Microbial Control of Insects

Insect Pathology. An advanced treatise. vol. 2. Edward A. Steinhaus, Ed. Academic Press, New York, 1963. xiv + 689 pp. Illus. Until 31 October, $20; $23.

This is the second volume of a two-volume treatise on insect pathology [vol. 1, reviewed in *Science* **140**, 167 (1963)]. The study of insect pathology and the use of diagnosis in entomology are only partially comparable to the corresponding field for vertebrates. Both are presumably interested in causes and primary reactions (about which little is known at the physiological or biochemical level), but, whereas vertebrate pathology is primarily concerned with diagnosis and cure, insect pathology is concerned mainly with the control of insects—that is, with killing the infected organism rather than curing it. Hence this volume, in contrast to volume 1 which dealt with more basic problems, emphasizes the culture of organisms, especially to obtain commercial quantities for application in nature, and the use, or the hoped for use, of these in the control of insects noxious to man. Numerous of the chapters end with summaries emphasizing the lack of adequate information and itemizing the kinds of data needed for further advances.

A number of things are omitted from these volumes. No mention is made of microorganisms for which insects are vectors (for example, malaria, tularaemia, and filiaria), not even of those that can be lethal to the insect. And, more surprisingly, no mention is made of the fungus group Laboulbeniales which infests only insects, perhaps because they do not ordinarily kill the insect (but, in volume 1, there is a chapter on the "normal" microbial fauna and flora of insects!).

Volume 2 includes chapters by O. Lysenko (on the taxonomy of entomogenous bacteria), A. M. Heimpel and T. A. Angus (on diseases caused by sporeforming bacteria), S. R. Dutky (on milky diseases), G. E. Bucher (on nonsporeforming bacteria), J. N. Couch and C. J. Umphlett (on infections caused by *Coelomomyces*), D. M. MacLeod (on Entomophthorales), M. F. Madelin (on hyphomycetous fungi), F. L. McEwen (on *Cordyceps*), J. Wiesner (on sporozoans), J. J. Lipa (on other protozoans), H. E. Welch (on nematodes), R. L. Doutt (on pathologies from insect parasites), T. Tamada (on epizootiology), I. M. Hall (on the use of microbes in insect control), J. D. Briggs (on the commercial production of pathogens), E. A. Steinhaus (on diagnostic procedures), and G. Wittig (on techniques in insect pathology).

I get the impression that this volume, unlike volume 1, is devoted to propagandizing for microbial control of insect pests. Desirable as such control measures might be, the fact remains that, at the present stage of our knowledge, it is seldom possible to control insect pests by using microbial methods. But, if these volumes help lead to the development of a significant amount of control in the future, such would surely be welcome.

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Marine Biology

Advances in Marine Biology. vol. 1. F. S. Russell, Ed. Academic Press, New York, 1963. xiv + 410 pp. Illus. $13.50.

This first volume of a proposed new series contains five contributions: "Rearing of bivalve mollusks," by Loosanoff and Davis (136 pp.); "The breeding of the North Atlantic freshwater eels," by the late Anton Bruun (32 pp.); "Some aspects of photoreception and vision in fishes," by Nicol (37 pp.); "The biology of coral reefs," by Yonge (51 pp.); and "The behaviour and physiology of herring and other clupeids," by Blaxter and Holliday (131 pp.). The first of these is not just a review paper, for it includes much original material not previously published, and it will be in great demand in marine laboratories as a *vade mecum*. Although its other major contribution, a review of the literature, is important, it is, nevertheless, primarily an itemization of the literature (mostly of the past 30 years). Bruun's essay was intended to be a refutation of D. W. Tucker's controversial notions; in my opinion the essay, even in its unfinished state, adequately disposes of that question. Nicol and Yonge have contributed good, standard performances, but it must be said that their papers would have been just as acceptable in the standard review journals. It is interesting to note that radiation is not mentioned in the admittedly skeletonized index and that it receives notice only in a footnote which is concerned with the effect of low concentrations of Sr^{90} and Y^{90} on the development of *Engraulis*. We need critical reviews in this aspect of marine biology.

This book will be a problem in libraries, because physiologists will want the handbook on raising bivalves on their desks at all times and fisheries biologists will doubtless feel the same way about the review of herrings. Both are large contributions that could stand alone as separate monographs, and if this first volume of *Advances in Marine Biology* has set a pattern to be followed in later numbers, the market for the books may be as diverse as its contents. One wonders if it might not have been more practical to publish these papers, which are obviously too long for review journals, as a series of short monographs. The material certainly would be more available to those who want to use it. As it is, those whose interests may not lean so heavily to fish and fisheries are asked to invest $12 if they need the information on rearing bivalves. This is the chief disadvantage of such serial volumes. Perhaps the publishers might consider reprinting the larger contributions in such volumes as paperbacks for those who really need the individual papers.

