—until in mammals all cells live in an internal environment. This makes a fascinating story.

There follows an account of the history of knowledge of the vascular system, written as one has longed to have medical history recorded. In these pages familiar discoveries are lived through again but, more than that, there is the continued logical story of the ideas they evoked—the history of medical thought.

It was a favorite saying of the late Professor Franklin Paine Mall that one ought to get just as much pleasure out of the discoveries of others in one's field as from one's own work. He would have found that quality of pleasure in Dr. Drinker's pages.

In Chapter IV is concentrated the story of the physiology of the lymphatic capillaries. It starts with the work of Carl Ludwig and his pupils. They succeeded in cannulating not only the thoracic duct but the peripheral lymphatic trunks as well. From his studies Ludwig believed that lymph was a filtrate from the blood, a concept later extended and established by Starling (1893) in a study of the influence of mechanical factors on lymph production. From this foundation further progress has depended on the development of exceptional skill in operative procedures, aided by the new binocular dissecting microscopes, adequate lighting facilities and tools perfectly adapted to their use. In addition, an essential factor in the advancement of knowledge in this field was the introduction (started in 1920) of microchemical methods which allowed for the first time repeated analyses of lymph from the same vessel.

By means of extensive experiments, notably by Dr. Drinker and his collaborators, on cannulating peripheral lymph channels, it has been demonstrated that in the entirely quiescent state there is practically no flow of lymph. This is expressed in the fifth generalization quoted above, that the lymphatics in the mammal have no inherent propulsive mechanism for moving the lymph.

The importance of this physiological fact is shown in its applications to medicine and surgery in the last chapter. There followed the even more remarkable achievements of cannulating the ducts draining the heart and the lungs. The studies on the lungs[1] were in press when the present Lane Lectures were being written. From both heart and lungs there is a considerable flow of lymph, relatively constant for each animal. Neither heart nor lungs are ever quiescent. Over-ventilation of the lungs reduces lymph flow and, conversely, lowered oxygen, by increasing the permeability of the blood capillaries, increases lymph flow. From the lungs, a single lymphatic duct on the right side drains the right lung and much more than half of the left lung, but from the heart, on the other hand, it is possible to collect all the lymph. Analyses of the lymph from the heart and of the pericardial fluid show such correlation in composition with serum as to demonstrate conclusively that both lymph and pericardial fluid are filtrates from the blood.

Based on the knowledge gained from extensive experiments on lymph flow and the conditions which affect it, is such an illuminating discussion (in the fifth chapter) on the mechanisms of wound healing and scar formation in relation to the newer methods for treating injuries that no surgeon can afford to miss it.

At the time Dr. Drinker was invited to deliver the Lane Medical Lectures for 1941, he was engaged in correcting proof of his recent book[2] which gives a detailed, critical analysis of the entire subject and an extensive bibliography. This invitation gave him a chance for a different type of contribution. These are days of high specialization in science, but the type of problem that must now be faced demands not one but often many of these special techniques. Books of the type of the present one, which give the story of the nature of a problem and of the balance of theory and experiment, are thus urgently needed by scientists themselves. Written in clear, lucid, non-technical language, these pages will prove a delight to the layman interested in biology, to the medical student keen to see what the adventure of research is like, and to the practitioner, still a student of medicine.

FLORENCE R. SABIN

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, NEW YORK, N. Y.

[1] Madeleine F. Warren and Cecil K. Drinker, *Amer. Jour. Physiol.*, 136: 207, 1942.

[2] C. K. Drinker and J. M. Yoffey, "Lymphatics, Lymph and Lymphoid Tissue." Cambridge, Mass.: Harvard University Press, 1941.

## A MODERN WIZARD

*Doctor Wood: Modern Wizard of the Laboratory.* By WILLIAM SEABROOK. 335 pp. New York: Harcourt, Brace and Company. 1941. $3.75.

THOSE who have known Dr. Wood for many years will doubtless read with much enjoyment, not to say amusement, this very interesting biography. In it they will find many verifications of their own experiences and many additions to those experiences. Naturally, it is impossible to give anything like a detailed review of a book which is saturated with anecdotes and in which the details of the special situations concerned are the things which provide the main features of entertainment.

