selected because they differ phylogenetically from the animals which have commonly been studied and because the edentate mammals apparently live with a body temperature which is usually lower than that of other mammals. The management of the laboratory is adjusted to receive all the benefits of the various technical and other facilities in the Canal Zone, and the provision of animals was very satisfactory. By careful arrangement in advance we transported all the equipment necessary for our physiological work. We found that we could count upon such essential local supplies as distilled water and ice and some reagents and articles which had been omitted or consumed. The laboratory space and the living arrangements were satisfactory, and it was a great advantage to be able to live and work isolated in the establishment at Barro Colorado Island. The situation was also pleasant and interesting, and the opportunity for observing the rich tropical flora and fauna was especially agreeable to physiologists who are usually confined to the artificial environment of the laboratory.

To many biologists the opportunities in the tropics are quite familiar, but it is not usually realized how great is the opportunity for experimental and comparative physiology in the tropical parts of America. Barro Colorado Island by reason of its situation and stable establishment is particularly favorable as a site in which to carry on experimental work, for the living material is there in its natural condition, and by careful planning the means for experimental study can be well provided. It seems likely that with so much of the world now cut off from the view of American biologists they will turn more particularly to the American tropics in order to extend their range of study and reduce the deadening influence which isolation will certainly bring. In tropical America the emphasis will be largely upon the new animals and plants and new environments rather than upon the personal element of association with large groups of scientists. Among the institutions of Central and South America there are, however, ancient cultural institutions, and many are carrying on scholarly work which pertains to the country in which they live. By travel among those countries, American biologists working among the scholars of Central and South America will find friendly interests which will go far toward developing good-will among the different nations of the Americas.

LAURENCE IRVING

SWARTHMORE COLLEGE

SCIENTIFIC BOOKS

RECENT BOOKS ON THE HISTORY OF MEDICINE

A History of Medicine. By ARTURO CASTIGLIONI, formerly professor at the University of Padua; research associate in the history of medicine at Yale University. Translated from the Italian and edited by E. B. Krumbhaar. xxvii + 1013 + xl pp., with 443 illustrations. New York: A. Knopf. 1941. $8.50.

Progress in Medicine: A Critical Review of the Last Hundred Years. By IAGO GALDSTON, with a Foreword by H. E. SIGERIST. ix + 347 + xiv pp. New York: A. Knopf. 1940. $3.00.

The Story of Surgery. By HARVEY GRAHAM. xv + 425 pp., with 23 illustrations. New York: Doubleday, Doran and Company, Inc. 1939. $3.75.

Medical Work of the Knights Hospitallers of Saint John of Jerusalem. By EDGAR ERSKINE HUME, lieutenant-colonel, Medical Corps, United States Army. xv + 371 pp., with 130 illustrations. Baltimore: The Johns Hopkins Press. 1940. $3.00.

The Chinese Way in Medicine. By EDWARD H. HUME. 189 pp., with frontispiece and 8 illustrations. Baltimore: The Johns Hopkins Press. 1940. $2.25.

Science and Seizures: New Light on Epilepsy and Migraine. By WILLIAM GORDON LENOX, president, Internatinal League against Epilepsy. xiii + 258 pp. with 10 illustrations. New York: Paul B. Hoeber (Harper and Brothers). 1941. $2.50.

Observations Made During the Epidemic of Measles on the Faroe Islands in the Year 1846. By PETER LUDWIG PANUM. Trans. by A. S. HATCHER, with Memoir by J. J. PETERSEN (Trans. by J. DIMONT) and Introduction by JAMES ANGUS DOULL. xxxvii + 111 pp., with a frontispiece. New York: Delta Omega Society, American Public Health Association. 1940. $2.50.

Man on His Nature. By SIR CHARLES SHERRINGTON. 413 pp. with 12 illustrations. New York and Cambridge: The Macmillan Company and The Cambridge University Press. 1941. $3.75.

Medicine and Human Welfare. By HENRY E. SIGERIST, William H. Welch professor of the history of medicine in The Johns Hopkins University. ix + 148 pp. + 20 illustrations. New Haven: Yale University Press. 1941. $2.50.

Magic in a Bottle. By MILTON SILVERMAN. xiii + 314 pp. New York: The Macmillan Company. 1941. $2.50.

Plague on Us. By GEDDES SMITH. 365 pp., with 11 (unlisted) illustrations. New York: The Commonwealth Fund. 1941. $3.00.

