

MEMORIAL RESOLUTION

RUDOLF KOMPFFNER (1909 – 1977)

Rudolf Kompfner, Emeritus Professor of Applied Physics, who died on 3 December 1977, came to Stanford in July 1973 after a long and distinguished career as one of the great inventors and applied scientists of our generation. In a true sense, he together with some of his colleagues was the creator of the modern satellite communication system which represents possibly the greatest revolution in world-wide communications since Marconi's original experiments. It is his invention, the traveling wave tube, a microwave amplifier, which is the key element in all satellites, and it was he together with his close friend and colleague, John Pierce, both then at Bell Telephone Laboratories, who initiated and directed the first satellite communication experiments. This represents the most outstanding of Kompfner's many achievements in electronics. These achievements are all the more remarkable in that Professor Kompfner had his professional training in an entirely different field and did not begin any work in electronics until he was over 30.

He was born in Vienna in 1909 and studied architecture at the Technische Hochschule there. He went to London in 1934 and worked as an architect until 1941. He was interned briefly then, as an enemy alien, on the Isle of Man. Shortly before this he had developed an interest in electronics and published a brief paper in the field. He once said that he completed his formal education in physics and mathematics on the Isle of Man. Upon his release from his internment, he was invited by the British Admiralty to work on microwave radar at the University of Birmingham which was one of the main centers for this kind of research in the United Kingdom. It was there during the War, largely on his own time and as a side issue to his official assignments, that he made one of his most original inventions, the traveling wave tube, an amplifier involving a new principle. It is still the most important device of its kind and the basis of many related amplifiers which have followed.

He described the history of that period and the evolution of his ideas in a charming little book, The Invention of the Traveling Wave Tube. There are few books which illustrate as clearly as this one the true nature of research - the false starts, the pitfalls, the errors, and the intermittent progress characteristic of all significant research programs. Here is science shown with all its warts and frustrations, as is seldom shown to the outside world. It is a true picture and very characteristic of the author. His invention, however, being then outside of the mainstream of microwave research, did not have a major impact until after the war. In 1944 he went to the Clarendon Laboratory at Oxford where he continued his research in electronics, and there he received the D.Phil.

In 1951 he went to Bell Telephone Laboratories as a member of the technical staff. There, as the leader of a group of gifted scientists, he was to display the full scope of his creative power and imagination. Members of this group conducted the first communication satellite experiment, they did some of the major early work in lasers, in optical communications, and also

as an offshoot of the satellite experiments, made what is possibly the major discovery in radio astronomy of the century.

In 1973 upon retirement from the Bell System, he returned to the academic community. He had been invited by former colleagues at both Stanford and Oxford. He decided to divide his time between the two universities as a professor on a half-time basis at each place. At Stanford he and his students initiated new work in optics and acoustics, including the conception and design of a new kind of scanning ultraviolet microscope. But as always, his influence went far beyond his own immediate activities through his constant stimulation of and interaction with his colleagues.

At Oxford he was a professorial fellow of All Souls from 1973 to 1976, and in 1977 he was elected as an associate member of the College. He was a fellow of the Physical Society, London, the Institute of Radio Engineers, the Institute of Electrical and Electronics Engineers, and a fellow of the American Academy of Arts and Sciences. He was a member of the National Academy of Engineering and the National Academy of Science and served on many of their important committees.

He also served on the board of directors of Associated Universities Incorporated which operates Brookhaven National Laboratory and the National Radio Astronomy Observatory at Green Bank, West Virginia. He received honorary degrees from his old universities, Vienna (1965) and Oxford (1969). Among his other awards were the Duddell Medal of the Physical Society of England (1955), the David Sarnoff Award of the American Institute of Radio Engineers (1960), the Stuart Ballantine Medal of the Franklin Institute (1960), and the John Scott Award (City of Philadelphia) (1975). In 1973 he received the Medal of Honor of the IEEE, its highest award, and in 1975 he was awarded the President's National Medal of Science.

All of these awards and honors are a tribute to his achievements as a scientist and as an engineer. These achievements do not convey the true essence of Rudolf Kompfner - his warmth, his charm, his integrity, his generosity, the personal and intellectual influence he had on his friends, his colleagues, and on students. This special personal quality can perhaps be indicated by describing one of Kompfner's favorite activities while at Stanford.

Every year while he was here he would teach a freshman seminar on the subject "How To Do Scientific Research." The meetings were held in his garage, and the procedure was for everyone in the class, including Kompfner, to suggest a problem for the quarter's program. The class would vote, Kompfner himself would have one suggestion, one vote, and then on the basis of this vote, they would start work on a topic, a new kind of windmill, a design for an earthquake-proof building; this year's project was the design of a wheelchair that could go up one step. One condition always imposed was that Kompfner should not be an expert on the problem so that he too, although leading, would be involved in the learning process and the groping for answers. What this meant to the students and what sort of person Kompfner was is conveyed in this most touching letter sent by one of his former students after Kompfner's death. "I think we learned more than the academic at these meetings. We learned the warmth that can exist between a teacher and his students. That, I believe, is the most important lesson which I will carry in my heart for the years to come." This is one of the finest tributes one can quote about Rudolf Kompfner.

For his co-workers and former colleagues everywhere, the loss of Rudolf Kompfner was more than just that of a brilliant and inspirational scientific colleague. Many did some of their most significant work under his leadership, but for all of us, the personal ties and relationships could not be encompassed merely within the intellectual and scientific. For us, Rudi played a very special role which cannot be described by all of his medals.

He is survived by his wife Peggy and his daughter, Helen Baden, who live at Stanford; and by his son, Paul, and a grandson, who live in England.

Marvin Chodorow, Chairman
Theodore H. Geballe
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