

AWARDS

Nobel Prizes

On December 10, in Stockholm, the 1964 Nobel Prize in physics was awarded jointly to Charles H. Townes of the Massachusetts Institute of Technology, who received half of the \$53 000 prize money, and to Nikolai G. Basov and Aleksandr M. Prokhorov of the Lebedev Institute of Physics in Moscow, who shared the other half. The three men were honored for "fundamental work in the field of quantum electronics which led to the construction of oscillators and amplifiers based on the maser-laser principle".

Work on masers dates back to 1951 when Purcell and Pound produced induced emission in a LiF crystal. However, the gain was well below unity. In 1953, J. Weber published a paper proposing means of obtaining stimulated amplification from crystals and from gases. The following year Gordon, Zeiger, and Townes of Columbia University reported that they had produced an operating maser. Meanwhile Basov and Prokhorov had been working independently in Moscow, and in 1954 they also reported that they had achieved maser action.

The next step was the extension of the stimulated emission technique from microwave to optical wavelengths. Possible approaches were discussed by Prokhorov and by R. H. Dicke, and in 1958 Townes and Schawlow proposed that an optical maser could be produced with a Fabry-Perot interferometer. Two years later, T. H. Maiman constructed the first operating laser.

Dr. Townes, who was born in Greenville, S.C., earned his bachelor's degree at Furman University and did his graduate work at Duke University and the California Institute of Technology. He received his PhD from Caltech in 1939. After several years with Bell Telephone Laboratories, Dr. Townes joined the faculty of Columbia University, where he later served as head of the Physics Department (1952-55) and director of the University's Radiation Laboratory (1950-



1964 Nobel laureates in physics: A. M. Prokhorov, C. H. Townes, and N. G. Basov

52). In 1961, he was appointed provost of MIT.

A. M. Prokhorov graduated from Leningrad University in 1939. After service in the Soviet army during World War II, he joined the Lebedev Institute as a senior associate, and he became chief of the Oscillation Laboratory there in 1954.

N. G. Basov was graduated from the Moscow Engineering and Physics Institute in 1950. Two years before, he had joined the staff of the Lebedev Institute as a laboratory assistant. He earned the degree of Doctor of Physical-Mathematical Sciences in 1957 and in 1958 became deputy director of the Institute.

The 1964 Nobel Prize in chemistry was awarded to an English crystallographer, Dorothy Crowfoot Hodgkin, Wolfson research professor of the Royal Society and professorial fellow of Somerville College, Oxford. Professor Hodgkin was honored "for her determinations by x-ray techniques of the structures of important biochemical substances". Notable among her achievements was the analysis of the complicated molecule, vitamin B₁₂, announced in 1955, which enabled the

vitamin to be synthesized and used in the treatment of pernicious anemia. She and her coworkers are also credited with the complete structure analysis of penicillin.



J. M. Burgers

Bingham Medal

On October 27, during the annual meeting of the Society of Rheology at the Mellon Institute in Pittsburgh, the Society's Bingham Medal for 1964 was presented to Johannes M. Burgers of the University of Maryland. The medal, which is given annually for outstanding contributions to rhe-