Reviews

OPERATIVE SURGERY

Operative Surgery. Under the general editorship of Charles Rob, M.D., M.Chir., F.R.C.S., and Rodney Smith, M.S., F.R.C.S. Volume 4: Part VI—Head and Neck and Clearance of Lymph Nodes (pp. 164); Part VII—Vascular Surgery (pp. 144); Part VIII—Endocrine Glands (pp. 66). Volume 5: Part IX—Orthopaedic Surgery (pp. 366). Volume 6: Part X—Hand (pp. 105); Part XI—Amputations (pp. 71); Part XII—Plastic Surgery (pp. 131); Part XIII—Gynaecology and Obstetrics (pp. 123). (Illustrated. Volumes 4, 5, 6—£5 10s. each volume.) London: Butterworth and Co. (Publishers), Ltd. 1957-8.

The second three volumes of this monumental work follow lines similar to those adopted in the earlier series. Volume 4 deals with operations on the head and neck, the endocrine glands, and the blood vessels. The section on arterial aneurysms has been written by Professor Rob himself; the pictures are clear and the descriptions lucid and concise, but we should imagine that most surgeons would like to watch an experienced master at work before they tried these operations.

Volume 5 is entirely devoted to orthopaedic operations, and 16 different orthopaedic surgeons contribute to this elaborate section. All common and many rarer procedures are described and profusely illustrated. In looking through this volume I could not help wishing from time to time that it had been possible to state what was the average functional result as compared with that obtained by the older and less complicated methods.

Volume 6 contains an extremely important section on the surgery of the hand which well repays study, and another in which amputations are very concisely and efficiently described. The editors had the inestimable assistance of Sir Gordon Gordon-Taylor in the accounts of the forequarter and the hindquarter amputations. The final section on gynaecological and obstetrical operations is particularly well illustrated.

ZACHARY COPE.

MATHEMATICAL EPIDEMIOLOGY

The Mathematical Theory of Epidemics. By Norman T. J. Bailey, M.A. (Pp. 194+viii. 36s.) London: Charles Griffin and Co. Ltd. 1957.

The mathematical theory of epidemics has made great progress in recent years, thanks to the work of such men as M. S. Bartlett, D. G. Kendall, and the writer of this book. Following on a historical sketch of mathematical epidemiology and some discussion of epidemiological principles, the book contains chapters on deterministic theory, the two main kinds of stochastic theory—continuous infection models and chain binomials—the measurement of latent and infectious periods, recurrent epidemics and endemicity, and on the detection of infectiousness. The final chapter sums up the present position of the theory in relation to its application.

The distinction between deterministic and stochastic mathematical models of epidemics is fundamental. In a deterministic model the future state of the epidemic process can be determined precisely, given the initial numbers of susceptibles and infectious individuals, together with the attack, recovery, birth, and death rates. Deterministic theory goes back to the work of Hamer at the beginning of the century, followed by the much more definitely mathematical work of Ross and Soper, and the later collaborative work of Kermack and McKendrick. A stochastic (or probability) model, on the other hand, has a chance element inherent in its structure; from it can be deduced, not the precise state of the epidemic at any future time, but the probability of each of the possible states. With one brilliant exception, stochastic epidemic theory has been developed in the last 10 to 15 years. The exception was McKendrick, who, in a most remarkable but for many years almost unknown paper (1926), anticipated many of the modern developments. Greenwood's chain binomials (1931), which often provide useful models for the distribution of household infections, are also stochastic in character.

Stochastic models have greater generality than deterministic models. In theory, where one of the latter is satisfactory we could always find one of the former which would also be satisfactory; the converse is not true. However, the mathematical difficulties in dealing with stochastic models can be formidable. The author summarizes the position on these lines: Deterministic models are sometimes satisfactory for describing the general character of epidemics which begin in large groups with only small numbers of initial cases. The general prediction of an initial rise and subsequent fall, provided that the initial number of susceptibles exceeds a certain threshold value, is in broad agreement with observation. However, when a deterministic model is used for studying the problem of recurrent epidemics in large communities it is found that the waves predicted are subject to a heavy damping which does not occur in practice. The corresponding stochastic models are free from this defect. Further, they predict the phenomenon of fade-out of infection in communities below a certain critical size, which is actually found to occur in practice. Although judiciously chosen models may give considerable insight into large-scale phenomena, we may be unable to achieve anything sufficiently precise to justify statistical tests of goodness of fit.

In handling epidemic processes in small groups, especially those of household or classroom size, probability treatment is essential. . . . Where the study of small groups is concerned, much more work is required in the development of various models for a wide range of diseases. Thus chain binomials and the modification with latent and infectious periods have been investigated largely in the context of measles, for which reliable data are relatively more abundant than for other infections. It is suspected that a continuous infection model would be more appropriate for diphtheria and scarlet fever, for example, but no exact tests have been made.

The author thinks that it is undesirable that biometrical investigation of the type envisaged should continue along largely mathematical lines for any length of time without adequate checking from observational data. The success already achieved with measles suggests that it would be eminently worth while making special efforts to this end with household data for a wide variety of diseases. He has some useful remarks to make on means for attaining this end.

J. O. IRWIN.

HAEMOLYTIC DISEASE OF NEWBORN

Comparative Aspects of Haemolytic Disease of the Newborn. By G. Fulton Roberts, M.A., M.D. (Pp. 199+xi. 17s. 6d.) London: William Heinemann Medical Books Ltd. 1957.

Haemolytic disease of the newborn has been recognized in man since the middle of the seventeenth century, while severe jaundice of the newborn foal was first described in 1774. Haemolytic disease in the pig has been noted only during the last ten years, and in this animal it has been produced experimentally as well as observed clinically. Much experimental work on hetero- and iso-immunization in other animals, such as the guinea-pig, rat, dog, rabbit, and mouse, has been described. Dr. Roberts, in a book which will appeal to practitioners of human and veterinary medicine alike, has collected this information together to compare the different clinical and serological manifestations of a condition in which great advances have been made in the last two decades. It is clear that the blood groups in animals are not nearly so well worked out as those in man, and this gap in our knowledge has perhaps hindered the experimental study of haemolytic disease of the newborn. The way in which maternal antibodies gain access to the foetal antigens in the different species is closely considered, and there is a wealth of odd and interesting facts, such as