The biography starts with a legendary letter supposedly written by Robert Williams Wood to his grandmother on the day he was born and announc-

ing his intention of paying his respects to the said grandmother in due course. Chapter I introduces us to some of his boyhood pranks, which read much more amusingly when the dangers and embarrassments associated with them are known to have passed. In Chapter 2 we trace his four years at Harvard, we breathe a sigh of relief at the evident intervention of Providence which prevented him from blowing up the chemical laboratory, we find him transporting himself into the realms of fantasy through an effort to enlarge his experience by swallowing a suitable quantity of oriental drugs and thus transforming himself in his own imagination into a fox, and finally we see him safely graduated in 1891, to the relief and surprise, as it is recorded, of his family and probably some of the faculty as well, many of whom, it is confessed, he must have infuriated beyond words. In the third chapter we find him at Johns Hopkins with the idea of securing a Ph.D. degree. We see him spitting out metallic sodium into street puddles to the great consternation of the darkies who, seeing him thus spit that which turns to fire, believed him to be a reincarnation of the devil himself. We read of his courtship of the future Mrs. Wood and of its practical turn in devising a specialized form of hot water bottle, depending upon a mixture of sulfuric acid and water, for the purpose of keeping her hands warm. We find him leaving Johns Hopkins without the degree for which he went there and going to the University of Chicago, where we learn of his grievances in the laboratory of Professor E. H. Schneider, from whom, however, he parted without mortality on either side. He completes his thesis for his Ph.D. degree in chemistry, but changes in the requirements in physics prevent him from completing that degree and result in his leaving in high dudgeon. Next we find him in Berlin where, as a result of some of his pranks, only his legs save him from official incarceration as a guest of the government. We find him trying out everything, including gliding, and nearly breaking his neck in the process. In 1897 he assumes the academically humble and poorly paid post of junior instructor of physics at the University of Wisconsin, where, however, advancement comes to him for his ingenious exploit in using the city's electric power supply to thaw out the city's water mains in winter. Later, in the same university, we find him beginning some of the spectroscopic work for which he was to become so famous.

Following the death of Henry Roland in 1901, Wood became professor of experimental physics at Johns Hopkins University where, supplemented by the work performed at his summer laboratory at East Hampton, he continued to enhance his reputation so well established in optics. The narrative is filled with anecdotes pertinent to this period, one of the most celebrated being that concerned with the cleaning of cobwebs from the interior of his long spectroscope, which action was performed by driving the family cat through the tube, a procedure which, as one might surmise, he did not fail to publish in the *Philosophical Magazine*. We read of his trips to Europe, of his subtle tiffs with certain Continental physicists and of his dramatic and perhaps a little hard-hearted procedure of exposing the myth of Blondlot's N-rays. We read of the background surrounding his humorous writings, notably his celebrated book "How to Tell the Birds from the Flowers." The war period is covered, and one senses that Wood's temperament was evidently not very well adapted to military procedures. We read of his exploits in the debunking of frauds and of his driving the celebrated medium, Margery, into hysterics. We learn of his exploits in the capacity of a scientific detective and of his solution of several criminal mysteries. Finally, we learn of his exploits as a boomerang thrower and of his confidence of his own skill in hurling a war boomerang right at the spectators of a football match, happily without fatality.

All in all, the book will provide entertaining reading for any one and particularly for those who have known Dr. Wood in the flesh and who, of their own experience, can enhance the setting of some of the amusing stories told.

W. F. G. SWANN

BARTOL RESEARCH FOUNDATION OF
THE FRANKLIN INSTITUTE

# SOCIETIES AND MEETINGS

## THE IOWA ACADEMY OF SCIENCE

THE fifty-sixth annual meeting of the Iowa Academy of Science was held at Iowa Wesleyan College, Mt. Pleasant, Iowa, on April 17 and 18, with 195 registered members and visitors attending. The academy was officially welcomed to the Iowa Wesleyan campus by President Stanley B. Niles, who at the same time reviewed the history, accomplishments and objectives of Iowa Wesleyan College, which was celebrating the centenary of its founding. The presidential address by President Roy A. Nelson, of Cornell College, following the welcome, ably developed the topic "Science in a Changing World." Then Dr. Walter F. Loehwing, of the State University of Iowa, presented an interesting discussion of the physiology of plant growth and development.

A joint symposium on industrial hygiene was held with the Iowa Medical Society on Friday afternoon.