

The Chlorophylls under the editorship of Dr. L. P. Vernon and Dr. G. R. Seely. It is somewhat invidious to single out individual chapters. H. H. Strain and W. A. Svec have reviewed the methods used in preparation, estimation and isolation of the chlorophylls, a field to which they themselves have made important contributions. Apart, perhaps, from avoidable repetition they give a critical and helpful account of the methods available, and in particular emphasize the difficulties, which have not all been completely resolved.

Holt gives a valuable account of recently discovered chlorophylls, and he deals in particular with the chemistry of chlorobium chlorophylls 650 and 660. This chapter, however, might have been improved by quoting findings and interpretations which are at variance with Dr. Holt's own work. The biosynthesis of these compounds raises a number of interesting questions which have not yet been adequately answered. The chemical synthesis of chlorophyll *a* is discussed by Dr. Lwowski; the contrast between the approach of Fischer and that of Woodward is an interesting demonstration of on the one hand supreme competence based on the classical organic chemistry of the German school, and on the other of the magnificent achievement which rests largely on the use of modern concepts to predict the reactivity of certain groups in complex molecules. Katz, Dougherty and Boucher give a valuable account of the use of infra-red and nuclear magnetic resonance spectroscopy in chlorophyll chemistry.

The state of chlorophyll in plants or micro-organisms is not yet completely understood. The nature of the linkage between chlorophyll and its associated protein is still somewhat uncertain and so are the chemical or structural factors which endow certain chlorophyll molecules with special reactivity. Our knowledge in this field and the uncertainties are clearly indicated in the chapters dealing with the optical properties of chlorophylls and chloroplast structure, and the description of the photosynthetic apparatus in micro-organisms.

Protochlorophyll is ably discussed by N. K. Boardman and the biosynthesis of the chlorophylls is reviewed by L. Borograd, both of whom give a fairly complete and up to date account of their respective topics. In some ways, however, the most interesting chapters are those written by Seely and by Vernon and Bacon Ke. There is a certain amount of overlap between these two chapters and there is also unavoidably a certain bias in the treatment of what are still regarded as controversial subjects. The reader cannot but be impressed, however, with the sophistication of the techniques used and the difficulties inherent in obtaining information about events which of necessity proceed extremely rapidly. Both these chapters give a useful, informative and helpful account of results obtained, and also of problems presented by the interpretation of the results. Altogether, the book will be most valuable to the many scientists interested in botany, microbiology, biochemistry and also to those engaged in research on chlorophyll.

A. NEUBERGER

MORE ABOUT SPORES

Spores

Their Dormancy and Germination. By Alfred S. Sussman and Harlyn O. Halvorson. Pp. xi+354. (New York and London: Harper and Row, Publishers, Inc., 1966.) \$14; 112s.

In this book two American workers, one a bacteriologist who has been concerned with the physiology of bacterial spores, and the other a mycologist who has concentrated on the behaviour of *Neurospora* ascospores, attempt to "highlight the common denominators in biological dormancy". They extend their treatment to germination.

A brief account of the structure of dormant spores is followed by a consideration of their powers of survival.

The American interest in space leads to a review of the possibility of spores remaining viable there, and the panspermia idea of Arrhenius is given a new airing. The structural changes involved in germination and its kinetics are discussed. Two chapters deal with the environmental influences on germination and the ways in which the process may be "triggered". There is a useful discussion of the physiological and biochemical changes during germination. The controlled synchronous development of biochemical activity in a population of germinating spores offers a beautiful system for the analysis of awakening metabolism. This is a matter of present day interest in a number of laboratories in various parts of the world.

In attempting to bring together information on bacterial and fungal spores, the authors are doing a service to microbiology. It is, however, clear that they have found it difficult to compose an opera with two stars, bacterium and fungus. Rarely do these appear on the stage together; there are few duets.

The book is well produced and is a credit to the publishers, but there are numerous misprints and slips—for example, I noted nine wrongly spelt generic names. Again in relation to mucoraceous moulds reference is made at times to zygosporae where sporangiosporae are meant, and in *Phycomyces* there is a mention of conidiosporae, which do not exist in that genus. In spite of these minor blemishes, however, the book is a useful and valuable one.

C. T. INGOLD

SYMPOSIUM ON DRUGS

CNS Drugs

(A Symposium held at the Regional Research Laboratory, Hyderabad, India, January 24–30, 1966.) Pp. xv+367. (New Delhi: Council of Scientific and Industrial Research, 1966.) Rs. 33.00; 66s.; \$10.

THIS publication is a compilation of the thirty-two papers presented at the meetings held in Hyderabad. Approximately half the contributions are from Indian scientists, and the others are from European or North American scientists. As the editorial committee points out in the preface, research in the field of CNS drugs has grown impressively in recent years, and has been from the outset obviously multidisciplinary. This makes it very difficult to achieve a nice balance between the various aspects of research in a meeting such as this; unhappily, the present publication fails to achieve this balance. Almost half the contributions describe structure-activity relations in various classes of centrally active drugs, both old and new (including Rauwolfia alkaloids; diazacycloalkanes; 1,4-benzodiazepines; azetidiones; 6,7-benzomorphans; 6-aminoquinazolinones; 2-alkyl-3-aralkyl-4(3H)quinazolinones; 4 substituted 2,3-polymethylenequinolines; *N*-aralkyl anthranilates; tropanes; *N*- β -phenylpropionamides and substituted diaminopyridines). These articles undoubtedly provide much valuable information to those interested in these groups of drugs. The emphasis on structure activity relations, however, inevitably means that the remaining papers are stretched too thinly over a very wide field. Half a dozen articles describe the neuropharmacology of new compounds or of substances extracted from natural products (the latter not to be scorned in a country from whose herbal medicines one of the first important tranquillizers, reserpine, was "rediscovered" only fifteen years ago). The topics of addiction, neuroendocrine relationships, sites of drug action in the CNS, and drug access to the CNS are covered well, but of necessity too briefly to be of lasting value. A lamentably small number of articles is devoted to biochemical aspects of drug action.

The symposium was published with reasonable expedition, although the quality of some of the illustrations is