

Science and philosophy in the shadow of war

From the 1890s through the 1930s, Vienna was home to an extraordinary flourishing of mathematics, logic, science, and scientific philosophy. It was there that a group of thinkers inspired by the examples of Viennese physicist-philosophers Ernst Mach and Ludwig Boltzmann gave birth to the modern enterprise of the philosophy of science. Led by philosopher Moritz Schlick, mathematician Hans Hahn, and economist Otto Neurath, the Vienna Circle, as it came to be known, gave the name “logical empiricism” to a philosophical program analyzing the structure and empirical interpretation of scientific theories. The members applied their program primarily to the physical sciences, but they included the biological and social sciences as well.

The distinguished Viennese mathematician Karl Sigmund, one of the trailblazers of evolutionary game theory, now tells their story in *Exact Thinking in Demented Times: The Vienna Circle and the Epic Quest for the Foundations of Science*. Sigmund’s book will long stand as the most engaging and accessible history of that remarkable movement. It is fair to say that the way we think and talk about science today—as a way of investigating and understanding our world based on rigorous logic and empirical investigation—is largely the legacy of the Vienna Circle. But an equally important part of their legacy is the way the members used scientific thinking to promote progressive social change and to oppose the hazy, metaphysical abstractions often used to cloak pernicious cultural and political agendas with an air of intellectual respectability.

The late 1800s and early 1900s were heady times in Vienna. The city was

home to groundbreaking modernist projects in music, art, literature, and architecture; radical innovations in psychology; and equally profound new developments in economics. Gustav Klimt, Arnold Schönberg, Sigmund Freud, and Joseph Schumpeter were just a few of the period’s unforgettable figures.

But they were also deeply troubled times. The Austro-Hungarian empire stumbled toward collapse at the end of World War I, and the deeply conservative Catholic right wing in Austria gradually rose to power after the war. Vienna remained a bastion of progressive liberalism and socialism during the 1920s. By

the early 1930s, however, even Vienna fell under the power of the proto-fascist Patriotic Front, a political party that emerged from the right-wing Christian



Philosophy, Gustav Klimt

Exact Thinking in Demented Times

The Vienna Circle and the Epic Quest for the Foundations of Science

Karl Sigmund
Basic Books, 2017.
\$32.00



Social Party. With Adolf Hitler's occupation and annexation of Austria in 1938, the forces of anti-Semitism and totalitarian repression destroyed what was left of the Vienna Circle, along with what was once so brilliant and promising in Viennese culture.

Given the turmoil of the time, it is impressive that so much was achieved by the Vienna Circle and its friends. A significant outpost grew up in Berlin under the leadership of philosopher Hans Reichenbach and statistician Richard von Mises. The logical-empiricist flag was

also planted in Prague, Czechoslovakia, where philosopher Rudolf Carnap and physicist Philipp Frank—Albert Einstein's friend and theoretical-physics chair successor at the German University of Prague—led the way.

In Vienna itself, there clustered around the circle philosophers such as Ludwig Wittgenstein, whose famous *Tractatus Logico-Philosophicus* transformed logic and the philosophy of language, and Karl Popper, who taught us to think of empirical falsifiability as the hallmark of genuinely scientific theories. Another regular mem-

ber was logician Kurt Gödel, whose proof of the incompleteness of arithmetic profoundly reshaped the foundations of logic and mathematics and helped to set in motion developments that eventually led to modern computing theory. Modern game theory owes its existence in no small measure to the work of mathematician Abraham Wald and economist Oskar Morgenstern, both of whom were part of the larger world of the Vienna Circle.

Sigmund himself grew up in the shadow of the Vienna Circle after World War II, and its legacy has shaped his professional career and his broad, philosophical outlook. His history of the movement reads at times almost like a memoir of a lost world. He writes that if he had the talent, he would have presented his story in film rather than prose. He frequently invites readers to imagine themselves sitting in one of Vienna's many famous coffee shops, listening in on the conversations of the story's protagonists as the theme song of *The Third Man* plays gently in the background. Though Sigmund is a mathematician, he shows himself here to be a master storyteller. This is history—serious and first-rate history—written like a novel. It is a masterpiece.

The Vienna Circle ended in tragedy and diaspora. Its founder and leading thinker, Schlick, was assassinated in 1936 by a deranged former student of his who was later freed from prison and lionized by the Nazis for having eliminated a "friend of the Jews." Neurath was forced to emigrate by political persecution and died in exile in the UK in 1945. Gödel had to flee in 1940; he survived a perilous trip through Russia and across the Pacific Ocean before making his new home in Princeton, New Jersey, where he took a position at the Institute for Advanced Study and became Einstein's colleague and friend. Reichenbach fled Berlin for Istanbul, Turkey, in 1933. Later, at UCLA, he nurtured the spirit of scientific philosophy, as did fellow exiles Carnap at the University of Chicago and Frank at Harvard University.

Some would say that we live once again in demented times, with reactionary political interests desperately seeking to impugn the intellectual authority of science as a force for good in human affairs. The example of the Vienna Circle should inspire us to resist those efforts.

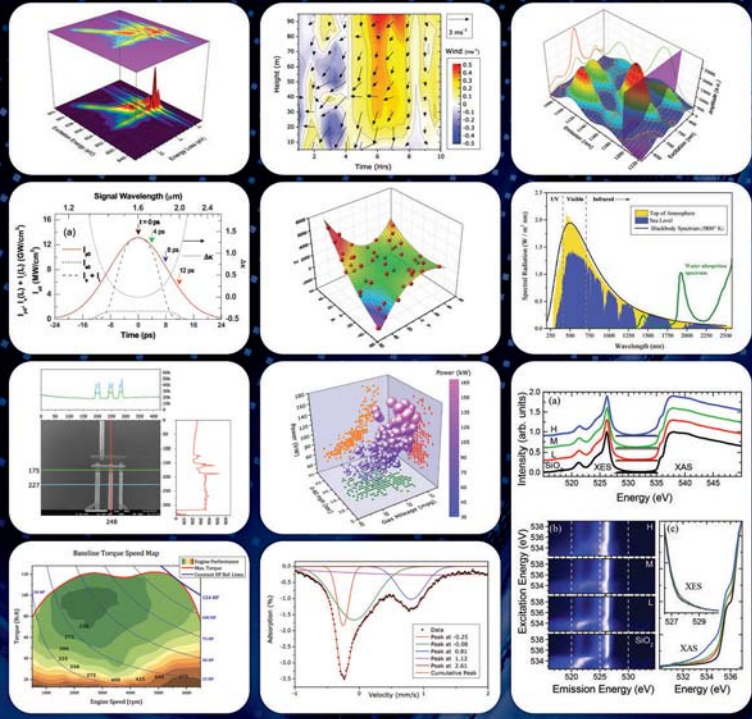
Don Howard

*University of Notre Dame
Notre Dame, Indiana*

New Version!

ORIGIN® 2018

Graphing & Analysis



Over 75 New Features & Apps in Origin 2018!

Over 500,000 registered users worldwide in:

- 6,000+ Companies including 20+ Fortune Global 500
- 6,500+ Colleges & Universities
- 3,000+ Government Agencies & Research Labs

For a **FREE 60-day** evaluation, go to
OriginLab.Com/demo
 and enter code: **2876**



25+ years serving the scientific & engineering community