Max Shiffman (1914–2000)

Peter D. Lax

Max Shiffman was Richard Courant's most brilliant student in America, Ph.D. 1938. For about fifteen years in the middle of the last century he was a leader in the calculus of variation applied to partial differential equations. He gave an invited address at Princeton University's 200th anniversary conference in 1946 and at the International Congress of Mathematicians in Cambridge in 1950. He gave a one-hour address at a meeting of the American Mathematical Society.

Shiffman's mother died when Max was two years old, and he was brought up by an older sister, Molly. Her daughter Vivian recalls that already as a child Max's thoughts revolved around mathematics, and he often wrote out his mathematical ideas on the wall over his bed. He received his undergraduate education at CCNY (City College of New York), which in the thirties was a hotbed of brilliant young students who were too poor or too Jewish to go to Harvard.

He was an instructor at CCNY in 1939–42. In 1942 he joined a research project of the OSRD (Office of Scientific Research and Development) at New York University (NYU), and from 1945 to 1948 he was associate professor at NYU. Here he was a major influence on a whole generation of graduate students, including Avron Douglis, Clifford Gardner, Joe Keller, Martin Kruskal, Cathleen Morawetz, Louis Nirenberg, and the author.

In 1948 Gábor Szegő hired him as a full professor at Stanford. There Shiffman modernized the curriculum in analysis, teaching for the first time there a course on functional analysis. His brilliant career came to a tragic halt in 1951, due to a schizophrenic breakdown. He recovered and continued his research and teaching until a second breakdown in 1956. With the support of his friends and a generous trustee of Stanford University, he was admitted to Chestnut Lodge, a prestigious psychiatric institute. After nine years of therapy he was transferred to Agnew State Hospital in California, where Max took advantage of a state law and sued in court to be released; he convinced a jury that he was mentally competent.

From 1965 to 1967 he was appointed to a research position at Stanford, mainly through the efforts of his friend and admirer, Don Spencer. In 1967 he obtained an appointment as a professor at California State University at Hayward. There he taught calculus, vector analysis, ordinary and partial differential equations, number theory, set theory, and measure theory to undergraduates, and special topics courses on the graduate level. He was willing to deal, kindly and patiently, with angle trisectors, circle squarers, and Fermat provers. According to Edward Keller, most of Max's colleagues regarded him as the greatest mathematician ever to serve on the faculty at Cal State at Hayward. He retired in 1981.

Max Shiffman, 1946.

Much of Shiffman's work dealt with Plateau's problem. He showed that if a boundary curve spans two minimal surfaces that are relative minima, then it also spans one which is not a relative minimum. In one of his last publications he showed that a doubly connected minimal surface whose boundary consists of two circles on parallel planes intersects any other parallel plane in a circle. Shiffman also worked on problems of conformal mapping, and the differentiability and analyticity of solutions of double integral variational problems. Most of these papers appeared in the *Proceedings of the National Academy of Sciences* and the *Annals of Mathematics*.

Shiffman used variational methods to study the flow of fluids, incompressible and compressible. He proved a basic theorem about compressible flows around bodies with prescribed subsonic speed at infinity; he showed that such flows are smooth until the flow becomes sonic. The technical tool he used, altering the equation of state, is called "shiffmanization" by cognoscenti.

In the summer of 1950, spent at the Rand Corporation, Shiffman became interested in game theory and obtained a far-reaching generalization of von Neumann's minimax theorem.

He is survived by his sons, Bernard, a professor of mathematics at Johns Hopkins; and David, who owns an investment company; and five grandchildren.

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