Biomathematics. The Principles of Mathematics for Students of Biological and General Science. Vol. 2. Numerical Methods, Matrices, Probability, Statistics. By Cedric A. B. Smith. (Pp. x+682; illustrated + tables. 138s.) London: Charles Griffin. 1969.

This is an enlargement, and separated into a second volume, in the fourth edition of *Biomathematics* which first appeared under the authorship of Dr. W. M. Feldman in 1923. Since then statistical theory has developed apace and the enlargement was inevitable. Professor Smith is a good teacher and this volume is excellent, but why do we have this pretence that statistical theory is different as applied to biology from statistical theory applied to engineering, or traffic, or chemistry, or metallurgy etc. It is not. The materials to which it is applied are different and a statistician entering any new field must gain experience with those materials, but the task of ordering undifferentiated data is essentially the same, and the multifactorial situations that require to be resolved are *in essence* the same mathematically. In a world of overspecialization one resents unnecessary specialization. However, the book is here and one must count one's blessings.

We start by solving equations, in fairly easy stages, and on the way we are taught something about factorials, indices, numerical differentiation and integration, successive approximation, and determinants. This leads naturally to a well-written and thorough chapter on matrices. The next chapter deals with probability. There are many statistical textbooks on the market; they all have a chapter on probability; since the subject in formal treatment is nearly 200 years old, it is not possible for these chapters to differ widely. This particular chapter is better than some. It reads well and is laced with good examples. By contrast the chapter on distributions gives the impression of being a little rambling; it dodges about from theoretical to observational distributions and runs into multivariate distributions without pausing for breath.

So we come to the two most important and best written of all the chapters, those on statistical inference and on the planning and analysis of experiments. Professor Smith deals fairly with the differences of philosophy that exist in the field of probability and adopts a very practical approach throughout especially when dealing with the concept of significance. In the chapter on experimental design the section on uncontrolled observational data will be of great practical help to many 'observers'.

If you have not had enough at the end of all this you can read 'Colson notation—arithmetic made easy'. Amusing but not important.

The presentation is excellent and the mathematical printing is easy to read. The price is formidable especially in a competitive market.

B. BENJAMIN

Biological Aspects of Cancer and Ageing. Studies in Pure Line Mice. (Modern Trends in Physio-

logical Sciences, Vol. 31.) By Leonell C. Strong. (Pp. xv+221; 112 charts. 75s.) Oxford: Pergamon Press. 1968.

How easy it is, when one is accustomed to use an expression in a particular, narrow sense, to come to believe that this is the whole of its meaning. This book is entitled correctly, but is not concerned with the physical and chemical changes in the organism related to senescence and their relevance to the genesis and progression of cancer in that organism. It is an account by Dr. Strong of much of his work concerned with cancer and ageing in its general sense, whether this be the effect of maternal age, the ageing of a line derived from a hybrid cross as it is inbred, or, even, the efficacy as therapeutic agents of extracts from the livers of young and old mice.

The main topics discussed are the effects of maternal age and degree of homozygosity upon longevity and tumour incidence, the effects of selection upon the biological effects of carcinogens, studies on the pleomorphic gene LST and its allele 1st, and the effects of various extracts of liver upon naturally-occurring tumours.

Unfortunately, this book is difficult to read. Of its seven chapters, four are reports of lectures, one is based upon a lecture, and only two are new writing. This leads to repetition, to the use of inappropriate statements (one is repeatedly told, for example, that the author does not have the time to discuss something), and to the use of some illustrations which are acceptable only if the author is present to explain them. The author's prose style, with its idiosyncratic use of words and lack of clarity, adds to the difficulty: it is a pity that the editorial opportunity to present a clear and concise account of this important work has been missed.

The experienced investigator, prepared to take both time and trouble, will find much of interest in this book: it is not recommended to beginners.

D. C. ROBERTS

Der gerechtfertigte Haeckel. Einblicke in seine Schriften aus Anlass des Erscheinens seines Hauptwerkes 'Generelle Morphologie der Organismen' vor 100 Jahren. Compiled by Gerhard Heberer. (Pp. ix+588. DM.78.) Stuttgart: Gustav Fischer. 1968.

In 1859 Darwin and Wallace startled the world with the concept of 'The Origin of Species by means of Natural Selection'. Over one hundred years later it is difficult to realize that these ideas would have been swamped by the vast opposition they aroused, were it not for the detailed corroborative work done by the great biologists and geologists who were fired by Darwinism. One of the greatest of these was Ernst Haeckel whose major works '*Generelle Morphologie der Organismen*' and '*Natürliche Schöpfungsgeschichte*' appeared during 1866-1868. The present volume commemorates their centenary. It contains a brief autobiographical sketch, with a postscript by Heinrich Schmidt; Haeckel's collected bibliography (by Thilo Krumbach); and a eulogy by Wilhelm Bölsche. Selections from Haeckel's various lectures and writing take up about 450 pages and the book