PROFESSOR KURT GÖDEL

Influential work in mathematical logic

Professor Kurt Gödel, the man regarded by common consent as the most influential mathematical logician of the century died at the age of 71 in Princeton, New Jersey, on January 14. Born in Brünn, Czechoslovakia, on April 28, 1906, Kurt Gödel was Privat-Dozent at the University of Vienna from 1933 to 1938. Having visited the Institute for Advanced Study several times, he took up residence in Princeton in 1938 becoming a Permanent Member of the Institute in 1946 and Professor in 1953. Besides honorary doctorates from several universities, he received the Einstein Award in 1951 and the National Medal of Science in 1974. Professor Gödel was a Member of the United States National Academy of Sciences, Fellow of the American Academy of Arts and Sciences, Foreign Member of the Royal Society, Corresponding Member of the Institut de France, a Corresponding Fellow of the British Academy, and Honorary Member of the London Mathematical Society.

The fame of Gödel rests on three outstanding results obtained during the decade of the 1930's. The first is his completeness proof for the first-order functional calculus; this was his doctoral dissertation and was published in 1930. Scarcely a year later he published his most celebrated result: the incompleteness thorem for various axiomatic systems. He showed in particular that the vast structure of the *Principia Mathematica* of Whitehead and Russell was inadequate for deciding all mathematical questions; indeed, the system could not even prove its own formal consistency. This inadequacy is inherent in any reasonably strong system which is effectively axiomatized, and so Gödel's Theorem changed the whole philosophical view of the foundations of mathematics; the repercussions of this unexpected discovery are felt and debated today.

On the positive side his techniques led directly to a new concept of effectively calculable function which had major influence on the development of computers and is still central in theoretical studies in computer science. However, Gödel himself held a very Platonist view of mathematical objects and higher infinities, and his next main achievement in 1938 was a reassuring one for his beliefs. He showed that if the system of *Principia Mathematica* (or even a certain stronger system) is consistent, then it remains so upon the addition of the Axiom of Choice and the Generalized Continuum Hypothesis, principles of prime importance in the arithmetic of infinite cardinal numbers. It was not until 1963 that Paul J. Cohen finally proved the independence of those axioms by a new idea but building on Gödel's work. Gödel's original methods for the consistency problem have recently had new applications reflecting on apparently quite unrelated mathematical problems, so it seems clear that the fruitfulness of his ideas will continue to stimulate new work. Few mathematicians are granted this kind of immortality.

A slight person and very fastidious, Gödel was generally worried about his health and did not travel or lecture widely in later years. He had no doctoral students, but through correspondence and personal contact with the constant succession of visitors to Princeton, many people benefited from his extremely quick and incisive mind. Friend to Einstein, von Neumann and Morgenstern he particularly enjoyed philosophical discussion. His widow, Adele; whom he married in 1938, survives him; there were no children.