relation of the sulci to the cortical areas; VIII. Endocranial casts and brain fissuration; IX. Some sulcal relations in the anthropoid and in the human brain; X. The fissural impressions on the endocranial casts of prehistoric man; XI. On homologies and the origin of sulci.

One is disappointed that the text does not deal with the mesial temporal and mesial frontal surfaces of the brain, where the history of the primate brain is the richest and wherein the secrets of phylogenetic development are most effectually concealed. The reason given for this omission is that ". . . it was not desirable to separate the hemispheres in this series" (p. 253). Insofar as the study goes, however, it is a thorough and dependable one, reflecting Dr. Connolly's wide experience in the field. The effort he expended on detail was immense and was wisely channeled into one phase of the over-all subject, namely, the geography of the fissures; his illustrations of the fissures are true and effective, for he has used the Schwarz stereograph in portraying them. Indeed, all of the 337 illustrations are excellent. The bigger problem of the relationship of thalamic development to the configuration of the gyri (of which the fissures are mere boundaries) is not dealt with. His description of endocranial casts of anthropoids and of prehistoric man constitutes an interesting chapter, but interpretation is scanty. The fissural pattern in fetal and adult human brains is treated at some length, as are also the differences in fissuration in Negroes and whites. It is curious that no reference could be found to the duplication of the central sulcus, described in 1882 by Giacomini, in 1907 by Tricomi Allegra, and in 1929 by Gerlach and Weber.

The documentation of the work is admirable. Only here and there can one find instances in which the works of the past could have been put to greater use—for instance, Kuhlenbeck's interesting interpretation of the significance of the lateral occipital gyri (p. 249).

Dr. Connolly's writing is terse and always to the point. His facility of expression makes the text read like a narrative. It is altogether a splendid piece of work.

WEBB HAYMAKER

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Illustrated Study Aid for Medical Bacteriology. Walter J. Nungester and Phebe G. Williams. Ann Arbor, Mich.: Edwards Brothers, 1949. 71 pp. $2.00.

This is a picture book. At first glance one might think it had little place among medical texts, but even slight perusal shows that it will take its place as an outstanding supplementary textbook in bacteriology.

Although the preface states that this is "strictly an experiment" it is the reviewer's opinion that the work in its present form has evident value for students studying medical bacteriology and immunology, postgraduate groups reviewing this subject matter, and teachers wishing to use the pictorial material for the preparation of lantern slides or directly on opaque projectors.

The technique of summarizing facts in charts and diagrams is here followed to its logical conclusion. It appears that few, if any, aspects of bacteriology cannot so be treated, as evidenced by the major divisions of the book: Types of Pathogens, Classification, Distribution and Spread of Pathogens, Disinfectants, Infection and Resistance, Immunology, Laboratory Diagnostic Procedures, Chemotherapy, Review of Diseases, Techniques and Methods.

Under each major heading is found a group of related charts and diagrams. Most are self-explanatory; a few assume some knowledge on the part of the reader, and all provide the nucleus of more or less extended discussion, depending on the group interest. The section previewing diseases has the most charts—40 out of a total of 131. The chart of each disease summarizes the pathology, nature of the pathogen, clinical and laboratory diagnosis, treatment, spread and prevention.

The potentialities of this work well warrant the extended version that the authors contemplate.

STANLEY MARCUS

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Clinical Pathology: Application and Interpretation. Benjamin B. Wells. Philadelphia-London: W. B. Saunders, 1950. 397 pp. $6.00.

The first laboratory employing the microscope for the diagnosis of infectious diseases was established by Pasteur at Alais in 1865, in connection with his investigations on pebrine of silkworms. The malady was controlled by destroying the ova of moths found infected by microscopic examination. In order to put this procedure to practical use, girls were taught how to make the necessary examinations. In this way the training of laboratory technicians was included as a function of the diagnostic laboratory at a very early date. Seventeen years later, Koch, in his monumental work on tuberculosis, called attention to the necessity of microscopic examinations of sputum for the tubercle bacillus, to confirm diagnosis of pulmonary tuberculosis. The teachings of these two gave to the diagnostic laboratory its true place in medicine.

Clinical pathology was not generally accepted as a specialty in the United States until the second decade of the present century. The wider application of serological methods, a multiplicity of biochemical tests, the assay of hormones and vitamins, and the determination of susceptibility and resistance of microorganisms to the sulfanilamides and antibiotics necessitated the bringing together of individuals skilled in the various branches of serology, biochemistry, endocrinology, and bacteriology to carry out the multitude of highly specialized techniques. The connecting link between these laboratorians and the practicing physician is the clinical pathologist; trained in medicine and skilled in the interpretation of the results obtained by the experts, he brings to the clinician a clearer understanding of the value and limitations of laboratory findings as they affect the patient.

It is essential for the physician to know what laboratory procedures are available and what they may contribute to the problem confronting him. The book by Wells will provide this information. There are nine chapters, the first seven of which deal with: laboratory procedures generally applicable to the study of infectious diseases, diseases of the gastrointestinal system, diseases of the re-

spiratory system, diseases of the kidney and urinary tract, diseases of the blood, diseases of the cardiovascular system, and metabolic and endocrine disorders. Chapter eight deals with clinical laboratory studies in surgery and chapter nine with clinical laboratory studies in obstetrics. In an appendix, the author, with the assistance of A. E. Moon, has presented a rounded-out discussion of laboratory aids in symptom diagnosis.

