SCIENTIFIC BOOKS

PSYCHOLOGY

Psychology: A Factual Textbook. By E. G. BORING, H. S. LANGFELD, H. P. WELD and Collaborators. xviii + 555 pp. John Wiley and Sons, New York, 1935.

DESPITE their yearning, since the middle nineteenth century, to make psychology look like physics and physiology, the psychologists have remained irrepressibly critical and philosophical, even in the presence of their undergraduate students. E. B. Titchener, some twenty-five years ago, and John B. Watson, a decade later, succeeded in writing thoroughly dogmatic text-books, but neither was able to set a style. Both of these authors achieved consistency by omitting material embarrassing to their own views on fundamental questions, and the majority of teachers have been unwilling to employ such arbitrary tactics. The persistent popularity of such a human and variegated work as Professor Woodworth's text is clear evidence that teachers of psychology still prefer a certain amount of confusion to any strictly doctrinaire treatment of their subject.

The editors of the present book are unwilling to admit, however, that a straightforward and non-philosophical treatment of the elements of psychology must necessarily be dogmatic. "Experimental psychology," they say, "has reached the stage of maturity. There is a vast amount of well-substantiated fact which forms the foundation of the science" and which "should be presented to the young student of psychology in terms free from the bias of metaphysical presuppositions or of psychological systems." Their aim, in short, "has been to present such a factual text as one would expect from a science." They have sought "to achieve, not a handbook encumbered with a mass of detailed information, dates, the names of investigators and the titles of monographs, but a generalized statement of fundamental facts in so far as generalization is possible at this time."

The gist of their method is to let current psychology tell its own story through the pens of nineteen active investigators. The book is by no means a recitation of disconnected facts, but the theories and hypotheses considered are those which are presumably open to experimental and factual settlement.

The success with which the book fulfills its aim is remarkable. The editors and authors have produced a continuity and lucidity which one rarely associates with collections of chapters by different writers. One gets the impression from the progression of the chapters and from the skilful employment of cross-references that the various contributors kept constantly in mind the larger story into which their individual chapters were to fit.

The general design of the work may be judged from the chapter titles: The Nature of Psychology, The Response Mechanism, Psychological Measurement, Vision, Audition, Taste and Smell, Somesthesis, Intensity, The Perception of Spatial Relations, Temporal Perception, The Perception of Movement, Perceiving, Learning, Imagery, Pleasantness and Unpleasantness, Emotion, Action, Thought, Personality.

The editors, themselves, feel that inequalities in the actual attainments of research within the various areas of psychology may have created an uneven balance among the several chapters of their book. Out of a total of 535 pages, about 90 are devoted to perception. The discussion of the measurement of intelligence, on the other hand, is compressed into seven pages. I find it difficult to believe that investigation in the field of perception has progressed more than twelve times as far as in the measurement of intelligence, but I am not sure that the editors have any need to apologize. I happen to believe that the topics of work and fatigue (which are omitted in this text) contain much more that is definite in the way of both method and conclusion than do other topics which are dealt with at considerable length. But this proves nothing; it simply raises the question whether the editors in their allotment of space were able to use as their basic criterion the actual progress attained in the various lines of experimental inquiry. They have probably put through a better book by following their own sense of the important rather than the statistics of titles in the journals or a mail vote of the American Psychological Association.

In short, the text before us is a solid but clear statement of the elementary facts and methods of psychology as these appear to a group of fair and able men who, though biased by the traditions of what is known as "experimental" psychology, have yet succeeded in producing a work that is essentially up-to-date and catholic.

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LIMNOLOGY

Limnology. By PAUL S. WELCH, professor of zoology, University of Michigan. McGraw-Hill Book Company, 1935, pp. xiv + 471. Price, $5.00.