De Morbis Artificum Bernardini Ramazzini Diatriba:

Diseases of Workers. By WILMER CAVE WRIGHT, professor of Greek in Bryn Mawr College. The Latin Text of 1713 Revised, with translations and notes. xlvii + 549 pp., with 3 illustrations. Chicago: The University of Chicago Press. 1940. $5.00.

IN his preface to Dr. Galdston's book, Professor H. E. Sigerist, of The Johns Hopkins University Institute of the History of Medicine, offers a casual exaggeration. "In recent years we have been presented with an infinity of popular medical books that you can not read without nausea. I never touch a book that is called *The Romance of . . .* , or *The Story of . . .* Paul de Kruif has created the genre in medical historiography at which he is a master, but his many imitators have failed miserably." This comment emphatically does not apply to the volumes here under consideration.

Castiglioni's "History of Medicine" first appeared in 1927. It has been skilfully translated and edited by Dr. Krumbhaar, and offers a fresh and original survey of the applications of scientific development to the broad problem of disease. With admirable and extensive illustrations it emphasizes the contributions of middle Europe to medicine. The discussion of Graeco-Roman medicine is particularly thorough. While Castiglioni's volume is not as detailed nor as inspiring as Garrison's well-known work (4th edition, Phila., 1929), it will probably supplant Garrison as a standard English reference in the history of medicine, since it is unlikely that a revision of Garrison would be successful even if undertaken by the brilliant editors who were his associates at Johns Hopkins.

Dr. Galdston's description of major developments in medicine during the last hundred years is stimulating but highly selective. It emphasizes particularly the development of bacteriology and its application in the prevention and treatment of disease, revolutionary studies in nutrition and endocrinology, and the startling growth of systematic psychiatry. As Dr. Galdston emphasizes, the latter may be medicine's most significant philosophical contribution to society, since it affords a basis for knowing ourselves.

Harvey Graham is the pseudonym of a well-known British surgeon. He has ably organized a broad historical account of his specialty. Surgery was born, he says, of a queer muddle of demonology, tribal ritual and social necessity. Much of its basic technique is amazingly ancient. Its great success has been due to the skill with which accumulating scientific knowledge has been applied to its problems by a host of brilliant thinkers and technicians. In the past century it has expanded widely as a result of the development of anesthesia, asepsis and transfusion. While this history is written with the customary brilliant British bias, it suffers from many errors of omission. Transfusion and management of shock, as important factors in the success of modern surgery, are only incidentally mentioned in a penetrating glimpse into the future of surgery.

Colonel Hume's survey of the medical work of the Knights of Saint John is informative and detailed. Founded in the eleventh century, the order is particularly identified with the occupation of Malta (1530) and the establishment of hospitals in various portions of the Mediterranean area and Europe. In addition to its broad humanitarian interest and its careful preparation for the care of the sick, the order was a pioneer in developing military medicine.

Dr. Edward Hume's volume comprises a series of interesting lectures presented at the Institute of the History of Medicine of The Johns Hopkins Medical School. His succinct account of native Chinese medicine is largely a description of an attitude. He refers to the vast formalized medical traditions of China as a record of man's loyalty to ancient beliefs and passive resistance to adversities in his environment. Dr. Hume describes a portion of a large-scale racial experiment in biological adaptation. He points the difference between the Chinese and Westerners, when he says a Chinaman faces his foes, whether human or the forces of nature, with adaptation and compromise, rather than with analytical inquiry with a view to control and transformation.

Dr. Lenox's book represents the culmination of his 20-year effort to further intelligent cooperation between patients, physicians and the public with respect to epilepsy and migraine. With an appropriate historical background, it describes simply and clearly the development of our still meager information and methods of handling these important disorders. This brief inspirational volume is a model of honest treatment of a medical condition for the benefit of sufferers from it.

The translation of Panum's "Observations on Measles" is the third of a series of republications of public health classics made possible by the Delta Omega Society. This is a particularly valuable one in illustrating the method by which epidemiological information can be obtained. Panum (1820–1885) was distinguished for his work in experimental biology at Kiel and at Copenhagen. He was a remarkable general physiologist, and was influential in developing the Scandinavian tradition in this field. His survey of measles in the Faroes was his doctoral dissertation.