The book is well written and the author has selected wisely among the plethora of tests now available. Although the volume is neither a textbook nor a laboratory manual it is highly recommended for the practicing physician and the medical student.

MALCOLM H. SOULE

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Haemoglobin: A Symposium Based on a Conference Held at Cambridge in June 1948 in Memory of Sir Joseph Barcroft. F. J. W. Roughton and J. C. Kendrew, Eds. London: Butterworths Scientific Publs.; New York: Interscience, 1949. 317 pp. $8.50.

Sir Joseph Barcroft was remarkable at least as much for his human qualities as for his outstanding scientific achievements. In his courage, vitality, and enthusiasm, and his affectionate understanding of other human beings, he aroused in his associates personal loyalty and devotion that is given to few scientists. He died suddenly in 1947 at the height of his activity, although he had been retired from his professorship for ten years, and the depth of his influence can be felt in reading the proceedings of this conference, which give a vivid and comprehensive summary of our present knowledge of hemoglobin.

The volume opens with personal tributes to Barcroft, and reminiscences, by E. D. Adrian, Sir Henry Dale, A. S. Krogh, C. G. Douglas, A. V. Hill, R. A. Peters, G. S. Adair, and F. J. W. Roughton. All are admirable and well worth reading, both for those who knew Barcroft personally and those who did not. They help to round out the picture of the man that one obtains from his own vividly written books and papers.

The rest of the present volume is concerned with current investigations on hemoglobin, many directly inspired by Barcroft himself. Here it is impossible even to mention all. Important considerations on the fundamental structure of hemoglobin are advanced by L. Pauling, J. Wyman, Jr., M. F. Perutz, and several others. J. C. Kendrew presents important conclusions, derived from x-ray studies, on the crystal structure of horse myoglobin. The molecule appears to consist of a single layer of folded polypeptide chains, with the plane of the heme group nearly at right angles to the protein layer. This corresponds to Perutz's four-layer structure for horse hemoglobin. Kendrew and Perutz also supply a helpful general discussion of x-ray crystallography of biological macromolecules, addressed to the nonexpert. Important data on amino acid composition are given by G. R. Tristram and by A. Rossi-Fanelli. R. R. Porter and F. Sanger discuss the terminal amino groups of the peptide chains of several hemoglobins, with interesting zoological correlations. E. M. Jope gives valuable data on absorption spectra. There are several studies on the important problem of the differences between adult and fetal hemoglobins; notable are the solubility studies of H. M. Jope and J. R. P. O'Brien, and of M. J. Karvonen. G. S. Adair, and H. Gutfreund, discuss important osmotic pressure studies. H. Barcroft, Q. H. Gibson and D. C. Harrison, and also W. N. M. Ramsay, have valuable contributions on ferrihemoglobin (methemoglobin) in normal blood and in disease. C. Rimington discusses the biosynthesis of heme. F. J. W. Roughton, J. W. Legge, and P. Nicolson present briefly their new data on the kinetics of hemoglobin in solution and in the red cell, and Roughton treats the intermediate compound hypothesis, with conclusions differing in important respects from those of Wyman; these and other disagreements which the reader will note in the book should stimulate further research. D. L. Drabkin describes his work on the accurate determination of the oxygen dissociation curve; H. E. Davenport describes the extraordinary hemoglobins of the worm *Ascaris*, and H. P. Wolvekamp discusses hemocyanin.

Many of these papers briefly present conclusions published elsewhere in greater detail. Others give information which as yet can be found nowhere else. Every contribution deserves close attention, and, in spite of its high price, the book can be recommended most warmly to everyone interested in the structure of this extraordinary class of macromolecules. It is a worthy tribute to Barcroft, whose living influence inspired the conference and the book which issued from it.

JOHN T. EDSALL

Harvard University

Malariology: A Comprehensive Survey of All Aspects of This Group of Diseases from a Global Standpoint. Mark F. Boyd, Ed. Philadelphia-London: W. B. Saunders, 1949, 2 vols. 1643 pp. $35.00 a set.

The reviewer cannot do better than quote, as the purpose of this book, the opening sentence of the foreword: "It has been the Editor's intention to make this volume a working manual of malariology, a comprehensive and adequate review or factual survey of all available knowledge relating to malaria objectively presented and brought down to date."

This objective is reached with the aid of 65 contributors who have dealt with the problems of malaria from either an abstract or practical standpoint. There are 70 chapters grouped in five sections as follows: Section I. Introduction, one chapter; Section II. Parasitology, eight chapters; Section III. Definite Hosts, 15 chapters; Section IV. Intermediate Host, 25 chapters; Section V. Control and Eradication, 21 chapters. In Appendix I, the equipment for field and laboratory investigation is listed with descriptions and available sources. Appendix II is captioned: Provisional Directory of Manufacturers and Distributors of Equipment and Supplies for Anti-Anopheline Operations. The author and subject indices are unusually comprehensive, occupying 153 pages. The first 31 chapters are in Volume I; Chapters 32–70, with the appendices and indices, compose Volume II.