

FIFTY YEARS OF PROGRESS IN SOIL MICROBIOLOGY

Microbiologie du sol

Problèmes et méthodes ; cinquante ans de recherches.
Par Prof. S. Winogradsky. Pp. 826+35 plates.
(Paris : Masson et Cie., 1949.) 3,000 francs.

PROF. S. WINOGRADSKY presents the results of fifty years work in this volume ; it consists of all his principal papers gathered together and reprinted in ten sections. There are also forewords to each section summarizing the position in 1945, a brief introduction to the whole volume, and a final section on the principles of ecological microbiology ; but, with these exceptions, all the work has been published elsewhere.

In the introduction it is stated that the memoirs, especially the earlier ones, have been pruned of unnecessary details and that certain passages have been condensed. This is a pity. Such changes detract from the historical interest of the volume, and sometimes introduce a modern note, out of keeping with the leisurely tempo of the scientific papers of the past century.

There are very few bacteriologists whose work has covered such wide fields as that of Prof. Winogradsky, and not many who have willingly adopted so many new points of view. The author saw the birth of modern microbiology and has watched its development through infancy and childhood to adolescence ; and at every stage he has helped it on by noteworthy contributions. His early work on nitrification attracted the attention of Pasteur himself and resulted in an invitation to work at the Institut Pasteur ; but for various reasons this invitation was not accepted until its renewal by Dr. Roux in 1922. Within the sections the papers are arranged chronologically, and to some extent the order of the sections themselves reflects their author's changing interests. The subjects fall into the following subdivisions : the first autotrophs, bacterial morphology, nitrification, anaerobic nitrogen fixation, retting of flax, special methods in soil microbiology, cellulose decomposition, aerobic nitrogen fixation, symbiotic fixation and ecological principles.

Prof. Winogradsky's scientific career began with the recognition of a new type of nutrition, when he described the autotrophic sulphur bacteria in 1887. His first paper on nitrification was published in 1890, when the work of Schloesing and Muntz had established the fact that nitrification in soil was brought about by micro-organisms. Various workers, notably Warington, Heraeus, Frank, Adametz and the Franklands, had already been trying to isolate a nitrifying organism in pure culture ; and Warington must have been very near it, and the Franklands undoubtedly had succeeded. At this point Winogradsky, in his own words, decided "à laisser de côté . . . toutes les formules, et à procéder lentement mais sûrement". In this revised version the sentence is rendered "à procéder en me tenant à une méthode la plus stricte-ment inductive". The classical work on *Nitrosomonas* and *Nitrobacter* which resulted from this decision is too well known to need further comment.

There are very few papers representing the years between 1895-23. In the decade following his appointment to the Pasteur Institute, Prof. Winogradsky was largely preoccupied with methods for studying the microflora of soils. This was his peak period of production, when he was not only devising

and describing new methods, but also applying them to the elucidation of old problems ; at this time most of his work on *Azotobacter* and symbiotic nitrogen fixation and on the decomposition of cellulose was done. He also returned to his earlier loves, the autotrophic bacteria.

The book provides a running commentary on the science of non-medical bacteriology during the past sixty years ; and at the present time the author is still as ready to plead for a new outlook, and new methods of attack, as he was in the last years of the past century. All soil microbiologists will be grateful to have these papers collected into a single volume where they are readily accessible.

MODE OF ACTION OF SELECTIVE ANTIBIOTICS

Selective Toxicity and Antibiotics

(Symposia of the Society for Experimental Biology, No. 3 : Published for the Company of Biologists on behalf of the Society for Experimental Biology.) Pp. vii+372. (Cambridge : At the University Press, 1949.) 35s. net.

THIS volume contains twenty-two papers read at Edinburgh in July 1948 and is the third of an annual series of symposium reports. The papers cover a wide range, and it is perhaps unfortunate that the editors have not thought it necessary to arrange them in a logical order with related subjects grouped together, and that no paper is furnished with a summary.

W. A. Sexton writes a most fitting preface entitled "The Organic Chemist's Approach to Chemotherapy", indicating how neatly the chemical pattern of a homologous series sometimes fits with the biological features of toxicity, retardation of growth, inhibition of germination or lethal action upon bacteria, fungi and protozoa. He remarks also upon a theme which runs throughout most of the other papers in this series, that many of the chemical constituents of living matter are in a constant state of change in that their synthesis and breakdown occur continually throughout life. From this single basic fact emerges the important guiding principle which governs the selective toxicity and antibiotic action of different chemicals, namely, their action upon enzymes and enzymatic systems, whereby they exert an indirect effect upon vital processes rather than a direct lethal action upon the corpus as a whole.

This view is reflected in papers on "The Study of Enzymes in relation to Selective Toxicity in Animal Tissues" (R. A. Peters) ; "The Design of Bacterial Inhibitors modelled on Essential Metabolites" (H. N. Rydon) ; "Aspects of Selective Toxicity of Sulphonamides and other Anti-Metabolite Inhibitors" (D. D. Woods and R. H. Nimmo-Smith) ; and "The Action of Penicillin on the Assimilation and Utilization of Amino-acids by Gram-Positive Bacteria" (E. F. Gale).

A number of papers are devoted to *ad hoc* problems such as the antibiotics derived from *Bacillus polymyxa* (G. Brownlee) and the resins of hops (L. R. Bishop) ; the effects of surface activity and permeability (A. R. Trim and A. E. Alexander) and of various fatty acids on the growth of different bacteria (M. R. Pollock ; E. Kodicek) ; of phenylcarbamates on higher plants (G. W. Ivens and G. E. Blackman) ; the significance