

of different kinds, with discussion of their advantages and limitations for particular purposes. Each chapter is written from extensive practical experience, and gives details not only of how to grow these cells but also, where necessary, of how to stain them and how to make the special tools for handling them, such as those required for microsurgery. Cells suitable for synchronous culture include *Chlorella*, *Acetabularia*, *Euglena*, *Tetrahymena*, and mitotic synchrony can be induced in *Physarum polycephalum* by coalescence of the microplasmidia. Cells suitable for microsurgery of various kinds are *Stentor*, *Amoeba* and *Euplotes*, and grasshopper neuroblasts. A separate chapter is devoted to methods for studying pinocytosis, especially in amoebae.

There are also five useful chapters on autoradiography which alone would make this volume worth purchasing. These also are full of practical details for obtaining the best results in quantitative autoradiography, high-resolution autoradiography, and autoradiography of water-soluble materials and of mammalian chromosomes. A most valuable feature is the discussion of the theoretical and the practical limitations of the techniques advocated. Finally—and appropriately—J. E. Edström contributes a chapter on micro-extraction and micro-electrophoresis for determining and analysing nucleic acids in isolated cells which makes even this *tour de force* seem possible for other mortals. The editor, D. M. Prescott, is to be congratulated on the production of a thoroughly useful volume.

J. H. HUMPHREY

SURGERY AND SCIENCE

The Surgeon's Craft

By Prof. Hedley Atkins. Pp. x+201. (Manchester: Manchester University Press, 1965.) 15s. net.

THIS readable little book traces the development of the surgeon's craft from prehistoric times to the present day and is presented in a form readily understandable by the non-medical reader. It should therefore appeal to scientists engaged in the physical, chemical and biological sciences on which surgery has so extensively drawn to make many of the achievements described possible. Here in short compass is recorded how surgeons operate on the heart and other vital organs with impunity; that these achievements are of comparatively recent origin is shown by the startling statement that well into the nineteenth century surgery was "bloody, brutal and dangerous"! Asepsis and anaesthesia were soon to alter that fearsome state of affairs. The distinction which the author draws between the surgeon and his more intellectually inclined physician colleague is probably fair, but he makes it clear that, especially in university departments of surgery and in the Royal Colleges, more and more younger men are undertaking basic research, both biochemical and biological, and thus bridging the gap between the laboratory and the wards and operating theatre.

The thorough, exacting and protracted training of the surgeon, and what kind of man he is, are described. This should give the non-medical scientist the chance of comparing this with his own training and attributes. Culmination for the surgeon is reached on appointment to a consultant post, usually in his late thirties, and no doubt the question as to why the surgical training takes so long will be asked. The answer would seem to be the immense responsibility in dealing with human patients, and this is reflected in the financial awards which will be of great interest to other scientists.

The author sees a glowing future for surgery, despite the ultimate object of surgery being the abolition of surgery. By the combined attack of many scientific disciplines it is to be hoped that a disease such as cancer will one day be conquered and so make the mutilating operations needed for its complete extirpation a thing of

the past. Truly then would the ultimate object of surgery be achieved. It is interesting to speculate what would be the effect on the surgeon's craft of the elimination of cancer, rheumatoid arthritis and cardiac and renal diseases. The solution of the homograft problem in transplantation would undoubtedly bring other outstanding problems into the surgical arena, and future advances must of necessity bring a profound change of outlook and approach for the surgeon.

Thus although *The Surgeon's Craft* still presents surgery in the main as a 'craft', the reliance of modern surgery on many scientific disciplines is obvious and should be a pointer to the training and occupation of the surgeon of the future. Prof. Atkins skilfully blends the clinical aspects of surgery with its scientific foundations. The proceeds of the sale of this book have been generously donated for the preservation of Down House as a memorial to Charles Darwin, from whom modern surgery drew much inspiration.

N. W. NISBET

PRINCIPLES APPLIED

Genetical Principles and Plant Breeding

By Prof. Watkin Williams. (Botanical Monographs, Vol. 5.) Pp. x+504. (Oxford: Blackwell Scientific Publications, 1964.) 70s.

THE title of this book suggests a similarity of content with several others written on the theme of plant breeding in recent years, but it differs from them in at least two important respects. First, it is directed towards a student audience, principally to those who are studying in the general sphere of agriculture, and secondly, it consistently relates the pure and applied aspects of genetics without burdening the text with either crop botany or the intricacies of the routine methods of crop improvement. It is tailor-made for course requirements and aims to provide an understanding of the genetical principles governing the lives of flowering plants, and of the methods which lead to their improvement.

The first five chapters deal with such basic considerations as the genetic components, the organization of the genes, the chromosome complement, mutation, and the role of the cytoplasm in heredity. Basic Mendelism and descriptions of mitosis and meiosis are not included as a knowledge of these is presumed. Genetic systems governing sex determination and breeding behaviour occupy three chapters with especial emphasis given to incompatibility systems. The following two chapters are concerned with plant populations, their adaptation to their environment, and the influence of selection. The genetic basis of disease resistance forms the subject of the penultimate chapter and, finally, there is a description of special techniques such as chromosome substitution and addition, the utilization of haploids and the production of polyploids. The text is liberally supplied with line drawings, tables and photographs and the bibliography is adequate.

Genetical Principles and Plant Breeding is attractively written with a degree of lucidity which will make it popular with many. It covers the broad subject adequately and with the authority which we may expect from Prof. Williams's wide experience of practical plant breeding and genetics. It is refreshing to see attention directed to chimeras and plastid mutation though equally it is disappointing that *Xenia* receives no mention.

Although this book seems remarkably free from factual errors, like others which have gone before, it perpetuates a few fallacies which are now in danger of becoming regarded as facts. For example, emphasis is placed on the incomplete meiotic pairing of autopolyploids with its detrimental effect on fertility, and the relative natural rarity of such plants is attributed to these causes. What is here overlooked is the complete pairing and high fertility of many autopolyploids and the ready response to selection, either natural or artificial, of those which are irregu-