Book Reviews

Medical Physics, Vol. II. Otto Glasser, Ed. Chicago: Year Book Publ., 1950. 1,227 pp. $25.00.

This monumental volume lists 181 contributors, who include many of the most distinguished contributors to medical physics and its related fields. Volume II supplements Volume I, which contained 1,792 pages and sells for $20.00; the two volumes can be purchased together for $40.00. Subjects treated only in Volume I are listed by title in Volume II.

A striking feature of the new volume is the numerous articles dealing with radiation. Atomic energy has nowhere had greater impact than in questions of health. Thus, for one who is concerned with protection against radiation, two articles by Karl Z. Morgan and Carl B. Braestrup give full accounts of monitoring and protection methods. Austin M. Brues describes the symptoms of radiation sickness and its therapy. A fuller account of radiation therapy is given by H. E. Johns. Still other aspects of this field are treated by Gustav Bucky, Edith H. Quimby, and W. E. Forsythe with E. Q. Adams. Even these articles are but a fraction of the papers devoted to radiation.

As one looks through the titles, starting with "Accelerators: High-Energy," by M. Stanley Livingston, and ending with "Weighing," by A. A. Benedetti-Pichler, one discovers that many subjects have been treated in the first volume and are not repeated in Volume II. There is thus a very real reason for considering the purchase of the two volumes at the reduced price. The books are expensive, but they are well printed, the subjects cover the medical field well and are generally excellent. The bibliographies are extensive. Anyone interested in understanding the scientific side of medical physics should have access to both volumes.

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Microbiologie du Sol: Problèmes et Méthodes. S. Winogradsky. Paris: Masson et Cie, 1949. 861 pp. 3,000 fr.

In this volume Winogradsky has arranged and edited his publications in microbiology. The purpose of the edition is twofold: first, to gather in one volume the contributions otherwise available only in widely scattered journals; the second, more important, is best told in the author's words:

Pour ma part, ce qui m'incite à entreprendre la reconstitution de toute une vie de recherches scientifiques c'est l'idée que cette chronique, analysée et commentée par son auteur lui-même à la fin de sa carrière, pourrait bien être utile aux débutants dans ce genre d'études. Au lieu de faits établi, terriblement nombreux et d'importance inégale . . . ils pourront y trouver un tableau vivant, en quelque sorte, de la recherche microbiologique avec ses méthodes changeantes, adaptées au but à atteindre, ses succès et ses déboires, et cela sur des problèmes qui figurent au premier plan des recherches microbiologiques depuis leur début et jusqu'au temps présent, donc au cours de plus d'un demi-siècle.

Only Winogradsky could trace from firsthand experience the important developments in soil microbiology from 1885 up to the present.

The papers have been arranged in ten groups, with an appropriate foreword, written in 1945, that places each in its proper setting. Articles originally published in other languages have been translated into French, with the exception of two in English. Numerous typographical errors and some repetition of material slightly impede the presentation, but in most parts of the book these go unnoticed as the ideas unfold.

In the first section are expressed the viewpoints, maintained almost unchanged throughout the author's career, which led to so many fundamental discoveries. The most important of these was that microbes and their activities must be studied as they occur in nature, with methods appropriate to this end. The inadequacies of the classic procedures for studying the sulfur bacteria are pointed out, and a new microculture method permitting continuous microscopic observation is described. With it, the experiments leading to an understanding of the metabolism of the sulfur bacteria, the first-known autotrophs, were performed. This was an epochal event in biology. The discovery of autotrophic metabolism was in a sense a by-product of the study of the morphology of the sulfur bacteria under natural conditions, and well illustrates the validity of the Winogradsky axiom that microbes must be studied as they live in nature.

The culture of the sulfur bacteria having been worked out, the classic studies on their morphology were completed. The results routed from its last stronghold the concept of microbial pleomorphism as a ready transformation of bacteria of one kind into another. Pleomorphism as later revived by Löhnis is also vigorously assailed by Winogradsky. This section provides a discussion of the fundamental aspects of microbial morphology that should be read by every microbiologist.

The third section includes the conclusive experiments which proved the autotrophic nature of the nitrifying bacteria. The method that was finally developed for isolating and studying them is described in detail.

It is interesting that in seeking free-living nitrogen-fixing bacteria Winogradsky found the anaerobic forms rather than *Azotobacter.* The isolation and ecology of *Clostridium pasteurianum* are described in section 4 and also mentioned in section 8. Experiments on the retting of flax (section 5) are given in the short space of 5 pages.