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A Virginia Botanist

John Clayton: Pioneer of American Botany. Edmund Berkeley and Dorothy Smith Berkeley. University of North Carolina Press, Chapel Hill, 1963. xii + 236 pp. $6.

Fifteen years before Linnaeus published his *Species Plantarum*, in which he named more than 400 Virginia plants, based on Clayton's collections, the first edition of the *Flora Virginica* appeared. Thereby is Clayton's niche in the history of North American botany sure and deep. Though he was preceded in Virginia by Banister, Clayton's work was not destined to be published as a unit. The botanical fraternity abroad included the draper Collinson,

the apothecary Miller, the nurseryman James Gordon, and the physicians Mead, Sloane, and Gronovius. The last, with opportunism, published Clayton's descriptions in Leiden. All were counting stamens and pistils for Linnaeus.

John Clayton, not to be confounded with the Reverend John Clayton, was a member of the American Philosophical Society (although he probably never attended a meeting), and he was reported to be a member of the Royal Society (which he was not) and a physician (seriously doubted). On these matters, the authors have commendably set the record straight. Clayton's genealogy is intricate; a schematic pedigree is a desideratum. Two chapters, the "Clayton family" and "Life in Virginia," are animated. It is difficult to know John's own personality from his letters. The enthusiasms of the botanical fraternity glow in this ingenious biography and overshadow any attempt to tape Clayton's dimensions of greatness. Certainly Clayton's life was "neither brilliant nor spectacular," though his actions were "thorough and painstaking."

The historian will encounter fresh materials, fully documented. The Ellis Papers at the Linnean Society and the Norton Papers at Colonial Williamsburg disclosed sidelights down to gentlemanly blackmailing (p. 67). The notes by John Ellis on "Flora Virginiana Claytonii," first published here, recall Governor John Drayton's "Carolinian Florist." Benjamin Clement's essay on the history of botany (1756) is a glowing coal, and it might have been reprinted in its entirety, as an appendix.

Contemporary Dutch estimates of Gronovius would have been illuminating, for the circumstances surrounding the printing of the second edition of the *Flora Virginica* (1762) are still puzzling. And now a few corrections. It is more accurate to state that although Dr. Houstoun, protégé of Philip Miller, planned to botanize in Georgia under Oglethorpe's appointment, he died in Jamaica. The Charleston caricaturist George Roupel, one of many names not indexed, illustrated botanical papers for Alexander Garden (p. 127).

This attractively designed biography will be a welcome addition to collateral reading lists for botany courses.

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New Books

Mathematics, Physical Sciences, and Engineering

Advances in Electrochemistry and Electrochemical Engineering. vol. 3, *Electrochemistry*. Paul Delahay and Charles W. Tobias, Eds. Interscience (Wiley), New York, 1963. 409 pp. Illus. $15.

Advances in Electronic Circuit Packaging. vol. 3. Proceedings of a symposium (Boulder, Colo.), August 1962. Lawrence L. Rosine, Ed. Plenum Press, New York, 1963. 463 pp. Illus. $16.50.

Advances in Petroleum Chemistry and Refining. vol. 7. John J. McKetta, Jr., Ed. Interscience (Wiley), New York, 1963. 497 pp. Illus. $19.75.

Advances in Space Science and Technology. Frederick I. Ordway III, Ed. suppl. 1, *Space Carrier Vehicles: Design, Development, and Testing of Launching Rockets.* Oswald H. Lange and Richard J. Stein. Academic Press, New York, 1963. 325 pp. Illus. $12.

The Art and Science of Growing Crystals. J. J. Gilman, Ed. Wiley, New York, 1963. 503 pp. Illus. $20.

Astronautical Congress, 12th International. *Proceedings.* Washington, D.C., October 1961. vols. 1 and 2. Robert M. L. Baker Jr., and Maud W. Makemson, Eds. Springer, Vienna; Academic Press, New York, 1963 (vol. 1, 518 pp.; vol. 2, 516 pp.). Illus. $22 each.

Asymptotic Behavior and Stability Problems in Ordinary Differential Equations. Lamberto Cesari. Springer, Berlin; Academic Press, New York, ed. 2, 1963. 279 pp. Illus. $9.

Basic Statistics. Thomas E. Kurtz. Prentice-Hall, Englewood Cliffs, N.J., 1963. 343 pp. Illus. $10.

The Buckling of Plates and Shells. H. L. Cox. Pergamon, London; Macmillan, New York, 1963. 138 pp. Illus. $6.50.

Carbon. vols. 1 and 2. Proceedings of the 5th conference (University Park, Pa.), June 1961. S. Mrozowski, M. L. Studebaker, and P. L. Walker, Jr., Eds. Pergamon, London; Macmillan, New York, 1963 (vol 1, 651 pp.; vol. 2, 685 pp.). Illus. $20 each.

