

profitably have been expanded further is that on dental variation. In particular, incisor shovelling and molar taurodonty would have been worthwhile additional markers. Following the main text in this work is a series of 149 tables giving a detailed enumeration of the data discussed in the analysis. In these days of ever rising printing costs, it is good that such data can still be given so fully, even though their publication depended on a special research grant for the purpose. Finally, the references provide a useful and up to date review of the present literature on the skeleton of the southern African Negro.

DON BROTHWELL

BEAUTIFUL INTERFEROGRAMS

Microstructures of Surfaces using Interferometry

By S. Tolansky. Pp. 65 (49 plates). (Arnold: London, July 1968.) 40s.

PROFESSOR TOLANSKY developed the basic techniques of multiple beam interferometry in the early 1940s and since then he and his students have used the method in a variety of problems in applied science. This book is by way of being an atlas of multiple beam interferograms. There is a brief section on techniques, but the main chapters consist of collections of beautiful interferograms and microphotographs with linking text; these are as follows.

Polished diamond and cleaved mica: this chapter shows the effect of prolonged polishing on diamond. Natural diamond: the pictures show the trigons, or triangular pits, similar pits produced by etching, and heavier patterns produced by prolonged etching. Quartz crystals: striations on natural faces are revealed and the elegant technique for showing vibration modes is illustrated by several interferograms of piezo-electrically excited crystals. Silicon carbide: this substance shows beautiful growth spirals. Hardness testing: Brinell and similar tests can be evaluated interferometrically. Impact at high speed: this chapter shows effects of rain drops impacting on 'Perspex' and duralumin at high speed. The final chapter shows fringe patterns from several surfaces of varied properties, for example, machined metals, fire-polished glass, gloss paint and the skin of a tomato, which last shows almost regular hillocks five or six fringes high. There are no examples of equal chromatic order.

This book is an excellent compendium showing the great power of this simple technique; with intelligent use it can supplement conventional microscopical techniques to reveal an entirely new range of detail in the surfaces of solids. The book is very well produced, with beautiful half-tones of the interferograms, and it can be recommended without reserve to all who are interested in surface structures.

W. T. WELFORD

BACTERIAL GROWTH

Biochemistry of Bacterial Growth

Edited by Joel Mandelstam and K. McQuillen. Pp. x+540. (Blackwell (Scientific): Oxford and Edinburgh, 1968.) 84s.

BACTERIAL growth is the increase in substance resulting from the formation of new organic material in the cell, and results in its eventual replication. The growth of bacterial populations is therefore included in this book although the book is largely concerned with the control of the reactions leading to the synthesis of macromolecules. Detailed consideration is given to the degradation of foodstuffs (Class 1 reactions), to the biosynthesis of basic small molecules (Class 2), to the synthesis of macromolecules (Class 3) and their organization into the cell structures. There are valuable chapters on genetics and on the coordination and regulation of metabolism to give

maximum yield in minimum time in different environmental conditions.

Although there are eleven contributors, the chapters in the second part are much more than a symposium, because they are closely correlated with a clear outline scheme giving a fairly detailed bacterial model of cell growth in the corresponding sections of the first part. This provides an elementary course for students (and lecturers) which should prevent them getting lost in the details of part 2. The editors say this is a book for beginners. It is a very clear account, but the second part forms an advanced course which together with the bibliography should be of great use to research students and lecturers as well as BSc students in microbiology, biochemistry or cell biology. The cross-references, the carefully constructed figures and apt illustrations show this to be the work of a team with an exciting story of modern advances to tell.

The newer experimental methods used are described sufficiently to enable the reader to understand the nature of the evidence on which the present conception of the cell rests. Although much of the work has involved the study of *E. coli*, other organisms are referred to when relevant. The multiplicity of bacterial taxa and the use of biochemical properties for characterization are dealt with in an appendix on classification. Another appendix on classes of enzymes is usefully referred to in the text.

I have few criticisms. It is unfortunate that lack of any consideration of the statistical distribution of individual cell generation times has led to the confusion of the mean generation time of a population with its doubling time. The two are rarely the same.

This book is strongly recommended.

K. E. COOPER

ACCELERATING BOOK

Particle Acceleration

By J. Rosenblatt. (Methuen's Monographs on Physical Subjects.) Pp. viii+183. (Methuen: London, 1968.) 35s.

RIGHT at the start I will say that I found this an interesting and useful book. It begins with two introductory chapters which are rather dull; one can even find minor errors in the nuclear physics described in the first chapter, while the account of elementary mechanics and electromagnetism in the second chapter assumes much less background in the reader than does the rest of the book. When the author really gets into his subject, however, from the third chapter onwards, the book improves considerably, giving a good account of the basic principles of the whole spectrum of particle accelerators. The discussion provides valuable insight into the practical problems that limit energies and beam intensities: technological problems such as magnetic fields (limited, in practice, by saturation of iron) or accelerating voltages (either dc or rf, limited by breakdown) and the economic problem of cost. These problems of technology and economics are interlinked: the switch to a different type of accelerator as energy increases is usually forced by cost, while a new idea, such as alternating gradient focusing, can make greater energy or beam intensity available for a given sum of money. In this context note that technical feasibility includes reliability: an unreliable accelerator is a very expensive device in terms of what one gets out of it for the money spent. All these points are becoming of particular importance nowadays when the need for higher energies and intensities to extend the study of elementary particle physics is colliding with the maximum cost our paymasters can consider.

In a short book like this the subject cannot be carried to the depth required by an accelerator specialist. The author's expressed aim, however, is not to do this but to provide an introduction, and in this I think he succeeds.