine inspiration, so that we could not help feeling that any sober rational comment or analysis of it would be a profanity."

Wittgenstein went to Cambridge to work with Bertrand



Kurt Gödel (left) and Albert Einstein. The two friends waged a life-long battle in defense of the Platonic scientific tradition, against the dominant ideology of empiricism and positivism.

Russell from 1911 to 1913, and again in 1929. The homosexual Russell adored him, writing: "I love him and feel he will solve the problems I am too old to solve," and later: "He was very inarticulate—but I feel in my bones that he must be right," describing him as "perhaps the most perfect example I have ever known of genius as traditionally conceived: passionate, profound, intense, and dominating." Russell wrote an adulatory introduction for the *Tractatus*.

Goldstein's Polemic

Goldstein, in her personal way, has set out to renew the battle against positivism. Her two-fold intention is clearly stated: to defend Gödel and Einstein against the popular dogma of today's degenerate intellectual climate, in which Einstein's Relativity Theory and Gödel's Incompleteness Theorem are regularly dragged into the service of precisely the positivist, mechanistic worldview that both dedicated their lives and their works to refute absolutely. Goldstein succeeds in this task most admirably, and in a manner both clear and compelling for any reader. Her second task, to present the character and the implications of Gödel's Incompleteness Theorem, is a more formidable challenge, which she achieves to a significant degree, but with certain fundamental lapses, which I will address below.

As to the common positivist slanders of Gödel's and Einstein's work today, Goldstein ridicules the frauds used to misrepresent the intentions of these two geniuses. In re-

gard to the popular myths peddled by Russell and others about Einstein's Theory of Relativity, she writes: "Measurements of properties like length are, according to special relativity, relative to a particular coordinate system or reference frame. But to reduce these technical terms—coordinate system, reference frame—to the idea of human points of view, is, well, nonsense."

As to Gödel: "Some thinkers have seen in Gödel's theorems high-grade grist for the post-modern mill, pulverizing the old absolutist ways of thinking about truth and certainty, objectivity and rationality. [These people claim that] the necessary incompleteness of even our formal systems of thought demonstrates that there is no non-shifting foundation on which any system rests. All truths—even those that had seemed so certain as to be immune to the very possibility of revision—are essentially manufactured. Indeed, the very notion of the objectively true is a socially constructed myth. Epistemology is nothing more than the sociology of power. So goes, more or less, the post-modern version of Gödel."

Goldstein quotes several of the most extreme cases of such stupidity (or lying). William Barrett, in his *Irrational Man: Studies in Existentialist Philosophy*, published in 1962, which has been forced down the throats of many unsuspecting undergraduates (including Goldstein), links the Platonist Gödel to those espousing the diametrically opposite view of the physical universe, Niels Bohr and Werner Heisenberg of the Copenhagen School, and in philosophic outlook, the fascist Martin Heidegger and his mentor Friedrich Nietzsche. Gödel's results, Barrett writes, showed that "even in his most precise science (mathematics)—in the province where his reason had seemed omnipotent—man cannot escape his essential finitude."

To the contrary, Goldstein writes: "Gödel's result, in effect, proclaims the robustness of the mathematical notion of infinity; it can't be drained of its vitality and turned into a ghostly Kantian-type idea hovering somewhere over, but without entering into, mathematics. The mathematician's intuitions of infinity—in particular, the infinite structure that is the natural numbers—can no more be reduced to finitary formal systems than they can be expunged from mathematics."

While she doesn't pursue it, Gödel's work provides substance not to the irrationalism of the positivists, but to the discoveries of Carl Friedrich Gauss and Bernard Riemann, the 19th-Century Platonist mentors of Einstein, who showed that the physical universe is indeed comprehensible to reason, but cannot be described by either the linear notions of geometry, or the stale mathematics of formal axiomatic systems. Gauss's development of the complex domain, which captures the *dynamic* nature of space-time, and Riemann's demonstration that mathematics must give way to physics in any truthful representation of physical reality, exemplify the character of Gödel's discovery—that the laws of the physical universe, and of human cognition as a crucial

aspect of that universe, are of a higher order than the mechanistic principles of any formal axiomatic system, and thus of any machine.

The Positivist Response

Wittgenstein never accepted Gödel's Incompleteness Theorem, asserting simply that "Mathematics cannot be incomplete, any more than a *sense* can be incomplete." He added: "My task is not to talk about Gödel's proof, but to bypass it."

Goldstein also notes the epistemological equivalence of the Bohr-Heisenberg "Copenhagen School" of quantum mechanics with the philosophic outlook of the logical positivists, such as Russell and Wittgenstein. Bohr insisted that not only is man incapable of knowing underlying laws of the universe, but that no such laws exist—that, like the "random selection" of the Darwinian view of evolution, physical change in the universe is lawless, random, and can only be approximated through probability and statistical analysis. (It was this notion which provoked Einstein, in his quest to discover a unified field theory, to quip that "God doesn't play dice.")

Goldstein also notes that Bohr and Wittgenstein both adopted a "prohibition against asking the sorts of questions that seek to make a connection between the abstract thought of their respective disciplines and objective reality."

Gödel's Friend, Leibniz

Gödel and Einstein were extremely close during their years at Princeton, from Gödel's arrival until Einstein's death in 1955. Einstein once told an associate that he continued going to his office at the Institute of Advanced Studies every day merely for "the privilege to walk home with Gödel." They viewed each other as the only "other" who shared the same mission, the quest for universal principles, such that they could work together on joint cognitive experiments.

