tem, Washington, D. C., November 10, 1941. This bulletin was prepared by Lieutenant Oliver Harold Folk, chief, Medical Statistics Section, Research and Statistics Division, under the direction of Mr. Kenneth H. McGill, assistant chief, Research and Statistics Division, and in cooperation with Colonel Leonard George Rowntree, M.C., Res., chief, Medical Division. On page six there appears this statement:

> The average height of the registrants examined (by local draft boards) was 67.5 inches, the average weight 150 pounds and the average chest measurement at expiration was 33.9 inches. Registrants who were classed by local boards as available for general military service averaged 68.1 inches in height and weighed 152 pounds.

On page eight of this report there also appears this statement:

> While many obvious reasons make direct comparisons with data compiled in previous emergencies impossible, it is interesting to note that the average height of recruits examined during World War I was 67.5 inches, the average weight was 142 pounds, and the average chest measurement at expiration was 33.2 inches.

What happened in Colonel Rowntree's analysis was, I think, that he had compared (1) a group of 2,000,000 men examined by draft boards in World War II with (2) *recruits,* or the men accepted by the army for military service in World War I. It must be remembered that all those less than 64 inches are not eligible for military service and were probably excluded from group (2) above, but were included in group (1). Hence we do not have here two comparable groups. The reason I feel this to be true is that the report specifically stated that *recruits* were 67.5 inches tall and recruits, according to army definition, are men *accepted* for military service who have not been assigned to a specific duty. It is quite true that men over 78 inches tall were also rejected, but every one knows that there are many more under 64 inches than over 78 inches.

You will notice from the report that, "Registrants who were classed by local boards as available for general military service averaged 68.1 inches in height. . . ." I have an idea that when the army reexamined these "registrants" and made "recruits" of them the average height of the latter increased some more. When the final figures are released I shall be surprised if we do not learn that the soldier in the Army of the United States in this present war is about one inch taller than his father was in World War I, provided the standards of height remain the same for both wars.

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# SCIENTIFIC BOOKS

## THE LYMPHATIC SYSTEM

*Lane Medical Lectures: The Lymphatic System. Its Part in Regulating Composition and Volume of Tissue Fluid.* By CECIL K. DRINKER, professor of physiology and dean of the School of Public Health, Harvard University. 101 pages; 29 illustrations. Stanford University Publications, University Series. Medical Sciences, Volume IV, No. 2. California: Stanford University Press, Stanford University. London: Oxford University Press, Humphrey Milford. 1942. Paper, $1.50; cloth, $2.25.

DESERVING a place as a medical classic beside Sir Michael Foster's Lane Medical Lectures on the "History of Physiology," published 42 years ago, are Dr. Cecil K. Drinker's lectures on "The Lymphatic System," for these few pages offer a most significant general account of the system.

All the five lectures are based on one theme—how do the blood capillaries and the lymphatic capillaries cooperate to produce the environment necessary for the life of every single cell in the animal body? For this function, Dr. Drinker finds that there are five essential features of the vascular system in mammals.

1. A closed system of blood capillaries with endothelial walls of varied permeability but capable of retaining practically all of the blood plasma during the usual conditions of rapid capillary transit.
2. A variable hydrostatic pressure in the capillaries.
3. A mixture of extracellular non-respiratory proteins in the blood to which the capillary endothelium is somewhat permeable.
4. An extravascular tissue fluid, lower than the blood plasma in content of blood proteins but in other respects practically identical with plasma.
5. A system of closed lymphatic capillaries with extremely permeable endothelial walls, which lacks any inherent propulsive mechanism to move lymph into larger valved vessels but is dependent upon inconstant and extraneous forces, such as those of muscular activity or massage, to cause entrance of fluid, cells, and particles into lymphatic capillaries and eventual flow of lymph back to the blood.

In the light of these characteristics which, in their entirety, are limited to the blood and lymph vessels of mammals, Dr. Drinker follows the changes in the environment of cells, from the very simplest forms for which sea water constitutes the external environment, through one shift or another in the animal kingdom—not in any sense through an orderly progression

—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.

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[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-