

Physics

Air Ministry: Meteorological Office. Professional Notes, No. 66: *Lightning and Aircraft*. By G. C. Simpson. Pp. 24. (London: H.M. Stationery Office, 1934.) 4d. net.

It is fortunate for aviation that Dr. Simpson should have first become prominent largely through the study of the electricity of thunderstorms, and in virtue of that fact and of his official position as director of the Meteorological Office, it would be expected that a handbook dealing with the risks of damage to aircraft due to lightning would not only be as helpful in that direction as the present state of knowledge allows, but would also be a boon to those seeking to learn something about atmospheric electricity without having to embark upon an elaborate treatise such, for example, as that of Elster and Geitel. This expectation is fully satisfied, for in only twenty-four pages both needs are met. The work of condensation has been so well done that on the theoretical side the average intelligent scientific reader who is not a specialist in atmospheric electricity is not likely to realise the amount of condensation that has been effected. This is a subject in which it is only too easy to find oneself unable to see the wood for the trees, the more so as the trees are often enveloped in a fog of controversy, and after experts have met to discuss its unsolved problems there is apt to be an intellectual battle, and a casual spectator may not be able to distinguish victor from vanquished.

On the meteorological side, a fairly definite picture emerges of the broad facts connected with the separation of the opposite electricities under various types of weather, the impression at the same time being conveyed that much remains to be learned about the mechanisms involved. On the practical side, one gathers that an aviator should not be unduly alarmed at the prospect of his machine being struck by lightning, especially if it embodies a sufficient amount of metal so arranged as to make the whole machine an electrical conductor of low resistance, unless the machine has a trailing aerial leading into the cockpit. When violent atmospheric are encountered, and cumulo-nimbus clouds are seen ahead, a trailing aerial must be hauled in with the utmost dispatch, if the lives of the occupants of the machine are not to be endangered.

Applied Geophysics in the Search for Minerals. By Prof. A. S. Eve and Prof. D. A. Keys. Second edition. Pp. xi+296. (Cambridge: At the University Press, 1933.) 16s. net.

In this new edition of their excellent introductory textbook to the rapidly developing science of geophysical prospecting, the authors have kept to the lines of the original work of 1929. Although a brief review of modern developments since that year has been added to each chapter, the book remains restricted to a manual intended rather for the use of non-geophysical mining engineers, geologists and others who have an economic interest in prospecting,

than for physicists and theoretical students of geophysics.

Within these limitations, the revisions made by the authors suffice to bring their work up to date, with a few exceptions. The opportunity might have been taken to revise the rather meagre and somewhat inaccurate descriptions of certain instruments which have been developed outside the United States, and for which full descriptions have long been available. For example, the diagrammatic picture of the gravity gradiometer, Fig. 91, still perpetuates the error of representing the radial dimensions as 20 cm., instead of its correct value 4.5 cm., whilst Evershed's 'earth'-tester is still referred to as a "Megger".

In a book of this type one has no right to expect detailed descriptions of instruments, in all their variety, but one does expect the details given to be accurate in the essential features, and one would prefer the illustrations to refer either to the original models which have a historical value, or to the latest models which replace the obsolete types.

Some of the earlier descriptions of special methods, notably in the electrical chapter, might well have been replaced by more detailed accounts of the modern methods of potential ratio, resistivity and inductive geoelectrical prospecting.

Engineering Radiography. By V. E. Pullin. Pp. vii+136. (London: G. Bell and Sons, Ltd., 1934.) 45s. net.

THE use of radiographic methods for the examination of welds and castings and for the detection of cavities, cracks and other flaws is rapidly increasing and there must be a considerable demand for an authoritative book dealing with the results so obtained. No one is better qualified than Mr. Pullin to write such an account and he has produced one which is full of interest and essentially practical. He has little to say as regards X-ray plant, a subject adequately treated elsewhere, but has confined himself to such questions as the preparation of the specimen and the interpretation of the radiographs. The book is very fully illustrated with photographs covering a range from simple welds to complicated castings, and alongside the radiographs are given illustrations of the actual flaws revealed by cutting up the specimens. In this way Mr. Pullin effectively demonstrates not only the potentialities but also the limitations of the method.

Of particular interest is the section dealing with γ -ray radiography. While γ -rays require longer exposures and give radiographs with poorer contrast, they possess certain advantages. It is found that X-rays are in general to be preferred when the thickness of the specimen does not exceed the equivalent of 3 in. of steel, while γ -rays give better results with more massive specimens and irregularly shaped castings. On account of its smaller bulk, the γ -ray apparatus can often be used when it is impossible to mount the X-ray tube in a suitable position.

Both the author and the publishers are to be congratulated on the excellence of the illustrations and the general lay-out.