and Tanganyika Territory. Then follow two chapters containing a most useful summary of the geology of the Union of South Africa. Central and South-West Africa and British West Africa are dealt with in the two succeeding chapters, the latter including some pages devoted to the British Cameroons and Togoland. Canada and Newfoundland are dealt with in two chapters occupying sixty pages, and the Indian Empire in two of sixty-six pages. These are admirable summaries, which are especially welcome in view of the importance and interest of the work which has been done in these lands and of the great volume of literature that has been epitomised. The Malay States, British Borneo, the Indian Ocean islands, and Hong Kong are treated in a chapter on the East Indies. Then come two chapters on the geology of Australia, one on New Zealand, and one on Oceania, some account being included in the last of territory acquired since the war. The last chapter, under the title of the Mandatory Regions, deals with Mesopotamia and Palestine.

In most cases the descriptions of the several regions are accompanied by sections and folding geological maps in black and white. These are printed on good paper, and students would derive considerable benefit in tinting them with washes of colour. In connection with each area a useful bibliography is also given, which, by referring readers to further sources of information, adds greatly to the value of the book.

Both author and publisher are to be congratulated upon having produced an important and most useful addition to British geological text-books.

(2) Mr. Penzer's book is of a more specialised kind. It is the second of a series devoted to the raw materials of industry, the first of which dealt with cotton and wool throughout the world. This second volume restricts itself to tin within the Empire, which, constituting two-thirds of the world's supply, provides ample material for a single volume. It is proposed to issue later another volume describing the extra-British sources of the metal.

The introduction deals with the history of tin production and with the tin-bearing minerals. Then there are four chapters describing the various fields, arranged according to continents; this part of the book contains much detailed information, and is illustrated by a number of specially drawn distribution maps. There is also a chapter on the industrial applications of tin, and one giving statistics as to output, prices, and conditions of sale. The volume closes with an elaborate classified bibliography.

A perusal of this book has left the impression that its writer has been assembling information upon a subject which is outside the limits of his own practical

experience. This impression detracts a little from the authority of the work, but it must not be allowed to obscure the fact of the author's remarkable industry or of the extraordinary amount of information which he has gathered together into the 350 pages of his book. By indefatigable labour he has made a valuable compilation which many interested in the mineral industries will be glad to possess and keep by them for purposes of reference.

C. G. C.

Our Bookshelf.

The Vitamins. By Prof. H. C. Sherman and S. L. Smith. (American Chemical Society: Monograph Series.) Pp. iii + 273. (New York: Chemical Catalog Co., Inc., 1922.) 4 dollars.

A VERY welcome addition to the literature of vitamins has been provided by Prof. Sherman and Mr. S. L. Smith in the volume under notice. The plan of the book is very simple; an historical introduction is followed by three chapters devoted to the three generally recognised vitamins and a final chapter is added on the relation of these important principles to the problem of food supply. A bibliography is also given, which comprises about a thousand entries and includes the literature so far as the end of 1921.

The treatment of the subject is throughout clear and critical, and the authors err if at all on the side of caution. Thus they do not regard the identity of the water-soluble and antineuritic vitamins as proved, but consider that "the preponderance of evidence thus far available favours the view that the water-soluble, growth-promoting vitamin is probably among the substances which may exert antineuritic action." They display a similarly open mind as to the vexed questions of the nature of vitamin B and its relation to the growth of yeast, which are both being actively investigated, with tantalisingly varied results, in many laboratories. The concluding chapter will probably be found the most interesting by the non-specialised reader, as in it the authors discuss the commonly used foodstuffs from a general point of view, devoting attention to their special merits or demerits, not only as carriers of vitamins but as sources of "good" or "bad" proteins and of energy. Their final conclusion brings comfort to those who are anxious as to the suitability of their everyday diet: "... we believe it safe to say that with a dietary selected to make the best use of our ordinary staple foods there will rarely if ever be occasion to purchase vitamins in any other form, or to give any greater anxiety to the vitamins than to some other factors which enter into our present conception of nutritive requirements and food values."

Essai philosophique sur les probabilités. Par Pierre-Simon Laplace. (Les Maîtres de la Pensée Scientifique: Collection de mémoires et ouvrages. Publiée par les soins de Maurice Solovine.) I. Pp. xii + 103. II. Pp. iv + 108. (Paris: Gauthier-Villars et Cie, 1921.) Each vol. 3 francs net.

OUR students spend little or no time in the study of the classical documents of scientific discovery. This neglect is very much to be regretted, for there can be

no doubt that nothing is so inspiring and fascinating as the perusal of the account of a great discovery by the discoverer himself. The personal element, so conspicuously absent in current textbooks, is in this way given its opportunity, especially if the discoverer's account is read in the original language in which it was written. The series now being issued under the editorship of M. Solovine is therefore to be welcomed.