Diffusion in Semiconductors. B. I. Boltaks. Translated from the Russian (*Diffuziya v Poluprovodnik akh.* Moscow, 1961) by J. I. Carasso. H. J. Goldsmid, Ed. Academic Press, New York, 1963. 390 pp. Illus. $14.

Dynamics of Satellites. A symposium (Paris), May 1962. Maurice Roy, Ed. Academic Press, New York; Springer, Berlin, 1963. 347 pp. Illus. $15.

Earth Science and Meteoritics. Compiled by J. Geiss and E. D. Goldberg. North-Holland, Amsterdam; Interscience (Wiley), New York, 1963. 328 pp. Illus. $10.50.

Elements of Chemical Reactor Design and Operation. H. Kramers and K. R. Westerterp. Academic Press, New York, 1963. 263 pp. Illus. $10.

Hungarian Problem Book. Nos. 1 and 2. No. 1, based on the Eotvos Competitions, 1894–1905 (120 pp.); No. 2, based on the Eotvos Competitions 1906–1928 (128 pp.). Jozsef Kurschak. Revised and edited by G. Hajos, G. Neukomm and J. Suranyi. Translated from the Hungarian (revised edition 1955) by Elvira Rapaport. Random House, New York; Singer, Syracuse, N.Y., 1963. Illus. Paper, $1.95 each.

Identification of Organic Compounds. A student's text using semimicro techniques. Nicholas D. Cheronis and John B. Entrikin. Interscience (Wiley), New York, 1963. 489 pp. Illus. $8.95.

Infrared Physics and Engineering. John A. Jamieson, Raymond H. McFee, Gilbert N. Plass, Robert H. Grube, and Robert G. Richards. McGraw-Hill, New York, 1963. 687 pp. Illus. $19.

Introduction to Theoretical Physics. Classical mechanics and electrodynamics. Roald K. Wangsness. Wiley, New York, 1963. 423 pp. Illus. $9.75.

Introduction to the Theory of Integration. T. H. Hildebrandt. Academic Press, New York, 1963. 395 pp. Illus. $14.

Introduction to University Physics. vol. 1. Joseph Morgan. Allyn and Bacon, Boston, Mass., 1963. 527 pp. Illus. $6.95.

An Introduction to Vacuum Technique. A. H. Turnbull, R. S. Barton, and J. C. Riviere. Wiley, New York, 1962. 200 pp. Illus. $7.75.

Invariant Imbedding and Radiative Transfer in Slabs of Finite Thickness. Richard E. Bellman, Robert E. Kalaba, and Marcia C. Prestrud. Elsevier, New York, 1963. 356 pp. Illus. $6.50.

Mathematical Methods for the Study of Automatic Control Systems. V. I. Zubov. Translated from the 1959 Russian edition by Yaakov Schorr-kon. Pergamon, London; Macmillan, New York, 1963. 335 pp. Illus. $12.50.

The Mathematical Works of J. H. C. Whitehead. vol. 4, *Algebraic and Classical Topology.* I. M. James, Ed. Pergamon, London; Macmillan, New York, 1963. 361 pp. Illus. $45.

Mathematics. David Bergamini and the editors of *Life.* Time Inc., New York, 1963. 200 pp. Illus. $3.95.

Mathematics and the Physical World. Morris Kline. Doubleday, Garden City, N.Y. (© 1959), 1963. 557 pp. Illus. Paper, $1.95.

Mechanical Vibrations. Austin H. Church. Wiley, New York, ed. 2, 1963. 452 pp. Illus. $12.

Nonstoichiometric Compounds. A symposium, 141st meeting of the American Chemical Society, March 1962. Roland Ward, Chairman. American Chemical Society, Washington, D.C., 1963. 261 pp. Illus. Paper.

Nuclear Research Emulsions. vol. 1, *Techniques and Theory.* Walter H. Barkas. Academic Press, New York, 1963. 534 pp. Illus. $18.

Nuclear Theory Reference Book 1957 and 1958 (142 pp.); **1959 and 1960** (142 pp.). A compilation of nuclear theory index cards. J. B. Marion, Ed. Natl. Acad. of Sciences–Natl. Research Council, Washington, D.C., 1963 (order from Superintendent of Documents, GPO, Washington, D.C.). Paper, $1 each.

Physics of Failure in Electronics. M. F. Goldberg and Joseph Vaccaro, Eds. Spartan, Baltimore, Md.; Cleaver Hume, London, 1963. 263 pp. Illus.

Physics of Thin Films. Advances in research and development. vol. 1. Georg Hass, Ed. Academic Press, New York, 1963. 364 pp. Illus. $13.