that which is now in general use and which is dignified by its long record of service. To seek something better is a sign of future progress; to discard what we have until it be found and tested would be foolish. In so far as Dr. Buxbaum's criticisms of orthodox taxonomic theory and practice and his suggestions for improvements help in the search, they will be widely welcomed by taxonomists. W. B. Turrill

APPLICATIONS AND PRODUCTION OF QUARTZ CRYSTALS

Quartz Vibrators and their Applications

By Dr. P. Vigoureux and C. F. Booth. (Published for the Department of Scientific and Industrial Research.) Pp. xii+371+64 plates. (London: H.M. Stationery Office, 1950.) 30*s*.

THIS book on "Quartz Vibrators" is based on the 1939 edition of "Quartz Oscillators" by P. Vigoureux, but has been made much more comprehensive by revisions and additions of new material on the methods of selecting quartz and producing quartz resonators. Stimulated by the enormous demands for quartz units for frequency stability and for selective purposes which arose during the Second World War, the production of quartz crystals became an important industry. The present book can be considered as a very complete exposition of British practice.

The first few chapters discuss the physical properties of quartz, the occurrence and examination of quartz crystals and give a short exposition of piezoelectric phenomena in crystals. These equations are next applied in deriving the properties of the longitudinal resonator and the thickness resonator. The equivalent electrical circuit for the crystal is used in discussing the stability of a Pierce-type crystal oscillator. The various types of low-coefficient crystals used in oscillators and filters are discussed. The simplest modes of motion and methods for mounting such crystals are described. An excellent chapter discusses the ageing phenomena in quartz crystals and describes methods for getting rid of gross defects. A fine-scale frequency-ageing phenomenon still remains, and it is this effect which produces an ultimate limitation to the accuracy of quartz crystal clocks. The degree of success in producing stable oscillators is discussed, and a day-to-day stability of 1 part in 10^8 is demonstrated. This is ample except for the most exacting primary standards. The use of crystals is described in producing the very selective filters used in the long-distance carrier and coaxial cable systems. A short chapter discusses the use of quartz crystals in under-water sound equipment and in ultrasonics. The remainder of the book is devoted to a very complete discussion of the various methods of sawing, orienting, lapping, etching, plating and mounting quartz crystals.

Several differences between British and American practices may be noted. A number of methods for determining orientation, such as etch pits and cleavage planes as well as X-rays, have been used in British practice, whereas only X-rays have been used in American practice. This latter method has recently been improved by the use of the double-crystal spectrometer, which improves the accuracy with which an angle can be determined. In the field of under-water sound, synthetic crystals such as ammonium dihydrogen phosphate are largely used in American practice in place of the more expensive and less-available quartz crystals.

The book is a very well-written account of the uses of, and manufacturing processes for, quartz crystals. The theories of filters, oscillators and resonators are well presented. The printing is excellent, and many photographs illustrate the manufacturing processes. The book deserves to be purchased by every user and manufacturer of quartz crystals. W. P. Mason

ANÆSTHETICS

The Mode of Action of Anaesthetics

By T. A. B. Harris. Pp. xii+768. (Edinburgh: E. and S. Livingstone, Ltd., 1951.) 42*s*. net.

THIS book gives a most illuminating account of the mode of action of anæsthetics in man. Dr. T. A. B. Harris has gone to great efforts to give a very accurate and up-to-date account of the way different anæsthetic drugs react when administered to a human being, and has written a brilliant synopsis of the observations which have been made by pharmacologists, physiologists, physicists and biochemists of the mode of action of anæsthetics during the past thirty years.

To undertake a task such as Dr. Harris has done in his book is formidable; yet he has succeeded in giving a clear, concise and intelligent account of the action of anæsthetics in man, while at the same time providing an interesting and stimulating synopsis.

Because of the importance stressed by Dr. Harris of a sound knowledge of the action of anæsthetics, and the body's response to them, his book will be a most valuable contribution to the science and practice of anæsthesia. Only by assimilating all that is known about the pharmacology of a drug can it be given wisely and with maximum safety to the patient, and give favourable operative conditions for the surgeon.

Briefly, the text is divided into four parts. The first deals with the action of narcotics, while in the second a full description is given of inhalation and non-volatile anæsthetics. Part 3 is devoted to the correlation of the level of anæsthetic depression of the nervous system with anæsthetic sleep, loss of sensation and loss of muscle movement and muscle tone, with a special reference to the use of *d*-tubocurarine chloride in clinical anæsthesia. The last section discusses metabolism during anæsthesia and the dominant action and side actions of anæsthetics on individual organs and systems, and closes with a chapter about anæsthetic explosions.

Dr. Harris's book is outstanding; hence it is difficult to choose any one section for special commendation. The whole is full of valuable information, is thoroughly reliable, and forms an up-to-date guide to the administration of anæsthetics. It will certainly arouse and stimulate much interest among anæsthetists, and is an ideal book for reference, having an extensive bibliography of two hundred and seven references. To the student of anæsthesia (and all anæsthetists are life-long students) this book will prove of considerable value, since the information it contains should to a large extent help to nullify mistakes. For candidates who have yet to obtain the diploma of anæsthesia, this work should prove of very great assistance for Part 1 and Part 2 of the examination. H. Roy Blades