Like Panum's volume, "Plague on Us" is dedicated to the memory of Wade Hampton Frost (1880–1938), who did so much to develop scientific interest in epidemiology in this country. Geddes Smith has pre-

pared a superb model of what a popularized historical work relating to science should be. It is clearly and entertainingly written, beautifully organized and illustrated, and so judicious and well documented as to constitute a valuable reference work for specialists in the field. It deals with the history of the great pestilences of bubonic plague, sweating sickness, yellow fever, cholera and influenza. It describes the history of scientific analysis of infectious disease and factors in their control. It offers many cleverly devised scientific detective stories relating to epidemics. It suggests how very much remains to be done in epidemiology and proposes stimulating ways by which these future tasks may be approached.

Appropriate to a notice of these books is a timely volume which is to appear this spring under the auspices of the Commonwealth Fund, "Papers of Wade Hampton Frost, M.D.: A Contribution to Epidemiological Methods," edited by K. F. Maxcy. This volume includes 19 papers prepared by Frost as an officer of the U. S. Public Health Service, and as professor of epidemiology at The Johns Hopkins University School of Hygiene and Public Health. They deal with the principles of epidemiology, the study and control of epidemics and with detail involving the epidemiology of influenza, diphtheria and other important diseases.

Dean of English physiologists, Nobel Laureate in 1932 and sensitive poet, Sir Charles Sherrington weaves into his Gifford Lectures all the strong and brilliant threads of his knowledge and artistry to make a panoramic and awesome tapestry of philosophy. Searching for a suitable text to represent the origin of modernity in the Renaissance, Sir Charles selects "De Abditis Rerum Causis" (Paris, 1548) by Jean Fernel (1497–1558), who was physician to Henry II of France. Fernel's dive into philosophy from the springboard of physiology was prompted by the Hippocratic aphorism asking "Whether in disease there is not something supernatural." To this question the Hippocratic school had answered in the negative in the famous treatise, "On the Sacred Disease." With great sympathy Sir Charles describes Fernel's sophisticated "vitalism" and then proceeds with a masterful accumulation of specific data and logical interpretation to show that no longer is the distinction between living and non-living a qualitative one. With skilful dialectic Sir Charles shows that our current philosophical position is as far beyond that of the Renaissance as is our more commonly appreciated advance of demonstrable knowledge of ourselves and our environment. Or is it?

The goal of biology, to explain living processes in terms of atomic physics, seems to Sir Charles to be vaguely visible as the mists of our ignorance gradually dissolve. However, his careful and systematic analysis of the vast accumulation of knowledge in his own special field of neurophysiology brings him back to the more fundamental problem of the apparent dualism of the Ego and the Non-Ego, which he calls "mind" and "energy." So far, says Sir Charles, "mind refuses to be energy, just as it always refused to be matter." He insists on differentiating the mental process from the cerebral process, although he admits their approximation.

> There on one side electrical potentials with thermal and chemical action, compose a physiological entity held together by energy relations; on the other a suite of mental experience, an activity no doubt; but in what, if any, relation to energy! . . . Our two concepts, space-time sensible energy, and insensible unextended mind, stand as in some way coupled together, but theory has nothing to submit as to how they can be so. Practical life assumes that they are so and on that assumption meets situation after situation; yet has no answer for the basal dilemma of how the two cohere. There is no more of course than mere analogy between this mind-energy complex which teases biology and that other the wave-particle dilemma which has been teasing physics. . . . Naked mind and the perceived world . . . have this in common—they are both concepts; they both of them are parts of knowledge of one mind. They are therefore distinguished, but are not sundered.

Sir Charles shows how science in shedding "anthropisms" becomes behavioristic, but how man through evolution becomes social and more than comprehensible by scientific criteria alone. Man's values for truth may be supplied by natural science, but for values in beauty and goodness man still relies on natural religion, which also values truth.

> Natural Religion has not forgone emotion. It has simply taken for itself new ground of emotion, under impulsion from and in sacrifice to that one of its 'values,' Truth. Its view of the world and of itself is based upon the purview of what by its light it can accept as true. In that way, for it, much that is comfortable in other religions lapses. If you will, man's situation is left bleaker. One feature of that situation is that the human mind, such as it is, is left the crown of mind to which human life in all its needs has direct access. Compared with a situation where the human mind beset with its perplexities had higher mind and higher personality than itself to lean on and to seek counsel from, this other situation where it has no appeal and no resort for help to beyond itself, has, we may think, an element of enhanced tragedy and pathos. To set against that, it is a situation which transforms the human spirit's task, almost beyond recognition, to one of loftier responsibility. It elevates that spirit to the position of protagonist of a virility and dignity which otherwise the human figure could not possess. It raises the lowliest human being conjointly with the highest, Prometheus-like, to a rank of obligation and pathos which neither Moses in his law-giving nor Job in all his suffering

could present. We have, because human, an inalienable prerogative of responsibility which we cannot devolve, no, not as once was thought, even upon the stars. We can share it only with each other.