ALTHOUGH limnology is a youthful science, research has been very active in this field during the past three decades, and this has resulted in a voluminous and

widely scattered literature. It has been a difficult problem, therefore, to obtain representative material for an introductory course. This task is now greatly simplified by the present book, which is an outgrowth of a general course in limnology that has been given by the author for a number of years. The content of the book has been well and adequately selected and it is based chiefly on results obtained on American lakes and streams.

The subject-matter is fourfold in character, since it deals with the geology, physics, chemistry and biology of fresh waters. The geological part relates to the origin of lake basins, the dynamic action of the water on the shores and the great diversities in area, depth and elevation of lakes and in the character of their bottom deposits.

In the chapter dealing with the physical properties of lake waters, the annual cycle of temperature changes is discussed, together with the thermal stratification of the water, the heat budgets of lakes, the annual temperature changes in the bottom deposits and the penetration of solar radiation into different types of lake water. The quantity and quality of the radiation that reaches different depths are greatly affected by the color of the water.

The chemical discussion of lake waters includes a consideration of the dissolved gases, silica, phosphates, nitrates, calcium, magnesium and various other inorganic substances that are found in fresh waters. Also the organic matter that is present in the colloidal state or in true solution is discussed at some length.

Chapters VI and VII are devoted to a discussion of the effect of the physical and chemical conditions that obtain in lakes on the biota and to the various responses shown by aquatic plants and animals to the seasonal changes in these conditions.

The main part of the biological section (chapters VIII to XIV inclusive) deals with the various aquatic organisms and with the problem of the biological productivity of lakes; emphasis is placed on the latter and it includes the production of plankton as well as that of the bottom-dwelling animals and the large aquatic plants. The food value of this material is given consideration also.

The last three chapters relate to special types of water, such as ponds, bog lakes and streams. A good classified bibliography covering 54 pages completes the book.

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SPECIAL ARTICLES

CONCERNING ACTIVE IMMUNIZATION IN POLIOMYELITIS

THAT *Macacus* monkeys can be rendered actively immune to the virus of poliomyelitis has been known since 1910.[1] At that early date the important fact was also discovered that in process of the immunization, in which living virus was employed, a proportion of the treated monkeys, instead of becoming immune, always became paralyzed. The means employed in the treatment were to make successive injections of the virus beneath the skin; later the injections came to be made into the skin itself, which is still the method of choice in the monkey.[2] There is no essential difference in the double effects produced, except that skin injections seem to yield a higher degree of immunity.

Numerous and varied attempts have been made to modify the virus so as to preserve the immunizing properties and to remove the paralyzing action. Both physical and chemical means have been employed, but the results have not been satisfactory. Whenever the modifying agents inactivated the virus, no immunity followed the inoculations; when they reduced the activity, immunity would result, but paralysis also.[3] The effect of the physical and chemical agents seemed to be quantitative only; a dilution, not an attenuation, of the virus was produced. The virus recovered from the paralyzed monkeys injected with the chemically treated virus resembled in virulence the original virus strain before treatment was begun.

During the twenty-five-year period which has elapsed since the first experiments on immunization were made, certain virus strains have been passed through many *Macacus* monkeys. An effect of this passage was to enhance the virulence of some, but not of all the passed strains. It is noteworthy that the virus of poliomyelitis is strikingly unstable in its disease-producing or pathogenic properties; for reasons not understood specimens of high virulence will suddenly fall off in activity, after a time regaining the lost power while being preserved in glycerol.[4] On the other hand, some strains of virus possess enduringly weak activity; they are difficult to work with, because of the frequent failure to induce infec-

[1] S. Flexner and P. A. Lewis, *Jour. Am. Med. Assn.*, 54: 1780, 1910.

[2] W. L. Aycock and J. R. Kagan, *Jour. Immunol.*, 14: 85, 1927.

[3] F. W. Stewart and C. P. Rhoads, *Jour. Exp. Med.*, 49: 959, 1929.

[4] S. Flexner, P. F. Clark and H. L. Amoss, *Jour. Exp. Med.*, 19: 195, 1914.