

all-round presentation of the subject, in reasonable compass, ever hope to make its way through that barbed-wire entanglement in which our education is now confined? The final answer must be some drastic change in the system.

Everyone should know the things which are here set out with so much charm, clarity of expression, humane tendency and fair balance of interest. That might well be required from all

completing a course of general education by the age of sixteen years. For the rest, encouragement should be given to scholars with special interest to pursue further the study of special branches of history. This is the sphere to which diplomatic relations, constitutional details, plans of campaign and colonization properly belong. There also the progress of science and of technical inventions should find a leading place. F. S. MARVIN.

## Absorption from the Intestine

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By Prof. F. Verzár, assisted by Dr. E. J. McDougall. (Monographs on Physiology.) Pp. xii + 294 + 12 plates. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1936.) 21s. net.

THE Monographs on Physiology, published by Messrs. Longmans, Green and Co., Ltd., have performed a useful service in providing competent reviews of different aspects of a rapidly advancing subject. It is good to see that the series is to be continued under the editorship of Prof. Lovatt Evans, and it is hoped that these monographs will now appear more frequently.

Prof. F. Verzár of Basle has made many important contributions, during the last ten years, to our knowledge of absorption from the intestine. He writes with the authority of experience on nearly all aspects of this subject, and his book is fascinating to read. The first five chapters are devoted to a general discussion of the anatomy of the intestine, methods of research, and the physical and chemical forces involved. The remaining seventeen chapters are each devoted to a discussion of the absorption of one class of substance.

The author has tried to explain all the facts in terms of physico-chemical laws. In many cases he has been successful in finding plausible explanations; and in all cases he has made it clear that there is no necessity at present to invoke vitalism. The water in the intestine is in free communication with the body water; if heavy water is placed in the intestine it becomes diluted, within an hour, by an amount corresponding with the total water content of the body. The membrane is also freely permeable to crystalloids. It is practically impermeable to colloids, although minute quantities of unsplit proteins, or even visible particles, may occasionally be absorbed, probably through an accidental fault in the membrane. Absorption is controlled by diffusion and osmosis, and in the large intestine the hydrostatic

pressure may be such that filtration is also an effective factor. The pumping movements of the intestinal villi may help to mix the intestinal contents, but it is probable that their main function is to pump absorbed fat into the large lymphatic vessels.

Hydrotropy plays an important part in the absorption of water-insoluble substances such as fat and calcium salts. This is defined as the property of some asymmetric, strongly surface-active, water-soluble organic substances of disintegrating water-insoluble substances to molecular complexes in which the hydrotropic molecules surround the insoluble molecule, and render it soluble and diffusible. Bile acids have this effect.

The rapid absorption of substances, such as glucose, which are useful foodstuffs, compared with similar substances, such as xylose, which are not, has seemed in the past to suggest that the intestinal mucous membrane is endowed with intelligence, and has provided a prop for vitalism. When the cells are killed they lose their power of discrimination. Prof. Verzár attributes these observations to the fact that glucose is rapidly phosphorylated in the cells of the living mucous membrane, while xylose is not. The diffusion gradient is therefore greater in the case of glucose than in the case of xylose. When phosphorylation is inhibited by monoiodoacetic acid, the cells lose their power of discrimination. Similar explanations can be applied to the absorption of fats and other substances. This work has led to interesting experiments with the suprarenal cortex, which is known to affect the phosphorylation of sugars. Adrenalectomy destroys the selective absorption of glucose and fats; the injection of eucortone restores it. These facts are easily explained on the theory discussed above.

The theoretical and practical importance of this work is obvious. Prof. Verzár and Dr. McDougall have performed an important service to physiology in writing an authoritative account of work that is not so well known as it deserves to be.