SCIENTIFIC BOOKS

HYDRAULICS

Hydraulics. By GEORGE E. RUSSELL. 5th edition. 468 pp. New York: Henry Holt and Company. 1942.

THIS book is the fifth in descent from a first edition published in 1909. Originally intended to serve as a short elementary text for classroom use, it has grown, through successive editions and two rewritings in large part, to the much more ambitious treatment represented by the present edition. The treatment is presented under fifteen chapters, of which ten deal with the more immediate aspects of the properties and behavior of liquids both at rest and in motion in channels with solid boundaries. The remaining five chapters deal with hydraulic machinery, implying the joint movement of liquids (water usually) and solid boundaries; and involving transfers of energy between the two members of the combination—typically, turbines and pumps.

Although the text is mainly devoted to hydraulics in its literal sense, treatment covering other liquids with high viscosity, such as petroleum oils, and also compressible fluids—gases and vapors—is given to an extent sufficient to enable the student to solve the simpler problems involving such fluids, and also to grasp the essential identity of the basic principles of fluid mechanics in its broader aspects. The five chapters on hydraulic machinery are intended to bring the book into step with modern practice.

The treatment in the first ten chapters is clear, well presented and does not call for mathematical preparation, beyond the simplest applications of the calculus. This self-imposed limitation is something of a handicap in the treatment of certain of the topics, but the treatment thus simplified facilitates the introduction of the student to the subject at an earlier date than under a condition of more rigorous and general treatment.

The chapters on hydraulic machinery present a well-organized elementary treatment of the principles involved, both geometrical and dynamic, with numerous illustrations drawn from recent practice in this field.

The text is well illustrated with 248 figures in the text, of which a number, especially in the chapter on hydraulic machinery, are half tones. There are also some 31 tables giving values of coefficients, etc., together with tables of natural trigonometric functions in the appendix. Most of the chapters are followed by an extended collection of problems illustrative of the subject-matter of the chapter, and aggregating 302 for the book as a whole. There are likewise appended to the subject-matter of the various chapters 76 classified bibliographic references. An appendix gives a brief and elementary discussion of the free vortex, and an explanation of the English and Metric systems of measurement.

The topics chosen for treatment are well selected, the arrangement appears logical, the treatment is clear and sound, and altogether the book should be welcomed as a definite contribution to the field of textbook literature of this subject-matter.

W. F. DURAND

HUMAN REPRODUCTION

The Hormones in Human Reproduction. By GEORGE W. CORNER, Director, Department of Embryology, Carnegie Institution of Washington, Baltimore. 265 pp. 24 plates. 32 figs. Princeton: Princeton University Press. 1942. $2.75.

IN 1942 Dr. Corner delivered the Vanuxem Lectures at Princeton. These lectures, delivered to a general audience, covered the very complex and fascinating assignment of hormones of reproduction. In this volume the author has added much to the material he presented in these lectures. The result is a masterpiece. The subject-matter is presented systematically and accurately and yet so simply and clearly that the reader can not help but be infected by the author's youthful enthusiasm. Even those of us who are intimately engaged in various aspects of the field of internal secretions are carried away with enthusiasm over Dr. Corner's skilful narrative of a detective story involving the innumerable facts accumulated during the past century by many inquisitive scientists. From it we can no doubt all learn how to present involved scientific material in an interesting and convincing style to the layman, but many of us will no doubt discover some, to us, new facts as well.

The subject-matter is developed from the historical, developmental and, in part, comparative scientific point of view beginning with the simplest form, but always in simple terms and with excellent photographic and diagrammatic illustrations of the underlying anatomy. In spite of the elementary and simple presentation the reader is not left with the impression that the remarkable control of the cyclic nature of the processes of reproduction in the female have been completely explained.

The historical background for the isolation of estrogens, progesterone and androgens is given in each case, but naturally, the author writes most feelingly in presenting the development of the scientific methods and results obtained in the isolation of the corpus luteum hormone. He frankly admits that he could not "write this chapter in cool detachment" because of his intimate contact with the work. This chapter

is an excellent lesson in hormone detection and isolation. It is full of examples of disappointments, difficulties, cooperative, national and international, give and take attitude and final success and independent confirmation. Dr. Corner also delights in "endocrine arithmetic," as he calls it. As a result he presents some truly astronomical values on the rate of formation and utilization of progesterone.

