The 184-in. cyclotron was designed and constructed with the view of generating mesons artificially; but until recently it was thought that the fast particles it produces were not sufficiently energetic for this purpose. From the point of view of meson production, an α-particle of energy 400 MeV. was considered to be approximately equivalent to four nucleons, each of energy 100 MeV.; and such a nucleon has not sufficient energy to lead to the creation of a particle of rest-mass 300 m_e. In contradiction with this view, the observations show that the generation of mesons occurs when the kinetic energy per nucleon is about 75 MeV., and indicate that the production process must be considered in relation to the α-particle as a whole.

It is pointed out by Gardner and Lattes[1] that it is possible to reconcile the observed production of mesons with the view that they are created in interactions between individual pairs of nucleons, if, following a suggestion of McMillan and Teller[6], account is taken of the internal motion of the nucleons in the colliding nuclei. Suppose the internal kinetic energy of the nucleons, in an α-particle or in a carbon nucleus, to be 25 MeV. For the production of mesons, it may be assumed that the most favourable collisions will be those in which the relative velocity of pairs of nucleons has the greatest possible value. The maximum kinetic energy available in the centre-of-mass co-ordinate system of a pair of nucleons in such a collision will then be equal to $\frac{1}{2}(\sqrt{100} + \sqrt{25} + \sqrt{25})^2 = 200$ MeV.; a value more than sufficient for the creation of a particle of mass 320 m_e. The same approach suggests that the threshold for the production of mesons by α-particles should occur at an energy of $\sim$ 300 MeV. The observations are thus consistent with the simple assumption that the mesons arise as a result of an interaction between single pairs of nucleons.

These experiments establish the possibility of investigating the properties of mesons in laboratory conditions, with localized sources of particles of high intensity. It is reasonable to suppose that they will lead to a period of rapid advance in nuclear physics, especially in the development of our knowledge of the internal motion of the nucleons, and of the forces between them which give stability to the nuclei. They represent a technical advance of decisive importance, and the progress of the investigations will be followed with great interest.

[1] Gardner and Lattes, *Science* (March 12, 1948).
[2] Lattes, Muirhead, Occhialini and Powell, *Nature*, **159**, 694 (1947).
[3] Lattes, Occhialini and Powell, *Nature*, **160**, 453 and 486 (1947).
[4] Goldschmidt, King, Muirhead and Ritson (in the press).
[5] Lattes, Occhialini and Powell (in the press).
[6] McMillan and Teller, *Phys. Rev.*, **72**, 1 (1947). See also Horning and Weinstein, *Phys. Rev.*, **72**, 251 (1947).
[7] Marshak and Bethe, *Phys. Rev.*, **72**, 506 (1947).

NEWS and VIEWS

Holweck Prize: Prof. Y. Rocard

THE Holweck Prize and Medal were founded in 1945 as a memorial to Fernand Holweck, director of the Curie Laboratory of the Radium Institute in Paris, and to other French physicists who met their death during the occupation of France in 1940–44. The award, made jointly by the Physical Society and the Société Française de Physique, is conferred alternately upon a French and an English physicist. This year the Prize and Medal are awarded to Prof. Yves Rocard, professor at the Sorbonne, and director of the Physics Laboratory of the École Normale Supérieure, University of Paris. During 1925–39 M. Rocard published many papers on the equation of state of gases, hydrodynamics, diffusion of light by liquids, the optics of the atmosphere, mechanics, acoustics, and the propagation of electromagnetic waves. He introduced molecular hypotheses into the equations of hydrodynamics; he rediscovered the classical equations, determined the state of the liquid in the capillary layer which separates it from the vapour, and developed the theory of surface tension. These detailed studies of the structure of liquids enabled Rocard to determine the mechanism of the diffusion of light by an exact calculation of the intermolecular field, and to give the classical theory of the Raman effect. In connexion with these investigations, he carried out a series of theoretical and experimental studies of the transparency of the atmosphere, the range of projectiles and the visibility of signals.

This period of Rocard's scientific life was followed, from 1930 until the War, by ten years of work on acoustics, the mechanics of oscillating systems, and the mechanics of fluids; he studied the stability of motion of locomotives, the possibility of self-sustained oscillations in a centrifugal pump, and the damping of vibrations in the wings of aircraft. At the beginning of the War, Rocard put his knowledge at the service of his country, especially his work on critical frequencies of self-oscillation in aircraft, and the increase of sensitivity of sound detection apparatus. During the occupation of France, he occupied his enforced leisure in compiling a book on the general dynamics of vibrations; this has been translated into English and published in the United States. At the beginning of 1943 Rocard escaped from France and joined the Free French Forces in England. He adapted British and American radar to French ships, and took part in the liberation of Corsica and the capture of Toulon.

Engineering at the National Physical Laboratory: Mr. D. G. Sopwith

MR. D. G. SOPWITH has been appointed superintendent of the Engineering Division of the National Physical Laboratory in succession to Dr. G. A. Hankins, who recently became director of mechanical engineering research in the Department of Scientific and Industrial Research. Mr. Sopwith has been on the staff of the Engineering Division of the National Physical Laboratory for about twenty years, and his main interest has been in research on engineering materials and in the application of the basic principles of elasticity to engineering design problems. Until 1938 he worked in collaboration with Dr. H. J. Gough on fatigue and corrosion fatigue of metals, and on the design of lifting gear such as crane hooks. The former work showed the effect of the atmosphere on the fatigue resistance of various metals, while the latter resulted in improved practical designs. During the War, Mr. Sopwith carried out important work on the design of gun springs, gun barrels and shells; but his most valuable contribution was on the penetration of shot into armour plate, and his work both analytically and by controlled experiment in a laboratory armour-penetration range has done much