same as an "ecosystem", and although Sukachev on pages 13–16 tries to explain the difference, it is not at all clear. In fact, it is only the narrow meaning which most continental biologists give to "ecology" (the study of the home, interpreted as the house without any occupants) which justifies the use of the clumsier word "biogeocoenology".

The authors, in their preface, stress the "newness" of their approach, but behind fancy words (for example, the adjective "biogeocoenotic" which is freely strewn around) English and American biologists will find what they have long been accustomed to—namely, the study of members of populations in relation to each other and to their environment. Moreover, the broader aspects of Sukachevian doctrine seem to have much in common with Clementsian doctrine; both are based on philosophical deductions as to what *ought* to be, rather than inductive generalizations as to what *is*. Just as Clements gave a very special meaning to "succession", so Sukachev gives a closely similar special meaning to "development" (page 539), but whereas Clements's philosophy made him postulate that ultimately in climax communities a dynamic equilibrium would be attained, Soviet philosophy makes Sukachev postulate that conflicting forces within the system lead to continual "development". The concept of a climax is not unequivocally rejected, however (page 524). In saying that biogeocoenoses are "self-regulating systems", Sukachev seems to mean much the same as Clements meant when he said that biotic communities were "organisms". Moreover, in demanding that there shall be homogeneity throughout a "type of forest biogeocoenose" (the lowest classificatory unit) in "composition of tree species, in other layers of vegetation, and in fauna; in the complex of forest growing conditions . . .; in inter-relationships between plants and environment, in regeneration processes, and in trends of succession" (page 503), Dylis is showing the same unpractical idealism that has always bedevilled continental plant sociologists.

The book has many weaknesses in details. It contains little critical synthesis and too much quotation of empirically observed relationships, many obscure or parochial statements and many platitudes; one is indeed tempted to say that the "fundamentals" tend to be obscured by superficial detail. Many tables and diagrams are inadequately annotated—for example, units of measurement are sometimes not given fully. That the Russian text is far from perfect is obvious from the translator's notes, one of which says that several lines appear to be missing. There are also many misspellings of scientific names, most of which have been copied from the Russian text, and a few in the Russian which have been corrected in translation. The translation seems to be accurate, but rather too literal for easy reading; it has, however, slipped once or twice on technical terms, and more often on vernacular names of plants; presumably "Goutwort" should be "Goutweed", but what are "white birch", "Khirgiz birch", and "English oak"? Names of a few western authors have returned to the west in unfamiliar forms—particularly W. R. Ashby, who appears as U. R. Eshbi.

The book covers a very wide range of subjects and gives very many references to Russian ecological work by no means confined to forestry; the bibliography cites well over a thousand Russian publications (but only about half this number of non-Russian publications). It touches on many relatively recent developments in ecology—for example, growth inhibitors in litter and in root excretions, the biology of insect epidemics. It contains many examples of figures from Russian work of measurements of biomass, leaf area, numbers of micro-organisms in the soil, and so on.

The book will be useful to a specialist who can read it critically with the aid of considerable background knowledge and perspicuity; it will enable such a person to supplement his knowledge and gain some insight into the work and outlook of his Russian colleagues; it cannot be recommended for the inexperienced student.

E. W. JONES

BACTERIA WITHOUT WALLS

Microbial Protoplasts, Spheroplasts and L-Forms

Edited by Lucien B. Guze. Pp. xx + 523. (Williams and Wilkins: Baltimore, Md., 1968. Distributed in the UK by E. and S. Livingstone.) 227*s*. 6*d*.

THE cell wall is so prominent a structure in the majority of bacteria that the widespread occurrence of species entirely lacking a wall has inevitably aroused great interest since 1935 when Dr Emmy Kleineberger-Nobel named them "L-forms" after the Lister Institute where she worked. Not only could these organisms multiply in artificial culture but many were soon implicated as potential causes of disease in man and animals. Work in the field further increased in the last decade after it was found that normal bacteria could be largely freed of their walls, although remaining viable, by a variety of agents like penicillin, which interfered with wall synthesis, or various murolytic enzymes such as lysozyme. Complete removal of the wall produces a "protoplast" but, if traces of wall remain, the organism is termed a "spheroplast": in some cases, wall formation resumes when the inducing agent is withdrawn although, in others, protoplasts remain wall-free like stable L-forms.

A considerable literature has therefore grown up about these organisms and the present volume provides a valuable survey of the field by reproducing forty-six papers delivered at a conference sponsored by the Upjohn Co. in November 1966. The first section discusses cell wall anatomy and the production of spheroplasts by penicillin and enzymes derived from leucocytes and phage lysates. The next section is concerned with morphology and function, including two papers on the topical question of the role of mesosomes in chromosomal replication and membrane synthesis; the third section covers a miscellany of topics like cultivation, antigenic properties, susceptibility to antibiotics and the identification of L-forms; while the last section includes fourteen papers on pathogenicity under experimental and natural conditions, including the importance of L-forms in bringing about relapse after the chemotherapy of infections. These papers therefore cover the whole range of microbiology, from genetics and physiology to problems of clinical medicine, and their joint publication with an index and a record of the discussions held at the meeting will be widely appreciated.

G. G. MEYNELL

GREEN PLANTS

The Diversity of Green Plants

By Peter R. Bell and Christopher L. F. Woodcock. Pp. ix + 374. (Arnold: London, 1968.) 80*s*. boards; 40*s*. paper.

IT is still considered desirable for undergraduate students of botany to know something about the plant kingdom. But the days are past when they could pursue what seems now to be a leisurely course through the various groups of plants. It is a mark of the high rate of evolution of the subject that most teachers of botany remember those days, but do not wish for a recapitulation.

Professor Bell and Dr Woodcock have written a textbook that takes these facts into account. In 350 pages we have some account of the green plants from the algae to the angiosperms, that is, all the groups of plants except the fungi. It deals with structure and reproduction, development and theories of evolution of each group in turn. The authors say they have avoided a disconnected treatment of types, but, in fact, the book is, for the most part, written around a series of types and may be none the worse for that. The primary classification adopted is into Cyanophyta, Chlorophyta, Chrysophyta, Pyrrophyta, Cryptophyta, Euglenophyta, Phaeophyta, Rhodophyta, Bryophyta and Tracheophyta. The algal groups