Laymen, physicists, chemists, biochemists and biologists alike will find this book exceptionally interesting and valuable.

F. C. KOCH

REPORTS

WARTIME ACTIVITIES OF MELLON INSTITUTE, 1942–43

DURING Mellon Institute's fiscal year ended February 28, 1943, the industrial research staff of the organization has been enlarged to 208 fellows and 187 fellowship assistants—a total increase of 40 for the year. These scientists and engineers have been employed on the 97 industrial fellowships in operation. Forty-four chemically trained women are doing capable work in fellowship laboratory investigations, primarily helping key men. The research demands of the war have indeed given rise to a general expansion of the institute's work.

The donors and members of the institute are exerting every effort to assist the armed forces, federal government agencies and American science and technology in this period of stress. A large number of fellowships are giving their full time to pressing problems induced by warfare. All other fellowships irrespective of name or field have direct or indirect contributory parts in the war effort. Many fellows are serving the nation on emergency advisory or research committees or are participating in field studies of wartime value. Constant technical aid is being furnished to the War Production Board, the Rubber Reserve Company, the National Defense Research Committee and the War Metallurgy Committee of the National Academy of Sciences. In consequence silence must be maintained during war regarding the nature, scope and results of most of the institute's industrial research programs. During the fiscal year—March 1, 1942, to March 1, 1943—the institute has expended $1,520,333 in conductng its various pure and applied science projects. These facts are set forth in the thirtieth annual report of the director, Dr. E. R. Weidlein, to the trustees of the institution.

The interest of the institute's department of research in pure chemistry in cinchona alkaloids has naturally led to investigations relating to synthetic anti-malarials. Apart from any socio-economic significance attached to the normal prevalence of malaria —an estimated one third of the population of the world is subjected to this disease—the gravity of the problem of coping with the malady in many military campaigns renders urgent the discovery of more effectual measures of control. Occupation by the Japanese of those regions in the Far East normally producing the bulk of the world's supply of quinine has made it even more imperative that research on synthetic antimalarials be extended. The department is carrying on a program comprehending various series of compounds for appraisal in malaria therapy. These studies involve in part simple heterocyclic nuclei structurally akin to the cinchona alkaloids and also compounds not so related. Certain Guatemalan plants esteemed locally in the treatment of malaria are being investigated chemically and pharmacologically.

In concluding for the time being researches on the cinchona alkaloids a number of ethers of hydroxyethylapocupreine have been prepared for comparison of their chemical and pharmacological properties with the qualities of the corresponding ethers of 6′-(β-thiolethyl) apocupreine. An innovation in building up certain members of the series of polyhydroxyalkyl ethers of apocupreine, and of other phenolic substances, was the use (as alkylating agents) of the monotosyl esters of the poly-isopropylidene acetals of suitable sugar alcohols. One method for the preparation of hydroxyethylapocupreine has been the hydrolysis of the benzyl group from benzyl-oxyethylapocupreine. It is now known that under the same conditions its homolog, α-phenyl-ethoxyethylapocupreine, is completely hydrolyzed to hydroxyethylapocupreine in approximately one sixth the time with consequent diminution of decomposition to a negligible amount of isolation of very pure hydroxyethylapocupreine in practically quantitative yield.

The statistical study of the use of hydroxyethylapocupreine in the clinical treatment of pneumonia has been suspended in order that the stock of this drug on hand may be utilized for antimalarial investigations. During the past year, however, medical collaborators of the department reported that, after three years of comparing pneumococcic pneumonia cases treated with sulfapyridine, sulfathiazole, sulfadiazine and hydroxyethylapocupreine, the percentage mortality with the latter was nearly the same as with the sulfonamides. Moreover, in contrast with the cases in which sulfa drugs were employed, no toxicity was observed under treatment with hydroxyethylapocupreine. The latter has been shown to be efficacious in the treatment of pneumococcic and staphylococcic infections of the eye.