

would have been better done had the author relied less exclusively on the *Proceedings of the Institute of Radio Engineers*—excellent as they are—as a source book, and come to British publications which were available before June 1932, the date of the preface to this edition. The structure and properties of the ionosphere are, quite certainly, more satisfactorily discussed in the British than in the American papers.

The extent of national unbalance in references may be judged from the following figures: citations from *Proc. I.R.E.* 157, from other American periodicals (excluding the publications of the Bureau of Standards) 100; from British periodicals 16, German 5, French 1. "America 257 not out, the rest 24" is a score which may mislead the author's young disciples in their most impressionable years. By way of contrast there may be quoted as a random sample the corresponding figures from a recent British book, nominally restricted to British work:—British 26, American 9, German 7, International 1.

The proof-reader has somewhat scamped his work, but the general make-up of the book is good, and this third edition can be cordially commended as a good general review of the very wide subject matter indicated in its title.

*Animal Industry in the British Empire: a Brief Review of the Significance, Methods, Problems and Potentialities of the Live-Stock and Dairying Industries of the British Commonwealth.* By A. N. Duckham. Pp. xvii+239. (London: Oxford University Press, 1932.) 15s. net.

IN this book the author surveys the animal industry of the British Empire which, as he shows, is responsible for about two-thirds of its farming output. The range of efficiency is wide, varying from native management under which, in spite of large numbers of animals, the marketed products are only a few skins and hides, to intensive milk production as practised in Great Britain, where the annual gross output may be up to £50 per cow. Great Britain stands first in value of output of animal products, this being estimated, in units of a million pounds, at 200 in 1928 out of a total Empire production of about 650; of the individual products milk comes easily first, its value being about 200, while cattle for beef are valued at 100, wool about the same, and poultry, pigs and sheep each are valued at 50. This gives the perspective on which the survey is based. The author then proceeds to study the separate countries, giving a general account of the live-stock conditions in each, discussing also the physical and the economic factors concerned. Finally he discusses the question whether the Empire could or could not be made self-supporting for various items.

The book brings together much useful information not easily available elsewhere and presents it in a readable form. Lists are given in an appendix of sources of further information. Altogether the book can be commended to the student.

*Gmelins Handbuch der anorganischen Chemie.* Achte völlig neu bearbeitete Auflage. Herausgegeben von der Deutschen Chemischen Gesellschaft. Bearbeitet von R. J. Meyer. System-Nummer 30: *Barium*. Pp. xvi+390. (Berlin: Verlag Chemie G.m.b.H., 1932.) 64 gold marks.

THE literature on barium compounds has been reviewed up to April 1932, and compounds which it forms with any of the 29 elements preceding it in the system are described with the usual wealth of detail. Considerable space has naturally been allotted to barium sulphate. Thus the various results of solubility determinations of this salt are tabulated and discussed. Whilst the values obtained at ordinary temperatures are moderately concordant, those near the boiling-point of water show wide discrepancies. In particular, gravimetric results appear to be very much higher than those calculated from conductivities, and natural barytes is said to give results about 15 per cent higher than the artificial salt. The physical properties of the element have been fully dealt with. These include atomic structure, mechanical properties, tables of wave-lengths of spectral lines and electrical conductivity, etc.

*Experimental Atomic Physics.* By Prof. G. P. Harnwell and Dr. J. J. Livingood. (International Series in Physics.) Pp. xiii+472. (New York: McGraw-Hill Book Co., Inc.; London: McGraw-Hill Publishing Co., Ltd., 1933.) 30s. net.

THIS introduction to atomic physics is based upon a course given at Princeton University, the purpose of the course having been to present the subject from a predominantly experimental point of view. Amongst the material included may be found radiation, atomicity of matter and electricity, thermionic and photoelectric effects, line spectra, atomic energy states, X-rays and radioactivity. Sufficient theoretical discussion is given to render the development systematic, but stress is laid on the experimental side and many experiments are described that are suitable for performance by students. Such experiments are by no means easy to arrange and this part of the book should make it of service to teachers who are planning a laboratory course on modern physics.

*Mirrors, Prisms and Lenses: a Text-Book of Geometrical Optics.* By Prof. James P. C. Southall. Third edition. Pp. xxiv+806. (New York: The Macmillan Co., 1933.) 22s. 6d. net.

THIS useful book on geometrical optics has been enlarged and improved by the addition of two new chapters. One of these deals with the microscope considered as being more or less typical of optical instruments, and the other treats of various subjects pertaining rather to physical and physiological optics yet having a bearing on the plan of the book as a whole. As in the earlier text, the historical notes are well done and add greatly to the interest of the volume.