The present essay was first printed as an introduction to Laplace's "Théorie analytique des probabilités." It gives in non-mathematical language the principles underlying Laplace's methods for dealing with the theory of probability, and shows how it is applied to problems of natural science—especially the astronomical problems to which Laplace applied his genius—to sociology and other aspects of communal life. Special attention is devoted to errors in the estimation of probabilities, due to psychological causes, and there is also a brief history of the methods of probability.

Considerable modification has since been introduced into the fundamental notion of probability, but Laplace's essay should be read by all students of mathematics. In it occurs the sentence: "Une intelligence qui pour un instant donné connaîtrait toutes les forces dont la nature est animée et la situation respective des êtres qui la composent, si d'ailleurs elle était assez vaste pour soumettre ces données à l'analyse, embrasserait dans la même formule les mouvements des plus grands corps de l'univers et ceux du plus léger atome: rien ne serait incertain pour elle, et l'avenir comme le passé serait présent à ses yeux." S. BRODETSKY.

Displacement Interferometry applied to Acoustics and to Gravitation. By Prof. Carl Barus. Pp. viii + 149. Publication 310. (Washington: Smithsonian Institution of Washington, 1921.)

PROF. BARUS' work is divided into twelve chapters, and occupies an intermediate position between the usual textbook dealing with routine work and the ordinary type of original research which attacks and solves some specific and definite problem. It is throughout of an exploring nature and may be said to investigate the suitability of interferometry as a method for research in various branches of acoustics and gravitation. In the first chapter the open mercury manometer, when read by interference, is discussed. In the second, the interferometer U-tube is used as an absolute electrometer. The third deals with acoustic pressures, the fifth treats of the compression of a sound wave in a pipe, and the sixth with the vibration of a telephone plate. In the eighth and following chapters various gravitational problems are approached. The book is a storehouse of unusual experimental methods and may be consulted with advantage by any one about to commence investigations along the lines indicated.

Publications of the Washburn Observatory of the University of Wisconsin. Vol. X. Part 4: *Observations of Double Stars, 1907-1919.* By George C. Comstock. Pp. 167. (Madison, Wis.: Washburn Observatory, n.d.)

THE volume under notice forms a catalogue of all the observations of double stars made with the 16-inch refractor at Washburn Observatory by Prof. Comstock

between 1907 and 1919; summaries of his earlier observations with the same instrument from 1889 to 1907 are also given, so that it is possible to detect changes. There are some 200 stars in the catalogue, including most of the well-known binaries.

The probable errors are given as $2^{\circ}.6$, $0^{\circ}.03$ for separations less than $0^{\circ}.5$, and $0^{\circ}.9$, $0^{\circ}.07$ for those between $2''$ and $4''$. Wires illuminated by red light were employed. This involves the possibility of small errors through unequal refraction of the images of wire and star in the eyepiece, unless the latter is achromatic. A list is given of the eyepieces, which are either Ramsden or Kellner, with powers varying from 196 to 1540; about 800 was commonly used. A. C. D. C.

Drugs in Commerce: Their Source, Preparation for the Market, and Description. By J. Humphrey. (Pitman's Common Commodities and Industries.) Pp. xi + 116. (London: Sir Isaac Pitman and Sons, Ltd., n.d.) 3s. net.

MR. HUMPHREY has contrived to include within the moderate compass of 113 pages of text a good account of the drugs of natural origin found in commerce. The information given includes descriptions of the drugs, notes on their constituents and sources of supply, and in most cases some particulars as to their modes of preparation for the market. Great pains have evidently been taken to secure accuracy, but it should have been pointed out that the "henbane" imported from Egypt is not derived from *Hyoscyamus niger*.

The book contains six plates illustrating the more important drugs, e.g. cinchona, ergot, opium, and jaborandi, and six more showing scenes in drug warehouses at the London Docks and methods of packing and selecting the spices, such as nutmeg and cinnamon, used in medicine. The book can be cordially recommended to any one desirous of obtaining general information regarding this interesting and little-known group of commercial products.

Memoirs of the Geological Survey: England and Wales. The Water Supply of Cambridgeshire, Huntingdonshire, and Rutland from Underground Sources. By W. Whitaker. Pp. iv + 157. (Southampton: Ordnance Survey Office; London: E. Stanford, Ltd., 1922.) 7s. net.

THE latest addition to the series on the underground water supplies of England deals with three counties which form a convenient unit. The counties being agricultural rather than industrial or manufacturing, very large water supplies are required in few cases. Supplies are obtained chiefly by means of wells, but some water is obtained from springs, notably the supply of the town of Wisbech, which, however, obtains its water from the county of Norfolk. At least one town of more than 5000 inhabitants seems to have no public supply. Chalk and, to a less extent, lower greensand are the sources of water in these counties. The Oolites and Lias are also of some importance. The value of chalk in this respect in the south-east of England corresponds with that of New Red sandstone in the Midlands. In addition to full details of the wells and springs in the three counties Mr. Whitaker gives some useful indications as regards enlarging and improving existing supplies.