Between 1906 and 1922 Winogradsky was prevented from continuing his investigations, but in 1922 he was invited by Roux to accept a position with the Pasteur Institute as head of soil microbiology. In this capacity he devised techniques which would give more accurate information on the activities of microbes in the soil. The direct method was perfected (this method is not limited

to soils) and is described in section 6. In the direct method soil is maintained under conditions similar to those in the field, and the microbial types which develop on added substrates are identified by direct microscopic examination and subsequent culture. This technique was used to show the importance of the cytophagas in the aerobic decomposition of cellulose in soil (section 7) and to demonstrate that *Azotobacter* is by far the most significant fixer of nitrogen (section 8).

The production of ammonia by *Azotobacter* is discussed at length. Numerous experiments, intended to prove that it is a product of nitrogen fixation rather than autolysis, are described. Although by modern biochemical standards the data and experimental techniques do not establish conclusively that N_2 is reduced directly to ammonia, the results do show that ammonia is given off from the cells under conditions simulating those in nature.

Data on ammonia production by nodules of legumes are presented in section 9, with results essentially similar to those found with *Azotobacter*. The concluding section formulates some principles of microbial ecology.

The keen analysis of fundamental problems and the simple and successful methods used to solve them mark Winogradsky as one of the world's greatest masters of microbiology. All microbiologists, but particularly beginners in soil microbiology, should be greatly indebted to him for this edition, which fully realizes the purpose of the author. His work has already profoundly influenced the ideas and practices of innumerable scientists, and its ready availability in *Microbiologie du Sol* assures that this influence will continue.

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Scientific Book Register

The Cerebral Cortex of Man: A Clinical Study of Localization of Function. Wilder Penfield and Theodore Rasmussen. New York: Macmillan, 1950. 248 pp. $6.50.

Metallurgical Applications of the Electron Microscope. London, England: Institute of Metals, 1950. 164 pp. $3.50.

Soviet Psychiatry. Joseph Wortis. Baltimore, Md.: Williams & Wilkins, 1950. 314 pp. $5.00.

Inorganic Syntheses, Vol. III. Ludwig F. Audrieth, Ed. New York: McGraw-Hill, 1950. 230 pp. $3.75.

Electromagnetic Theory, Vols. I, II and III. Oliver Heaviside. New York: Dover Publs., 1950. 386 pp. $7.50.

Handbook of Physiology & Biochemistry. 40th ed. R. J. S. McDowall. London: John Murray; Philadelphia: Blakiston, 1950. 767 pp. $7.00.

Principles of Genetics. 4th ed. Edmund W. Sinnott, L. C. Dunn and Th. Dobzhansky. New York: McGraw-Hill, 1950. 505 pp. $5.00.

Electricity and Magnetism: Theory and Applications. 3rd ed. Norman E. Gilbert. New York: Macmillan, 1950. 569 pp. $5.00.

Heat and Temperature Measurement. 2nd ed. Robert L. Weber. New York: Prentice-Hall, 1950. 422 pp. $6.65.

Some Theory of Sampling. William Edwards Deming. New York: John Wiley; London: Chapman & Hall, 1950. 602 pp. $9.00.

Elements of Ordinary Differential Equations. Michael Golomb and Merrill Shanks. New York: McGraw-Hill, 1950. 356 pp. $3.50.

Association Affairs

Salt Lake City Meeting of the Pacific Division

The 31st annual meeting of the Pacific Division, AAAS, was held in Salt Lake City, June 19–24, at the invitation of the University of Utah. The university, which this year is celebrating its one-hundredth anniversary, offered a most cordial and hospitable welcome and provided unusually fine facilities for the meeting. The Student Union Building, which served as registration headquarters, provided a cafeteria and coffee shop, rooms for group luncheons and banquets, committee rooms, and meeting rooms for part of the scientific sessions. General sessions were held in Kingsbury Hall, which has a seating capacity of 2,000. Other sessions were held in conveniently located university buildings. The physical arrangements contributed markedly to a successful, well-integrated meeting.

The divisional symposium held on Tuesday morning—"The Westward Migration and Its Consequences"—was of outstanding interest and importance. Four papers were presented: "Westward Ho! America Moves West," by Leland H. Creer, professor of history, University of Utah; "Population Pressure and Its Impact on the Environment," by John Tee-Van, of the Conservation Foundation and the New York Zoological Society; "Land Use, the Basis of Western Economy," by Sigmund V. Wantrup, professor of agricultural economics, University of California; and "Forestry Practice and Watershed Management, the Key to Resource Conservation," by Reed W. Bailey, director of the Intermountain Forest and Range Experiment Station. Presentation of these papers was followed by lively discussion.

This symposium was followed by an address on Tuesday evening by Olaus J. Murie, president of the Wilderness Society, on "Saving the Western Wilderness."

On Tuesday afternoon the president of the University of Utah, Albert Ray Olpin, and Mrs. Olpin, received