

scopy, and on optical rotatory dispersion. This is a most valuable compilation of information on these relatively new and less well-known techniques.

Next follows a section on photosynthesis, concerned mainly with ferredoxin. The papers fall into two groups, dealing with electron transfer and synthetic reactions respectively. Reviews of soluble protein factors in chloroplast electron transport, and of a ferredoxin in photosynthesis, summarize the development of present knowledge, and are followed by several papers on synthetic pathways involving ferredoxin, one on a proposed model of ferredoxin, and one on the kinetics of ferredoxin reduction.

Section 3 deals with nitrogen fixation. Although one can see the connexion with non-haem iron proteins in general, and with ferredoxin in particular, one cannot help feeling that this section was largely off the main line of interest of the symposium. Equally this difficult field still seems to lack sufficient information of a kind to stimulate the attention of the non-specialist reader. The papers report various experiments on aspects of nitrogen fixation, with little interrelationship between them.

The final section deals with a number of dehydrogenases, mostly from cell particles. Again, these are related only by that and the general theme of the section.

There is no record of discussion or comment, and the papers are apparently reproduced essentially as they were presented at the symposium. The remarks of the section chairmen are introductory, and not a summing up of the material presented. One has to rely on reading the individual papers to get an evaluation of the present status of each problem, and one is denied access to any record of the argument and discussion which are often among the most valuable results of such meetings.

The book itself is well produced and seems remarkably free of printing errors. In general there is little that one would wish to comment on so far as the content is concerned. The papers are largely concerned with experimental work, of which this is essentially a progress report, and which should be read in that light. The presentation might have been better, but nevertheless the book provides a much-needed summary of present work on iron proteins, particularly the ferredoxins, and is recommended to all workers interested in the role of iron in biological systems.

M. H. SMITH

## VIRUSES, MYCOPLASMAS AND LEUKAEMIA

**Methodological Approaches to the Study of Leukemias**  
 Edited by Vittorio Defendi. (A Symposium held at The Wistar Institute of Anatomy and Biology, April 5 and 6, 1965. Symposium Monograph, No. 4.) Pp. ix + 225. (Philadelphia: The Wistar Institute Press, 1965.) 7.50 dollars.

SINCE the discovery by Gross in 1951 that leukaemia in a particular strain of mice could be induced by a virus, the search for viruses as the cause of malignant conditions has become a major trend in cancer research. The electron microscope has revealed, in numerous experimental animal tumours, virus-like bodies, the oncogenic properties of which have been proved by the injection of cell-free tumour extracts into suitable recipients. With the introduction of new techniques, the number of transplantable animal tumours in which such viruses have been found is increasing rapidly. Furthermore, it has also been found that malignant transformation of cells grown *in vitro* can be initiated by the introduction of virus into the culture. It was a natural development therefore that the search for oncogenic viruses should be extended to human tumours, especially to leukaemia, utilizing the methods used with success in the study of experimental animal leukaemias. *Methodological Approaches to the Study of*

*Leukemias* contains the proceedings of a symposium which aimed at discussing how the various techniques could be used in the search for viruses in human tumours and at spot-lighting the many difficulties, both methodological and interpretative, which beset an investigation of this kind.

Some of the participants dealt with cell kinetics, stem cell differentiation and chromosome anomalies in relation to leukaemia, but most of the contributors focused their interest on subcellular particles shown by electron microscopy to be present in tumour cells cultured *in vitro* or in cells obtained from primary neoplasms. Such particles were identified in cultures of Burkitt's lymphoma or observed in the plasma from leukaemic patients. The principal points of discussion were whether these are the agents which are responsible for the malignant behaviour of cells, whether they are latent viruses which manifest themselves because of the leukaemic condition, or whether they should be looked on only as secondary invaders.

Several contributions were devoted to the mycoplasmas, the smallest micro-organisms so far observed which contain all the enzyme systems and genetic mechanisms compatible with free-living existence on agar. Mycoplasmas are known to be the cause of at least one type of pneumonia in man. This class of organism was first isolated from human tumours in 1937, but gained much importance only recently when mycoplasmas were identified in tissues of leukaemic patients. At the symposium much information was given about the morphology and metabolism of these micro-organisms, which are encountered in the most diverse pathological states. It was admitted that the possible presence of mycoplasmas in tissues under examination makes it even more difficult to investigate the role of viruses in leukaemia. The participants agreed that only future research can determine whether mycoplasma or virus have in fact anything to do with the aetiology of human leukaemia. The proceedings of the symposium are nevertheless a valuable source of information concerning the application of electron microscopy to leukaemia research, and from the volume the reader will also learn about the many potential pitfalls present in such an approach. P. C. KOLLER

## THE ASPERGILLI

### The Genus *Aspergillus*

By Prof. Kenneth B. Raper and Dorothy I. Fennell. With a chapter on Pathogenicity by Peter K. C. Austwick. Pp. ix + 686. (Baltimore, Md.: The Williams and Wilkins Company, 1965. Distributed in the U.K. by E. and S. Livingstone, Ltd., Edinburgh.) 160s. net.

THE aspergilli are a ubiquitous, prominent and notorious component of common mould. They occur everywhere in soil and compost, and cause deterioration of many materials including fabrics, leather, paper and foodstuffs; their fermentation products include sauces and alcoholic drinks, antibiotics and citric acid, and they find a use as a biochemical tool for the detection of minor elements in soil. In addition, some are pathogenic for man, animals (particularly birds) and plants, and others produce toxins which poison livestock and possibly induce cancer in man, while their spores may act as airborne allergens. As aspergilli are of such economic importance and because they are easily recognized in their asexual (imperfect or conidial) state, grow well in culture, and are both macroscopically and microscopically attractive organisms, they have received much attention during the past two hundred years.

*The Genus Aspergillus* is a third generation monograph. In 1926, Thom and Church published *The Aspergilli*, a volume of 272 pages in which sixty-nine species were accepted; this was replaced, in 1945, by Thom and Raper's *A Manual of the Aspergilli* (373 pages, 77 species)