1946. In 1946 Rossi became a professor of physics at the MIT. He was named Institute Professor in 1966, and became Institute Professor emeritus in 1970. (See Rossi's article in PHYSICS TODAY, October 1981, page 34.)

Giacconi received his PhD in physics from the University of Milan in 1954, where he continued as an assistant professor of physics until 1956. At that time he became a research associate at Indiana University, remaining there until 1958, when he became a research associate at Princeton University. From 1959 to 1973 he was the executive vice president and a member of the board of directors of American Science and Engineering (Cambridge, Massachusetts). In 1973 he became a professor of astronomy and associate director of the high energy astrophysics division at Harvard's Center for Astrophysics. Giacconi has been director of the Space Telescope Science Institute (Baltimore, Maryland) since 1981, and professor of astrophysics at Johns Hopkins since 1982.

In 1959, at Rossi's suggestion, Giacconi undertook a study of the theoretical and experimental prospects for x-ray astronomy at American Science and Engineering. Together they proposed using grazing incidence reflection techniques for detecting x rays, and Giacconi suggested incorporating principles of x-ray microscopy in the construction of high resolution x-ray telescopes. Giacconi's group made the first observations of discrete extrasolar x-ray sources and the diffuse x-ray background in a series of four flights sponsored by the US Air Force from 1961 to 1963. Rossi suggested thermal bremsstrahlung emission by extremely hot low-density gas as a possible mechanism of x-ray production—this is now thought to be the production mechanism in most of the sources. Giacconi continued his rocket investigations, and conceived and directed several NASA projects, including the solar x-ray spectroscopic telescope on Skylab, Uhuru—the first orbiting x-ray observatory—and the orbiting Einstein Observatory.

Phillips received his PhD in physics from University College, Cardiff (1951). In 1966 he became a professor of molecular biophysics at the University of Oxford and Professorial Fellow of Corpus Christi College (Oxford). He helped found the British Crystallographic Association, serving as its president until 1984. In the 1950s Phillips and U. W. Arndt introduced automated diffractometry systems for precise measurements of x-ray data from proteins. In 1965 Phillips and his group solved the structure of lysozyme—the first enzyme structure to be solved by x-ray crystallography—as well as the structure of the complex with its substrate, yielding information on the local chemical action of the enzyme at its bonding site. He has solved several other enzyme structures, including triosephosphate isomerase.

Blow studied at Cambridge University, where he received his PhD in 1957. He was a member of the Medical Research Council Laboratory of Molecular Biology from its foundation in 1961 until 1977, when he became professor of biophysics at the Imperial College of Science and Techology. Blow was dean of the Royal College of Science from 1981 to 1984. In 1959 he and Francis Crick published a method for determining the phase angles from the results of isomorphous replacement measurments in x-ray diffraction, which form the basis of methods used today. Starting in 1962, Blow and Rossmann described methods of using x-ray diffraction data to find the geometrical relationships in multi-subunit structures. The existence of more than one subunit in the crystallographic asymmetric unit (noncrystallographic symmetry) was developed towards a new method of structure determination. Blow solved the structure of alpha-chymotrypsin in 1967. More recently he has solved, with collaborators, the structure of tyrosyl-tRNA synthetase, which was used as the basis for the first experiments in protein engineering.

Lax received his PhD from New York University in 1949. He worked at Los Alamos National Laboratory (1945–46, 1950, 1958) before becoming a professor at NYU in 1958. Lax has served as director of the university's AEC Computing and Applied Mathematics Center (1964–72), director of the Courant Institute of Mathematical Sciences (1972–80), and director of the Courant Mathematics and Computing Laboratory (since 1980). Lax has made fundamental contributions to scattering theory, the theory of nonlinear conservation laws, our understanding of the Korteweg-de Vries equation and the role of stability in numerical schemes.

Kiyoshi Ito (Research Institute for Mathematical Sciences, Kyoto University, Kyoto), who shared the mathematics prize with Lax, was cited for "his fundamental contributions to pure and applied probability theory, especially the creation of the stochastic differential and integral calculus."

OSA honored eleven in 1986

The Optical Society of America honored 11 physicists in 1986 for their work in optics.

The society presented its highest award, the Frederic Ives Medal, to Amnon Yariv (Caltech) for his "numerous pioneering contributions to lasers, optoelectronics and phase-conjugate optics," as well as for his textbooks for optical scientists and engineers. Yariv earned his BS (1954), MS (1956) and PhD (1959) in electrical engineering from the University of California, Berkeley. After graduating, he worked for Bell Telephone Laboratories (Murray Hill, New Jersey) until 1964, when he joined the faculty of Caltech. He is now the Thomas G. Meyers Professor of Electrical Engineering and Applied Physics at Caltech. Yariv made pioneering studies of mode locking in lasers, and he helped develop several early solid-state laser systems. With W. H. Louisell he laid the foundation for nonlinear quantum optics, he predicted parametric fluorescence, and he made pioneering contributions to phase-conjugate optics. In 1971 he proposed semiconductor-based integrated optics technology, which he and his students demonstrated in 1978. Yariv has written *Quantum Electronics* (1967), *Introduction to Optical Electronics* (1971), *An Introduction to the Theory and Application of Quantum Mechanics* (1982) and *Optical Waves in Crystals* (1984).

H. Moysés Nussenzveig (Pontifical Catholic University of Rio de Janiero, Brazil) received the Max Born Award for his "distinguished and valuable contributions to the theory of Mie scattering and to the theories of the rainbow and the glory." After receiving his BSc (1957) from the University of Sao Paulo, Nussenzveig was a postdoctoral fellow at Utrecht, Birmingham and Zurich. He became a full professor at the Brazilian Center for Physics Research in 1962. He taught at the University of Rochester (1965–75) and at Sao Paulo (1975–82) before becoming professor of physics at the Pontifical Catholic University in 1983. Nussenzveig is best known for his research on high-frequency scattering: By applying complex angular momentum methods, he solved the problem of slow convergence associated with the Mie and Debye partial wave solutions for the scattering of light by a homogeneous sphere, yielding an improved theory of the rainbow and an explanations of the glory.

Joseph A. Giordmaine and Robert C. Miller (both of AT&T Bell Laborato-