When Einstein died, Goldstein reports, Gödel's last true friend in the world was Gottfried Leibniz (1646-1716). He told Karl Menger, his friend from the Vienna Circle days, that many of Leibniz's manuscripts were never published, and some destroyed, by "those people who do not want man to become more intelligent." Menger, exposing his positivist bent, suggested that a "free thinker" like Voltaire was a more likely target of such censorship, but Gödel retorted: "Who ever became more intelligent by reading Voltaire's writings?"

This author had the good fortune to meet several times in the early 1990s with Wang Hao, a close associate of Gödel, and the author of several books about Gödel's life and ideas. He was at the time working on a book attacking Russell and Wittgenstein, drawing both on Gödel's work and his own research. During my own extensive studies of Chinese history and philosophy, I had discovered correspondence between Leibniz and a number of Jesuit missionaries

in China to be of particular interest in examining the common and contrasting characteristics of Chinese and Western thought. I expected that Wang Hao, whose university education was in China, would be able to shed light on this history, especially the role of Leibniz, given Gödel's keen interest in Leibniz as the greatest mind of Western civilization.

To my surprise, Wang was dumbfounded at Gödel's love for Leibniz, and admitted that his own efforts to understand Leibniz had been unsuccessful. Wang also admitted that he knew very little about Chinese history or philosophy. Despite studying with many of China's leading professors, he said that the courses were dominated by the ideas of Bertrand Russell and his positivist allies! He concurred that his current effort to understand Gödel and his war with the empiricists would be beneficially informed by a study of Leibniz's engagement with Confucian thought. Unfortunately, our collaboration was cut short by Wang Hao's death in 1995.

I tell this story in part because I believe a similar point can be made in regard to Goldstein's work—that it would benefit from a study of Leibniz. While she clearly grasps the negative aspect of Gödel's work—his intellectual destruction of the mechanistic mind set of the positivists, she occasionally falls into the mechanists' trap in explicating the implications of Gödel's (and Einstein's) positive conception of the lawfulness of the universe, and the role of man's cognitive power within that lawfulness.

For example, in discussing the fact that Gödel's theorems prove that the mind cannot be reproduced by a machine (which is, after all, only a type of formal axiomatic system), Goldstein writes: "Of course, there is no *proof* that we know all that we think we know, since all that we think we know can't be formalized; that, after all, is incompleteness. This is why we can't rigorously prove that we're not machines." She adds: "Just as no proof of the consistency of a formal system can be accomplished within the system itself, so, too, no validation of our rationality—of our very sanity—can be accomplished using our rationality itself." This is similar to the problem of those who rejected the universality of Euclidean geometry, due to the independence of the parallel postulate, only to replace that postulate with another, creating a "non-Euclidean geometry," but still one based on a set of axioms and postulates.

As Gauss and Riemann recognized, the problem lies precisely in the use of an axiomatic system in the first place, since the real world cannot be described by any formal mechanistic system. Only an *anti*-Euclidean system, such as the complex domain and the Riemann complex surfaces, can begin to describe, in non-linear ways, the actual dynamic processes which characterize the physical universe. Thus, although the *proof* that the mind transcends machines cannot be carried out within a formal system—as Goldstein notes—that in no way means there is no such proof. To say, as Goldstein does, that we cannot prove our rationality "using our rationality itself," mistakenly assumes that "rationality"

is an axiomatic system subject to the limitations demonstrated by Gödel, and that a "proof" can only be axiomatic in nature.

In fact, Goldstein shows elsewhere that she understands this point, but, perhaps lacking the Leibnizian concept of the relationship between the mind and the universe as a whole, she falls into the positivist trap. The discoveries of Lyndon LaRouche in the science of physical economy since the 1950s, which themselves derive from the works of Leibniz and Riemann, address precisely that issue—the proof, within the long waves of physical economic processes, of mankind's knowledge of universal principles, or conversely, in the case of physical economic collapse, proof of mankind's failures to discover and master such principles.²

Gödel certainly understood this point, since his theorems rest on his assertion that the "undecidable" proposition in his proof is nonetheless recognized by our minds to be true, a cognitive process which is *above* the formal system itself.

Goldstein also reports on a remark by Gödel to an associate that he did not believe in evolution. Later she asserts that few scientists would accept any implications of immortality from Gödel's work, since "we are not only living with the truth of Gödel, but also the truth of Darwin. Our minds are the product of the blind mechanism of evolution." It is likely that Gödel would not have rejected the concept of evolution, but would, rather, object to the degraded and anti-scientific version of evolution promoted by Darwin and his British empiricist promoters. A Leibnizian view, like that later developed by the great 20th-Century Russian scientist Vladimir Vernadsky, locates evolution not within a Hobbesian universe of random chance and survival of the fittest in a war of each against all, but in the coherent universal principles of the cognitive universe, the Noösphere, subsuming the abiotic and biotic phases of dynamic self-development of the universe. The positivists could neither understand, nor even be willing to contemplate, such fundamental scientific concepts, as heretical to their near-religious belief in mechanism.

Goldstein's book is now being translated into 11 languages, demonstrating that there are forces afoot which are anxious to re-invigorate the battle against empiricism. This certainly includes the scientists in the circle of Sheldon Goldstein of Rutgers University, who has been persecuted for his work promoting the ideas of physicist David Bohm, who fought against the Copenhagen School up until his death in 1994. Rebecca Goldstein acknowledges her debt to Sheldon Goldstein, whom she praises as unequalled in his appreciation for "the beauty and elegance of abstract thought."

2. See Lyndon H. LaRouche, Jr., "Science and Economic Crises: The Pagan Worship of Isaac Newton," *EIR*, Nov. 21, 2003; on the web at www.larouche.com/pub.com/lar/2003/3045pagan_isaac.html