

Pursuing Science and Logic in an Age of Excitement and Turmoil

Exact Thinking in Demented Times: The Vienna Circle and the Epic Quest for the Foundations of Science. By Karl Sigmund. Basic Books, New York, NY, December 2017. 480 pages. \$32.00.

In 1920s Vienna, a group of philosophers, mathematicians, and physicists called “the Vienna Circle” embarked on a formidably ambitious project to investigate the foundations of science. Just as Alfred North Whitehead and Bertrand Russell had shown that mathematics can be built up from set theory in *Principia Mathematica*, Vienna Circle members aimed to demonstrate that one could logically build up scientific theory from basic observations. Their philosophy, known as “logical positivism” or “logical empiricism,” idolized science, logic, and empiricism. It dismissed as meaningless any theorizing or speculation that was not empirically based, with a particular contempt for “metaphysics.”

Exact Thinking in Demented Times, by mathematician Karl Sigmund, is a joint biography of Vienna Circle participants and their predecessors, associates, and adversaries. It is both deeply researched and enormously entertaining, with vivid personal portraits, remarkable incidents and anecdotes, and a dramatic interpretation of an exciting and tragic historical period. Douglas Hofstadter helped polish Sigmund’s English translation and contributed a fascinating preface describing his own intellectual encounters with the Vienna Circle and their idol/nemesis, Ludwig Wittgenstein.

At any given time, 10 to 20 people were involved with the Vienna Circle, which held regular meetings from 1924 to 1936. Central figures at the start included physicist Moritz Schlick, who served as chair; sociologist Otto Neurath; and mathematicians Otto Hahn and Philipp Frank. Rudolf Carnap joined the Circle in 1926 and became the leading exponent of logical positivism — his book, *The Logical Structure of the World*, became a bible for the movement. In 1929, the Circle announced themselves to the world by publishing a manifesto entitled “The Scientific Conception of the World:

The Vienna Circle,” which laid out their views and goals.

Looming over the Vienna Circle were four of the great intellectual giants of the first half of the twentieth century: Albert Einstein, Kurt Gödel, Karl Popper, and Wittgenstein. Sigmund wisely gives himself much latitude to digress outside the Circle proper, and includes substantial additional accounts of the lives and works of these four figures.

Einstein was not directly involved with the Circle, but he interacted with many participants over the years; his revolutionary discoveries on the nature of time, space, atoms, and light inevitably and profoundly impacted any study of physics.

While Gödel was a member of the Circle for some years and attended meetings, he apparently stuck firmly to a Platonist conception of mathematics. His great discoveries in logic were met with excitement by the group’s mathematicians, but hardly affected the overall philosophy. Popper was never invited to join the group or attend their meetings, and first came to prominence with a characteristically hard-hitting attack on logical positivism. Nonetheless, he was on collegial terms with the Circle and considered them as philosophical comrades-in-arms, fighting the same good fight.

Wittgenstein’s impact on the Circle was enormous. A substantial fraction of *Exact Thinking in Demented Times* tracks the complex evolution of the Circle’s relations with Wittgenstein. To many in the Circle, including Schlick and Hahn, Wittgenstein’s *Tractatus Logico-Philosophicus* seemed a revelation; Neurath, however, found many of its oracular pronouncements to be mere “metaphysics.” The Circle spent several

semesters of meetings working through it line by line, and naturally wanted to bring Wittgenstein into their discussions. This led to complications since Wittgenstein never believed that anyone but himself actually understood him properly, and had radically changed his views since *Tractatus*.

While many of Wittgenstein’s acolytes viewed him as a secular saint, Sigmund depicts him as somewhere between utterly horrible and completely impossible. The following characteristic anecdote serves as an example. In 1944, Wittgenstein held a philosophy chair at the University of Cambridge. He was once approached by Rose Rank (formerly a dedicated member of the Circle and always extremely poor), now working in Britain on a factory assembly line. She asked him if he could recommend her for a fellowship. Wittgenstein replied that there was nothing he could do for her, and added that he saw no disgrace in earning a living from manual labor.

Early chapters of the book describe the Circle’s intellectual predecessors, starting with Ernst Mach and Ludwig Boltzmann and their debate about the reality of atoms. The book is full of fascinating figures and incidents, some close to the narrative’s main thread and others more distant. Sigmund painstakingly describes the struggles of Circle participants to obtain regular academic appointments, and offers charming vignettes of the characters’ personal romances. He recounts the remarkable story of Gustav Klimt’s scandalous Faculty Paintings (1900-07, destroyed in 1945) at the Klimt University of Vienna, which depicted the arts and sciences as “naked men and women drifting in forlorn trances through an uncanny void.” He gives an account of three Viennese novelists—

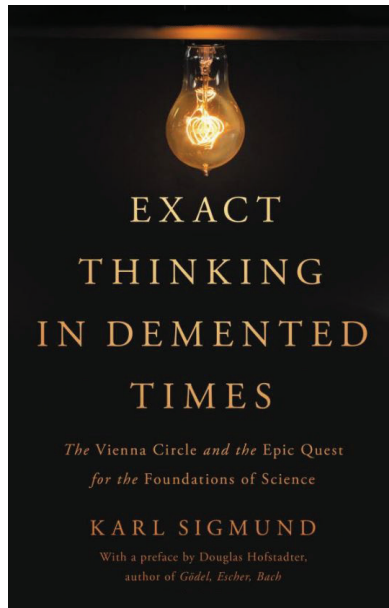
Robert Musil, Hermann Broch, and Leo Perutz—who were each influenced by their study of mathematics and wrote works with mathematician protagonists.

In the final chapters, the Vienna Circle and logical positivism come to an end in two distinct ways. The rising tide of Nazism, culminating in the Anschluss of 1938—the “demented times” of the title—drove the Circle far from Vienna. Some Circle members were Jewish, some were active in left-wing politics, and all were considered undesirable in the Third Reich. Schlick was murdered by a psychopathic stalker in 1936; though he was neither Jewish nor politically active, Nazi writers defended the murder as a justifiable reaction to his perverse philosophy. The rest of the Circle fled, sooner or later, into exile, ending up either in the U.S. or the U.K.

Ultimately, the philosophers were more deadly than the politics. A series of trenchant, unanswerable critiques of logical positivism by Popper, Willard Van Orman Quine, Thomas Kuhn, and others left the Circle entirely demolished — to a degree unusual in philosophy, where victories and defeats are typically partial and provisional. The word “positivist” became a pejorative, akin to narrow-mindedly ignoring everything except superficial, easily-quantifiable measurements. Positivism also developed an association with the behaviorist theory of psychology, which flourished and perished over much the same time period. Strikingly, the word “positivism” is almost never used in Sigmund’s book.

Nonetheless, the problem of characterizing the relation of observational evidence to scientific theory is real, important, and unsolved. No one questions that the Vienna Circle very much overestimated the scope and power of the type of analysis it was pursuing. However, that does not negate the possibility that this kind of analysis is powerful and worth seeking when analyzing the foundations of physical science.

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