

the chemical evidence. The next important molecule she attempted was to lead to her greatest triumph, the structure of vitamin B<sub>12</sub>, the anti-pernicious anaemia factor. It was here that she was able to show how a knowledge of, and, better still, a feeling for, chemistry could be combined with the most refined physical analytical techniques. Her series of papers on this structure will always be a model of a tactical approach to a formidable problem. Her step-by-step advance, beginning with the recognition of the planar porphyrinoid ground around the cobalt atom, continued atom by atom until it included the whole closed loop, through the propanolamine and nucleotide group, which linked it ultimately with the cobalt atom itself. The completion of this work included the precise location of more than ninety atoms and is the present 'high-water mark' of crystallographic analysis. In establishing it, Prof. Hodgkin's work has set a new standard in X-ray analysis methods and has shown the way by which successively more difficult structures can be attacked.

### The 1964 Nobel Prize for Physics

THE 1964 Nobel Prize for Physics is shared: one half has been awarded to Prof. Charles H. Townes, provost of the Massachusetts Institute of Technology, and the other half jointly to Prof. Nikolai G. Basov and Prof. Aleksandr M. Prokhorov, of the U.S.S.R. Academy of Sciences Lebedev Institute of Physics. The prize is awarded for work in the field of quantum electronics which led to the development of the micro-wave maser, and later to the laser.

#### Prof. Charles H. Townes

Prof. Charles H. Townes, who is forty-nine, obtained his bachelor's degrees at Furman University, South Carolina, and his M.A. at Duke University, North Carolina. He worked for his Ph.D. at the California Institute of Technology, and in 1939 joined the Bell Telephone Laboratories, where he remained until he was appointed professor of physics at Columbia University in 1947. Here he directed his attention to the problem of generating coherent radiation by using transitions between the energy-levels of molecules. The method, used in 1953 in the first maser, was based on the stimulated emission of radiation from excited ammonia molecules at a wave-length close to 1.25 cm. This maser was novel in two respects: its very low noise when used as an amplifier, and its high-frequency stability as an oscillator.

#### Prof. Nikolai G. Basov and Prof. Aleksandr M. Prokhorov

Profs. Nikolai G. Basov and Aleksandr M. Prokhorov developed independently an almost identical maser at the Lebedev Institute. Prof. Basov is a graduate of the Moscow Engineering and Physics Institute. He is forty-two and is at present deputy director of the Lebedev Institute. Prof. Prokhorov was born in Australia in 1916. After attending Leningrad State University he served in the Soviet Army during the Second World War and then joined the Lebedev Institute, where he became chief of the Oscillation Laboratory in 1954. He was awarded the Lenin Prize in 1959. Profs. Basov and Prokhorov are both corresponding members of the U.S.S.R. Academy of Sciences.

The operation of the first micro-wave masers evoked widespread interest in the application of the maser principle, and led to the development of the optical maser, or laser. This device was first discussed in detail in a paper published by Townes and Schawlow in 1958, and a little later Basov was among the first to suggest the use of stimulated emission in semiconductors as a means of generating coherent radiation.

### Ministry of Aviation Chief Scientist :

Dr. W. Cawood, C.B.E.

DR. W. CAWOOD has been appointed chief scientist of the Ministry of Aviation in succession to Sir Robert Cockburn, who has been appointed director of the Royal Aircraft Establishment, Farnborough (*Nature*, 204, 127; 1964). Dr. Cawood has been chief scientist of the Ministry of Defence (Army Department) since September 1960. He was born at Leeds in 1907 and educated at Archbishop Holgate's School, York, and the University of Leeds. During the period 1928-38, while engaged on research work, he produced many scientific papers on the physical properties of aerosols, the theory of coagulation, etc. In 1937 he was a member of the League of Nations International Atomic Weights Committee. He entered the Scientific Civil Service in 1938 and served for some eight years in the Headquarters Armament and Instrument Research and Development Branches of the Air Ministry and Ministry of Aircraft Production, becoming deputy director of armament research in 1945. He was promoted to chief scientific officer in April 1947, and served as deputy director of the Royal Aircraft Establishment until February 1953, when he was appointed principal director of scientific research (defence) of the Ministry of Supply. Some two years later he became principal director of scientific research (air) (later director-general of scientific research (air)); and in March 1958 he was appointed deputy controller of aircraft research and development. Two and a half years later he was transferred to the post of chief scientist of the War Office (now Ministry of Defence (Army Department)). His new appointment took effect as from November 30.

### Head of Agricultural Bacteriology Division of the Ministry of Agriculture:

Dr. J. G. Murray

DR. J. G. MURRAY has been appointed head of the Agricultural Bacteriology Division of the Ministry of Agriculture, and took up his new duties on November 1. Dr. Murray, who was born in Derrytrasna, Lurgan, was educated at Lurgan College and Greenmount Agricultural College, before entering Queen's University, Belfast, in 1934. After graduation, he joined the Ministry of Agriculture as an advisory officer, working mainly with the Milk Section. Since 1943 he has been a member of the research staff of the Ministry's Agricultural Bacteriology Division. He now also becomes head of the Agricultural Bacteriology Department at Queen's University. Dr. Murray is a member of the Council of the Society of Dairy Technology, a committee member of the Society of Applied Bacteriology and a member of two committees of the British Standards Institute. His particular research interest is the bacteriology of processed foods—especially milk and dairy products.

### Meeting of Panel on WMO Development Fund

THE Panel of the Executive Committee of the World Meteorological Organization, established to approve projects for implementation in 1965 under the new WMO Development Fund, held a meeting at the Headquarters of WMO in Geneva, in November. The new Meteorological Development Fund of U.S. dollars 1,500,000 was established by the Fourth World Meteorological Congress in 1963 in order to enable significant and prompt assistance to be rendered to members during the period 1965-67. Its general purpose is that full advantage be derived from the opportunities which now present themselves for the improvement of man's basic understanding of the atmospheric processes. A plan for the operation of the new fund was approved by member governments earlier in the year, and assistance is to be made available in the following fields: (a) telecommunications facilities; (b) observational facilities (including those relating not only to conventional observations but also to APT and other satellite installations, automatic weather stations, ocean