

BOOK REVIEW FOR QUARTERLY REVIEW OF BIOLOGY

ENDOSYMBIOSE der Tiere mit pflanzlichen Mikroorganismen. By Paul Buchner. 771 pp. Verlag Birkhäuser, Basel, Switzerland, 1959. Sw. Fr. 62.40 (paper bound); Sw. Fr. 66.50 (cloth).

This indispensable revision succeeds the versions issued in 1921 and 1930. It will surely preserve its long held status as the definitive review of its field and as an inspiration for the languishing craft of comprehensive monography.

The present edition is slightly shorter than the second, owing largely to the contracted treatment of algal symbioses in accord with the virtual neglect of this field in the interval. The text is thus most fully concerned with the symbioses of intracellular microorganisms in insects. This topic has hitherto been the subject almost exclusively of descriptive, morphological research, but the fragments of experimental studies on the physiology of the symbionts and mutual relationships with the host are extensively discussed. More recently, many geneticists have awakened to the pertinence of the many symbioses that are perpetuated in heredity and, conversely, have made their own contributions to symbiology (e.g. L'Heritier on sigma-Drosophila; Sonneborn on kappa-Paramecium) but these aspects are not included here.

Despite the weighty documentation of Buchner's reviews, some workers have nurtured a persistent skepticism, inferring instead that the symbionts are merely specialized mitochondria (which recalls the now discredited theory that mitochondria are microbial inclusions readily cultivable in vitro). If nothing else, the numerous insects that have been artificially cured of their symbionts should smother such doubts,---except that we cannot ignore the startling and uncomfortable fact that green plants can be "cured" just as readily of their chloroplasts by chemotherapy. The most conspicuous failing in this phase of entomological research has been the lack of a microbiological orientation and close heed to Koch's Postulates, which apply no less to symbiology than to its subsidiary field of infectious disease. Presumably for technical reasons, the microsymbionts of the most intimate complexes have not been grown in vitro, but it would be more accurate to insist that no convincing evidence has usually been forwarded that the isolated microbes inhered in the symbiosis. The potential usefulness of the aposymbiotic insect as a specific criterion for such claims, as well as for the general application of the symbiosis concept, by virtue of reinfection experiments has not been adequately emphasized, though re- and cross-infections have been recorded for a few insects whose symbionts are readily cultivated (Rhodnius prolixii; Lasioderma serricorne). In vitro cultivation of the symbionts would not be obligatory in the first instance and the re-infection test should thus guide the development of the technique for their identification, maintenance and finally artificial cultivation. The outcome for this controversy predicted by this reviewer is not the unmitigated defeat of the mitochondrial at the hands of the microbial theory for ~~chloroplasts~~ chloroplasts and symbionts but a reconciliation in terms of a unifying concept labelled elsewhere as the plasmid.

A work of such profound merit and diligent detail warrants translation to accommodate students for whom German is not a native tongue. The content, and perhaps the style, of this monograph are too formidable for casual perusal by the English-speaking student. Such a translation would enrich the teaching of biology and stimulate research in symbiology more than enough to justify the task. But whatever the language, no serious student of biology can afford to miss an acquaintanceship with this work.