

BOOK REVIEWS

Tizard. By Ronald W. Clark. 458 pp. MIT Press, Cambridge, Mass., 1965. \$10.00.
Reviewed by Richard Waterhouse, *The American University*.

This is an excellent, full-scale biography of the late Sir Henry Tizard (1885–1959), who achieved eminence as a scientific advisor to the British Government and particularly the Royal Air Force before and during World War II.

Two strands in this story of his life are of particular interest. One concerns his key role in getting radar developed and operational in time for the critical Battle of Britain in 1940. Radar was instrumental in winning this battle. The other strand concerns the conflict between Tizard and F. A. Lindemann (later Lord Cherwell), who became Winston Churchill's chief scientific advisor.

This conflict was ventilated by C. P. Snow, who opposed Lindemann, in his Harvard Godkin Lectures in 1960 and by Lord Birkenhead, who defended Lindemann, in his book *The Professor and the Prime Minister* (reviewed in *Physics Today*, Oct. 1963, page 72). Clark's book presents the story of the feud from Tizard's standpoint, but in an objective way. The author does not claim his subject was always right, but tries, successfully I think, to be fair to all parties.

The author had access to the papers of both Tizard and Lindemann and quotes revealing letters from both. Both were exceptionally able men, and both made important contributions to defense policy, but it is evident that they clashed in temperament as well as in policy. The author tells of an incident in which they got into a heated argument about the most economical way of packing oranges in a box—whether directly on top of each other, or in layers slightly off-center—ending up both red in the face.

The events so far disclosed indicate that Lindemann, although the less attractive character of the two, was the better politician.

Tizard held important positions in

university administration at London and Oxford, as well as being a pioneer liaison man between the establishments of science, government, and the military. His life story thus makes interesting reading from several standpoints. The book is thorough, and includes over twenty photographs, a list of Tizard's publications and broadcasts, a six-page list of references, bibliography, and index. I think the author can be commended for doing the kind of thorough job his subject would have appreciated.

Les Vérifications expérimentales de la Relativité générale. By Marie-Antoinette Tonnelat. 307 pp. Masson & Cie, Paris, 1964. 84 F.

Reviewed by Jacques E. Romain, *Centre de Recherches Routières, Sterrebeek, Belgium*.

General relativity may be the only twentieth-century physical theory that has stood so long on so few experimental checks. This peculiar situation may be the reason why the field was left in a state of relative inactivity between, say, 1930 and 1950. The recent appearance of unforeseen testing possibilities for more and more features of the theories of gravitation is focusing increasing interest in the scientific world. It is significant that the latest few general-relativity conferences included one or more contributions to the problem (mostly review papers). However, a complete description of the present-day state of the question can only be found in scattered form in learned journals and conference proceedings. Such a book as the one under review, devoted to a synthesized exposition and a thorough critical discussion, is unique so far and should be warmly welcomed, especially as the treatment is authoritative, and the collection and classification of references (unfortunately practically limited to 1962) has been given special care.

In order to make the book self-contained, the author begins with a 65-page textbook on general relativity

(complemented by mathematical appendices on tensors, differential geometry, and conservation laws), including the standard exposition of the three so-called "crucial tests". Extra tests, related to the rotating disk or to the relativistic gyroscope, are then considered separately from the general relativistic viewpoint. Gravitational waves are not discussed in any detail. The second part of the book is devoted to the red shift on the cosmological and on the terrestrial scale; the Mössbauer-effect measurements are allowed a special chapter. Included is an especially detailed discussion of the concept and measurement of frequency in general relativity (a subject to which the author has devoted an additional paper in *Ann. Institut Henri Poincaré*, after this book was set). The third part consists of a brief review of the standing of the various Euclidean theories of gravitation in the face of the experimental tests and a general discussion of the relationship between general relativity and the equivalence principle. The deepest idea to be retained may be the remark that a non-Euclidean geometry is imposed by the consideration of accelerated motion rather than gravitational forces and that, therefore, it must not be considered a direct offspring of the equivalence principle.

The book is pleasant to read and to handle. The reviewer is gratified to find, in a French book, a (short) subject index.

The Elements of Pulse Techniques. By O. H. Davie. 197 pp. Reinhold, New York, 1964. \$8.75.

Reviewed by W. T. Wintringham, *Bell Telephone Laboratories*.

The Elements of Pulse Techniques may be useful to some persons, because 337 references are included to augment the author's six-chapter text. Some others may find the book useful, because many circuits for generating, amplifying, delaying, measuring, and using pulses are reproduced. However,