Book Reviews

Principles of Plant Pathology. E. C. Stakman and J. George Harrar. Ronald, New York, 1957. xi + 581 pp. Illus. $8.

To many persons, plant pathology is an art. To Stakman and Harrar, plant pathology is a science.

In America the *art* of plant pathology is flourishing. Plant diseases are serious matters to farmers and to all who grow plants for pleasure or profit, and they have emphasized the pragmatic programs of plant pathology. American plant pathologists have responded so well to these pressures and have built up the art so well that they are sometimes envied by their colleagues abroad.

As for the *science* of plant pathology in America, the case is very different. As the readers of this journal well know, such situations are evident in other sciences as well. Plant pathology is not alone.

It is high time that someone published a book on the science of plant pathology in America, and Stakman and Harrar have done so. Prior to this we have had books galore on such subjects as diseases of citrus or pathology in forest practice, and we have had books on practical control methods. Other books have been aimed somewhat more closely than these in the direction of scientific plant pathology. They have dealt with the microbial agents of disease. A typical chapter heading would be "Diseases caused by Ascomycetes." This approach to the subject attains scientific status by default: It is not immediately practical, therefore, it must be scientific. Actually, these books, like the others, simply give an encyclopedic treatment of individual diseases. They merely slice the subject at a different angle. Treatment of theory in either pattern is "purely coincidental."

Stakman and Harrar have cast all that aside. They are concerned with plant disease as a conceptual scheme, not as a series of diseases to be fought. Theirs is not a book on diagnosis or control, on mycology or virology or nematology. They have dared to consider theory their first order of business—to speculate on the nature of things. They have, for example, attempted to give some explanation of the reasons why spore-bearing structures in fungi are shaped as they are; why fungi must penetrate tissues in the way that they do. They remark, characteristically, "A disease . . . is essentially a process—a stream of events that can be affected anywhere along its course by other streams of events." This is thoughtful writing about a dynamic subject.

I think they have weakened their case somewhat by dragging in a few pragmatic chapters, such as those on "Plant Diseases of International Importance" or "Diseases in Transit and Storage." Nevertheless, I am impressed with the depth of the thinking in the book. I think it is a milestone on the long, long road from the mystic notions of spontaneous generation to a deep understanding of the nature of disease in plants.

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The Infectious Diseases of Domestic Animals. With special reference to etiology, diagnosis, and biologic therapy. William A. Hagan and Dorsey W. Bruner. Comstock Division, Cornell University Press, Ithaca, N.Y., ed. 3, 1957. xx + 968 pp. Illus. $10.50.

This is primarily a textbook of veterinary microbiology, in which considerable emphasis is placed on infectious diseases. The approach used by the authors has resulted in an outstanding compilation of current knowledge concerning infectious diseases and infectious disease agents, broader in scope than either a text of microbiology or infectious diseases although, of necessity, lacking the detail found in a book of infectious diseases per se. The excellent correlation of the subject matter and the style of writing make this a highly readable text.

As in the previous edition, the book is divided into seven parts which deal, respectively, with the immunological aspect of the host-parasite relationship; chemotherapeutic and antibiotic agents; the pathogenic bacteria; the spirochetes; the bartonella, the rickettsiae, and the pleuropneumonia organisms (these are discussed in part IV, entitled, "Bacterialike Pathogenic Organisms of Uncertain Classification"); the pathogenic fungi; the pathogenic protozoa; and the viruses.

The book has been brought up to date by the incorporation of much recent pertinent work and by the inclusion of several additional tables and illustrations and a greater number of references. The over-all length exceeds that of the previous edition by approximately 50 pages.

In my opinion the book is superior to any other of its kind currently available in the field. Fundamental information is stated clearly, impartial treatment is accorded controversial issues, and balance has been achieved by selective emphasis of the subject matter. Exotic diseases, which are an ever-present threat to the livestock industry of this country, receive considerable attention.

A few minor changes and critical suggestions might be considered for future revisions of the book. Additional pictorial material could have been used to advantage in dealing with the protozoa. A more careful selection of reference material might have contributed to greater completeness in the case of certain diseases discussed (for example, anaplasmosis) and to greater accuracy in certain statements (such as that enzootic abortion of ewes occurs in Australia and New Zealand). Inclusion of the initials of those whose names appear in the reference list would, it is felt, be an improvement.

Omissions are few, although several diseases of considerable importance (such as epididymitis of rams, ovine pneumonia, and virus pneumonia of pigs) are not mentioned. On the other hand, reference to bluetongue as a disease of cattle as well as of sheep is perhaps misleading.

I heartily endorse this book for use in the teaching of veterinary microbiology and infectious diseases and as a ready source of information on essentially all phases of work in the field of infectious disease.

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Handbuch der Physik. vol. 28, *Spectroscopy II.* S. Flügge, Ed. Springer, Berlin, 1957. vi + 448 pp. Illus. DM. 98.

The first of the five articles contained in this volume deals with microwave spectroscopy (78 pages, in English) and is written by Walter Gordy, one of the leading men in this field. It gives a vivid and clear account of methods, instrumentation, and achievements in this latest branch of spectroscopy, which, despite its youth, has played an important role in atomic, molecular, and solid-state physics and even in astrophysics.

Continuous spectra are treated in the second contribution, by Wolfgang Finkelnburg and Theo Peters. This article (in German) is well organized, covers the field with admirable completeness, and is a reliable source of information.

