are correspondingly discouraged. The books are well printed, but the point of the illustrations is often lost by the absence of any information of scale. In the texts there is a surprising reticence over the names of the scientists concerned in the work described, unless they be dead.

The books are intended for a freshman reading biology for the first time, and presumably such a student will have no prejudices as to how biology should be presented, provided that it is interesting and stimulating. These texts are interesting and, although there will be complaints that the organisms themselves have been lost in generalities, the authors do not discourage biological novices with overwhelming masses of detailed unrelated facts, as has so often happened in past elementary biology books. However, students may from time to time feel that they would have liked an explanation of the experimental problems involved in obtaining the facts described—a particularly important point for those familiar with the techniques of physical sciences but unfamiliar with the rather different technical problems of a biologist. Much of the interest and use of these books in Britain, particularly that of Telfer and Kennedy, will be for those of our school science sixth-forms and universities where attempts are being made to replace the traditional presentation of biological (and for that matter medical) curricula. In the design of such courses, these books should be carefully examined.

B. B. Boycott
A. Curtis

CAPTIVE ANIMALS

Animals in Captivity

By Philip Street. Pp. 231 + 24 photographs. (London: Faber and Faber, Ltd., 1965.) 25*s*. net.

KEEPING wild animals in captivity is an ancient art and it flourished in several long-lost civilizations. *Animals in Captivity* is concerned with its history in modern Europe, and primarily in Britain. The only continental zoo treated in any detail is Hamburg, where the Hagenbecks added immensely to practical knowledge about the keeping of captive animals, especially the larger species. The founder of the family can rightly be regarded as the father of modern zoos and circuses, and if more of his ideas had been adopted much better progress in this field would have been made.

Nearly a century ago, Hagenbeck saw the need and possibility of acclimatization. For monkeys he advocated a cage temperature of around 60° F, with flaps giving access to fresh air; they used them, even with the thermometer below zero. A few pages later Mr. Street quotes from the Centenary History of the Zoological Society of London. One of the big problems awaiting Chalmers Mitchell in 1903, when he began his long and successful tenure, was that keepers insisted that all tropical animals be kept warm, even if it meant sealing all windows. This attitude is still widely persistent.

Whipsnade is rightly portrayed as a trend-setter of great importance, but its original purpose—the provision of a rest centre for London animals—has been superseded by more useful objectives. A forcible change of scene upsets wild animals more than it helps them. Many aspects of the subject are dealt with adequately, but the book disappoints in its major omissions, and it could almost have been written 10 or 20 years ago. The bird chapter makes no mention of 'walk-through' flight aviaries. The names of Hediger and Grzimek cannot be found, but their contributions have been of incalculable value. The former's work on the psychology of animals in zoos is fundamental, while Grzimek has rebuilt the bombed Frankfurt Zoo into one of the world's outstanding collections, with a fresh approach to many housing problems.

Under the heading of health and food the work at the Philadelphia Zoo finds no place, yet the balanced diets devised in the laboratory there have given a completely new shape to longevity and breeding statistics wherever the system has been adopted. These and other recent developments could well have replaced long passages on minor matters. The illustrations, mostly by the author, are excellent, and there is an index, but no bibliography.

George Cansdale

A FOUNDATION STONE OF PHYCOLOGY

The Structure and Reproduction of the Algae

By F. E. Fritsch. Vol. 1: Pp. xvii + 791. Vol. 2: Pp. xiv + 939. (London: Cambridge University Press, 1965.) 90*s*. net per volume.

IN the twenty years which have elapsed since the publication of the second volume of *The Structure and Reproduction of the Algae*, the study of these plants—phycology as it is now fashionable to call it—has undergone profounder change and greater expansion than it did in the forty years which separated the completion of Fritsch's work from that of its forerunner, Oltmann's *Morphologie und Biologie der Algen*. Chemical investigation and the electron microscope have revealed in their different ways an underlying unity of basic structure and fantastic diversity of detail which in 1945 could be only dimly suspected. Algae, some species of which have for a long time been used as convenient experimental material for investigation of some of the classical problems of plant physiology, now engage the attention of the physiologist and biochemist in a more general way, and a large body of publications has appeared showing that their functioning and metabolism have intrinsic interest as great as that of any group of organisms. Phytoplankton still remains the form of plant life receiving least attention from the botanist, but whole new classes of plankton algae have been defined and important advances have been made in understanding their ecology, much of this depending on culture techniques, the use of which Fritsch himself did so much to encourage. Side by side with these developments, which are largely new since 1945, description of species and elucidation of life-cycles by classical method have been progressing steadily.

Nevertheless, Fritsch's two volumes continue to figure in the reference lists of research papers, ecological and physiological as well as morphological; they are constantly brought out in the practical class as the final arbiter on most points relating to algae; and there is no doubt that this present reprinting is both welcome and justified. Partly this is because the foundations of phycology have always been to a remarkable extent broadly based and have stood the test of time. From the beginning, almost, biochemical characteristics have ranked equally with morphological features in algal taxonomy. Phycology has been fortunate in having had many distinguished exponents who, like Fritsch, remembered the ecology and physiology of the organisms they investigated and encouraged others to investigate these, even though their own primary interest was in other aspects.

In addition to wideness and balance of outlook, Fritsch's writing displays meticulous scholarship. Misprints presumably must occur in a work of this length, but I cannot recollect having found one, or any misquotation of fact or reference.

The Structure and Reproduction of the Algae is undoubtedly out of date in detail, and in particular the physiology which it includes has an old-fashioned look, but an account so soundly constructed will certainly continue to serve as a basic text for a long time. Unfortunately, another Fritsch would be required to revise it adequately.

G. E. Fogg