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CHEMISTRY OF PENICILLIN

By the Committee on Medical Research, O.S.R.D., Washington, and the Medical Research Council, London

THIS brief summary of results obtained by British and American chemists, issued under the joint auspices of the Committee on Medical Research (O.S.R.D., Washington) and the Medical Research Council (London), is a preliminary notice of the principal findings secured up to the end of 1944 in a collaborative effort of a large number of investigators, unnamed at present. It implies some corrections of published data; authors of early publications are among those who have cleared up these points. For the sake of clearness, the account is not given in chronological order of development. The primary object of this communication is to disclose significant facts which have been confirmed by unequivocal synthesis and to record a few essential points which are still matter for conjecture. Full details will be published at a later stage, together with an account of experiments not referred to in this report.

Several antibiotics of the penicillin class are known and all have the empirical formula $C_9H_{11}O_4SN_2 \cdot R$. In F-penicillin (known in Britain as penicillin-I), R is Δ^2-pentenyl, $-CH_2 \cdot CH{=}CH \cdot CH_2 \cdot CH_3$; in dihydro-F-penicillin, R is *n*-amyl; in G-penicillin (known in Britain as penicillin-II), R is benzyl; in X-penicillin (also known as penicillin-III), R is *p*-hydroxybenzyl; in K-penicillin (a recent addition to the series), R is *n*-heptyl. The best elementary analyses are of pure crystalline sodium salts. Determinations of the molecular weights of the sodium salt and of the methyl ester of G-penicillin indicate that the empirical formulae truly represent the molecular weights.

The penicillins are strong monobasic acids of pK about 2.8; electrometric titration does not disclose the presence of a basic group. Slow titration with perchloric acid in acetic acid solution indicates such a group, but the penicillin is biologically inactivated by this treatment; rapid titration gives a negative result.

The ultraviolet and infrared absorptions, crystal

of neuroanatomy which has formed a regular part of standard psychology texts for many decades.

For some obscure reason psychologists traditionally have burdened their students with detailed descriptions of the nervous system, apparently in the hope that knowledge of this sort will in some mysterious fashion prove helpful to an understanding of psychological events. The regrettable fact is that to date there remains a vast chasm between the established data of mental activity and those of neurology; and the reviewer doubts seriously whether a purely descriptive account of the anatomy of the nervous system can be of any assistance to the student's comprehension of psychological phenomena. Possibly the advanced reader profits from a competent review of certain aspects of neurophysiology such as those involved in recent studies on electrical activity of the brain or acetylcholine and cholinesterase metabolism, but even here the potential psychological implications of the physiological data are so speculative that one is tempted to deny the original assumption and to insist that the psychology student's efforts might more profitably be directed toward a fuller investigation and better understanding of phenomena which belong within the psychological sphere as currently defined.

Obviously there are other points of view and it may well be that teachers of psychology will welcome precisely those sections in Professor Goodenough's book which the reviewer is inclined to regard as unnecessary. In any event, the inclusion of this material need not detract from the volume's obvious value as a text-book nor from the fact that the author has done a commendable job of synthesizing the important material in her field.

F. A. BEACH
THE AMERICAN MUSEUM OF NATURAL HISTORY

THE STORY OF THE WRIGHT BROTHERS

The Wright Brothers. By FRED C. KELLY. New York: Harcourt, Brace and Company. 1945. $3.50.

HERE, for the first time, is a complete and authentic record of the first men who achieved, sustained and controlled flight in a heavier-than-air flying machine—a biography authorized by Orville Wright.

The story begins with the boyhood background of Orville and Wilbur Wright, and covers, in interesting form, their many dreams, activities and enterprises which led to that epoch-making event at Kitty Hawk, North Carolina, on December 17, 1903, when, with Orville Wright at the controls, their bi-plane took off from the sand dunes and made flying history.

Following the first successful flight, a detailed account is given of their difficulties with the press, the lack of interest first shown by the United States Army, their successful flights and demonstrations in Europe, their engagement in the aviation business, their building the first airplane for the United States Army and their patent suit with Curtiss.

This story of the Wright Brothers is the most complete single volume depicting the history of their work in aviation and clarifies beyond question the disputes which finally culminated in their being given proper and full credit for making the first man-carrying controlled and sustained flight in a heavier-than-air machine.

Mr. Kelly has done a remarkable job in his book, and has compiled, in a form delightful to read, a great mass of details and information which is a splendid record of our two foremost American pioneers in aviation, Orville and Wilbur Wright.

RALPH H. MCCLARREN
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BOOKS RECEIVED

ALLEN, JOHN STUART. *Astronomy: What Everyone Should Know.* Pp. 199. New York: The Bobbs-Merrill Co. $2.50. 1945.

———. *American Old and Middle Tertiary Larger Foraminifera and Corals.* Part I—American Paleocene and Eocene Larger Foraminifera. Thomas Wayland Vaughan. Part II—West Indian Eocene and Miocene Corals. John West Wells. (Memoir 9.) Pp. x + 175, Part I; iii + 25, Part II. New York: Geological Society of America. 1945.

BRODY, SAMUEL. *Bioenergetics and Growth: With Special Reference to the Efficiency Complex in Domestic Animals.* Pp. xii + 1023. New York: Reinhold Publishing Corp. $8.50. 1945.

BRIGGS, LYMAN J., LOWAN, ARNOLD N., *et al. Tables of Associated Legendre Functions.* Pp. lxvi + 306. New York: Columbia University Press. $5.00. 1945.

BURCH, GEORGE, and WINSOR, TRAVIS. *A Primer of Electrocardiography.* Pp. 215. Philadelphia: Lea & Febiger. $3.50. 1945.

FRANCIS, DEVON. *Aviation: What Everyone Should Know.* Pp. 229. New York: The Bobbs-Merrill Co. $2.50. 1945.

GOOD, CARTER V. (Ed.). *A Guide to Colleges, Universities, and Professional Schools in the United States.* Pp. xv + 681. Washington, D. C.: American Council on Education. $5.00. 1945.

HOOPER, M. A. *The River Mathematics.* Pp. 401. New York: Henry Holt & Co. $3.75. 1945.

TWISS, SUMNER B. (Ed.). *Advancing Fronts in Chemistry: Volume I, High Polymers.* (A series of lectures sponsored by Wayne University under the direction of Neil E. Gordon, Chairman, Department of Chemistry.) Pp. 196. New York: Reinhold Publishing Corp. $4.00. 1945.

WARNER, W. LLOYD, and SROLE, LEO. *The Social Systems of American Ethnic Groups: Yankee City Series, Vol. III.* Pp. xii + 318. New Haven: Yale University Press. $4.00. 1945.

WOLFE, BERNARD. *Plastics: What Everyone Should Know.* Pp. 189. New York: The Bobbs-Merrill Co. $2.50. 1945.

YATES, RAYMOND E. *Atom Smashers: A Story of Discovery.* Pp. 182. New York: Didier. $2.00. 1945.