One must contemplate Sir Charles's masterpiece from a little distance, so as not to be blinded by its dazzling detail. It is a magnificent artistic achievement, like a great fresco, a grand symphony, or an heroic poem or drama. Considered reflectively, Sir Charles's great effort looms like a peak in the range of the twentieth century Georgians, like a lofty take-off for the flight of current thought.

Dr. Sigerist's "Medicine and Human Welfare" comprises the sixteenth series of "Lectures on Religion in the light of Science and Philosophy" delivered on the Dwight Harrington Terry Foundation at Yale University. In analyzing the manifold relations between medicine and human welfare, Dr. Sigerist organizes his ideas around the concepts of disease, health and the physician. As one aspect of the age-old struggle between man and nature, medicine originated in close association with religion and developed with magic. Dr. Sigerist traces with admirable illustration the development of ideas regarding disease, particularly with reference to cause, which determines type of management. He then contrasts this skilfully with the growth of our ideal of health from the Greek concept of balance and harmony to the modern notion of "public health." Dr. Sigerist considers the physician from a sociological standpoint. He feels that medicine like education will ultimately become a public service in every civilized country.

"Magic in a Bottle" is the first attempt to popularize significant episodes in the development of pharmacology, which occurred only during the last century and a half. Written by an experienced journalist who is a contributing scientist in his own right, it is brilliantly written, highly informative and essentially accurate, even though it may include obviously fictitious conversation for dramatic effect. Selected references offer a trained pharmacologist an opportunity to become acquainted with many of the classics in the science, of which he may not be fully aware. The reader is offered significant detail in the long history of the isolation of biologically active compounds from various crude sources that may have been used as drugs on an empirical basis from antiquity. This effort began with Sertuerner's isolation of morphine from opium in 1803, and includes subsequent isolation and identification of alkaloids, glucosides, vitamins and hormones. Clear and interesting accounts are given of Ehrlich's systematic establishment of chemotherapy, the contributions of Fischer, and the remarkable current work on the sulfanilamides. The volume has been prepared with a rare sense of humor and with a keen appreciation of the human character of the scientists involved, their struggles, disappointments, lucky breaks, tragedies and enduring achievements.

One of the most important practical developments of modern medicine has been in the field of industrial hygiene. One of the pioneers in this effort was Bernardini Ramazzini (1633–1714), whose treatise on occupational diseases, "De Morbis Artificum," was first published in 1700. Mrs. Wright, professor emeritus of Greek at Bryn Mawr, has prepared a clear translation of this important work, with an unusually stimulating and informative historical introduction. Already in debt to Mrs. Wright for her splendid translation and account of Fracastoro on "Contagion," medical historians must now again acknowledge how much they may owe to a sound classical scholar sympathetic with their problems. Not only is Mrs. Wright's work significant in medical history, and indispensable in a historical survey of occupational diseases, but it also affords a detailed historical picture of the vivid life of a great Italian city in the late seventeenth century. Rendering into current idiom many of the great medical and scientific classics of the Renaissance may do much to give modern scientists a clearer appreciation of the factors that make their science possible. Here is a useful opportunity for classical scholars.

Historical surveys of scientific achievements remain among the most important tasks to which all scientists may contribute. They offer perhaps the best way by which the spirit and method and aim of science can be communicated to the mass of people. George Sarton has frequently indicated the potential significance of such efforts. Wide public appreciation of the spirit and aim of science may be the salvation of our democratic civilization with which the scientific spirit is so closely related. Demonstrable knowledge of ourselves and our environment, voluntarily accepted after critical examination, provides the firm foundation for a rational faith which no arbitrary authority or superstitious ideology may demolish—the solid rock from which free peoples may decide toward what goals they may be able to work, and by what means they may be able to reach them. This knowledge, which is science, must be made fully available to all people, if democracy is to survive. Simply written but thought-provoking and essentially accurate popularizations of science, such as have been so successful in regard to medicine, offer a relatively easy way to obtain public understanding of science, without burdening the citizenry with non-essential, tiresome, technical details. This is their justification, no matter what their stylistic faults.

CHAUNCEY D. LEAKE