

obituary

Rudolph Minkowski, an outstanding contributor to many areas of astrophysics, died on January 4, 1976, at the age of 80. As a staff astronomer at the Hale Observatories, and later at the Berkeley Radio Astronomy Laboratory, he pioneered the study of planetary nebulae, supernovae, and radio-emitting galaxies.

Minkowski was born in Strassburg and educated at Breslau. Although strongly interested in astronomy, he found the physics program more attractive at Breslau, and he took his Ph.D. in optics in 1921. After a year at Göttingen, he joined the physics group at Hamburg, where he rose to the rank of professor. In 1935 the increasing Nazi repression drove Minkowski to leave his homeland. Encouraged by former colleague Walter Baade, who had preceded him to Pasadena, he moved to a research assistantship at the Mount Wilson Observatory, where his abilities soon earned him a regular staff position. In his 25 years with the telescopes of Mount Wilson, and later of Palomar Observatory, Minkowski became one of the World's leading investigators of the violent phenomena of the universe.

Supernovae remained one of Minkowski's central interests during his entire

career. He distinguished early between the two principal types of supernovae and studied the spectra of many individual supernovae in other galaxies. In collaboration with Baade he studied the remnants of the few known supernovae that have appeared in our own Galaxy. Of particular importance was their thorough analysis of the Crab Nebula, an object whose importance in astrophysics has increased as it was discovered successively to be a radio source, an X-ray source, and a pulsar.

After the discovery of discrete radio sources, Minkowski was a leader in their identification and interpretation. Again working with Baade, he identified some of the strongest radio sources as supernova remnants. Others were identified as disturbed galaxies; the original Baade-Minkowski interpretation of them as pairs in collision did not hold up, but their nature has continued to puzzle astrophysicists for two decades.

Another of Minkowski's long-term interests was the nature of planetary nebulae. In addition to his analysis of these objects, he set up a survey, using a 10" telescope, that more than doubled the number of planetary nebulae known.

Minkowski's greatest public service in astronomy, however, was his supervision of the National Geographic

Society-Palomar Observatory Sky Survey. This incomparably valuable set of photographs has been made widely available in reproduction and is an essential part of the facilities of every astronomical library. Its uniformly high quality is a result of Minkowski's painstaking care.

The study of supernovae and disturbed galaxies naturally led Minkowski to study normal galaxies as well. His pioneering study of internal motions in elliptical galaxies was superseded only a dozen years later, when a new generation of observing equipment became available. It was in his last observing run at the Palomar 200" telescope that he determined the optical redshift of the radio source 3C 295, which remained the farthest point on the velocity-distance diagram of cosmology for 15 years.

After retirement from Mount Wilson and Palomar Observatories in 1960, Minkowski spent a year at the University of Wisconsin and then moved to Berkeley, where he retired again in 1965. Neither retirement had any visible effect on his output of scientific articles, which continued into the 1970s. Several generations of astronomers will remember the personal warmth that underlay his wisdom.

Ivan R. King

announcements

Awards

The Chemical Society, Washington, has awarded the 1975 Hillebrand prize to **Dr Ming-Chang Lin** for his work on and with chemical lasers.

Dr Harold A. Rosen has been awarded the first L. M. Ericsson International Prize for his work on geostationary communications satellites.

The Institute of Physics has made the following awards for 1976:

Charles Vernon Boys Prize to **Professor S. D. Smith** of Heriot-Watt University, Edinburgh, for his contributions to the design of scientific instruments in solid state physics and in physical meteorology.

Duddell Medal and Prize to **Mr G. N. Hounsfeld** of EMI Limited, for his development in the use of X rays for

the examination of three dimensional structures.

Glazebrook Medal and Prize to **Sir Montague Finniston** of the British Steel Corporation, for his leadership in the application of science to the large scale manufacture of steel.

Guthrie Medal and Prize to **Professor A. Salam** of the Imperial College, London, and the International Centre for Theoretical Physics, Trieste, for his contributions to the theory of fundamental particles.

Maxwell Medal and Prize to **Dr S. W. Hawking** of the University of Cambridge, for his contributions to theoretical astrophysics.

Rutherford Medal and Prize jointly to **Professor R. J. Blin-Stoyle** of the University of Sussex, and **Dr Joan M. Freeman** of the UKAEA, Harwell, for their work on β -radioactivity of complex nuclei.

Appointments

Sir Kenneth Berrill, **Professor C. C. Booth**, **Sir Alan Cottrell** and **Mrs J. E. Floud** have been appointed to the Advisory Board for the Research Councils (ABRC).

Dr J. H. Humphrey, Deputy director of the National Institute of Medical Research, has been appointed Professor of Immunology at the Royal Postgraduate Medical School.

International meetings

April 1-2, **The Changing Environmental Conditions in Great Britain and Ireland** during the Devensian Cold Stage, London (The Executive Secretary, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG). April 20-23, **Human Reflexes and Motor Disorders**, Brussels (I.C.B.,