The third chapter, on crystal spectra, is written (in German) by Eugen Fick and Georg Joos. It excels throughout in clarity and thoroughness, whether it is dealing with the description of phenomena, the presentation of results, or the exposition of theory.

The Zeeman-effect is the subject of the fourth article (written in English). Its author, J. C. Van Den Bosch, is a member of the staff of the famous Zeeman laboratory in Amsterdam. This chapter covers most of the material which is essential for the experimenter. The theoretical discussions are based upon the vector model. The quantum mechanical treatment is found in volume 35 of this encyclopedia. This rather concise article would have gained by the addition of a detailed list of publications relative to the different elements.

The last chapter (in French), on natural optical activity, is by Jean Paul Mathieu. The presence of this chapter in a volume of spectroscopy is rather peculiar but must be justified by interpreting the term *spectroscopy* in a rather broad sense. This article is a thorough, clear, and attractively presented contribution. Historical remarks and general laws, methods of measurements, and optical activity of isotropic and anisotropic media are the main subject-divisions.

Subject indexes in German-English and English-German and a table of contents, in French for the last article, conclude the volume.

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Synthetic Methods of Organic Chemistry. vol. 10. With reaction titles and cumulative index of vols. 6 to 10; vol. 11. W. Theilheimer, Ed. Karger, Basel, Switzerland; Interscience, New York, 1956, 1957. 746 pp.; 494 pp. $25.25; $20.

In volumes 10 and 11 of this series of annual publications, the editor has continued the important compilation of new synthetic methods and of improved old procedures in the field of organic chemistry.

The tenth volume contains a cumulative alphabetical index for volumes 6 to 10 and, in the body of the text, all reaction titles of these volumes. Most of the entries in the tenth volume deal with publications which appeared in the years 1953–1955. Each abstract enumerates starting materials, products, reaction conditions, and yields. In addition, the original literature and, sometimes, supplementary references are given. This pattern is continued in the eleventh volume, which contains abstracts from papers published between 1954 and 1956. A total of 1679 abstracts are published in these two volumes. They should be of great value to chemists who wish to keep up to date on important developments in synthetic organic chemistry.

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The Direction of Research Establishments. Proceedings of a symposium held at the National Physical Laboratory, 26–28 Sept. 1956. National Physical Laboratory. Her Majesty's Stationery Office, London, 1957 (order from British Information Services, 45 Rockefeller Plaza, New York). Four sections. $4.50.

That skillful blend of scientific freedom, wise leadership, and selective allocation of resources which constitutes good research management is a major objective of research directors in industry and government. Many conferences devoted to the problems of research administration have been held in the United States under the sponsorship of various host institutions but without a formal continuing organization. The present book contains the proceedings of the first such conference to be held in Great Britain, one of the series of symposia regularly held by the National Physical Laboratory.

The six sessions included 20 papers by as many authors—14 British, two Canadian, two American, one German, and one Dutch—together with extensive discussion by those in attendance. The first session included papers on the relations between basic and applied research and on the choice and termination of research projects, by J. D. Bernal and Willis Jackson, respectively. The lively discussion ranges from such topics as optimum size of research establishments to the pros and cons of financial awards to individual scientists for particular research successes.

The second session dealt with the problem of creativity, with papers by Morris Stein and D. J. van Lennep. Stein describes a study, carried out by the University of Chicago, of the psychological and sociological factors related to the creativity of American chemists. Creativity, defined as the process resulting in "a novel work that is accepted as tenable or useful or satisfying by a group at some point in time," was determined by the judgment of supervisors, corroborated by that of colleagues and subordinates. Van Lennep studies chemists and physicists from the point of view of applied psychology. In both papers, and in the discussion, creativity seems to be regarded as a quality, probably inherited, which men possess to a greater or lesser degree and which can be brought to its highest expression for a given individual by a suitable environment.

The second session closed with a paper on budgets and administrative controls, by D. R. Willson—a topic which is certainly involved in any consideration of the environment that influences creativity. The author begins by quoting Thomas Jefferson—"The least government is the best government"—an opinion which every research man will heartily endorse. The roles of budgets, project cost accounting, control services, and expenditure controls were debated with as much vigor as in our conferences in the United States.

The third session consisted of four papers on general organization. E. S. Hiscocks describes the growth of scientific research from a craft to a large-scale industry, from the one-man laboratory to team research, and the concomitant necessary changes in organization. He believes, as I do, that "the business of a scientific establishment is to achieve products of scientific thought, and since the spearhead of such an activity lies in the scientists themselves, all other staff are in a sense the tools of the scientists and work to ease their job."

R. Vieweg discusses "Science and the Workshop," coming to the fairly generally accepted conclusion that both a central workshop and small auxiliary shops are required. F. M. Lea and H. A. Snow give advice on the design and provision of buildings in which research is carried out.

The research staff was considered in the fourth session, with five papers: "Selection and Personal Assessment of Staff," by W. S. Bristowe; "Staff Selection and Assessment," by F. T. Rosser; "Superiors and Subordinates in Research," by H. A. Shepard; "Staff Groupings and the Flow of Authority," by C. R. Harington; and "Incentives," by S. Mayne. The first two papers describe the selection and rating procedures in an industrial laboratory (Imperial Chemical Industries) and a governmental laboratory (National Research Council, Canada), respectively. The differences in practice with respect to interviews and weighting of personal factors such as leadership, cooperation and loyalty, power of expression, and personal acceptability are perhaps typical of the two samples rather than representative of characteristic differences between industrial and governmental research laboratories.