

## BOOK NOTICES AND REVIEWS.

*The Vitamins in Health and Disease.* By BARNETT SURE, Ph.D., Professor of Agricultural Chemistry, University of Arkansas, Fayetteville, Arkansas. April 1933, pages xiv + 206, 4 tables. Price \$2.00. Publishers, The Williams & Wilkins Company, Baltimore, Maryland.

There are several texts which discuss the properties of vitamins, chemical procedures used in isolation and identification and general methods of testing for the presence or absence of these essential constituents in various food stuffs.

The necessity for the inclusion of adequate amounts of the various vitamins in our diet has been stressed. They are essential for reproduction, milk secretion, appetite, bone and tissue building, growth, resistance to an infection, dentition, etc., etc.

Doctor Sure has written a very interesting book in non-technical language in which the discovery of vitamins, and their necessity in the diet are discussed as a basis for presentation of the effects observed when the diet is deficient. Vitamins A, B, C, D, E and G are each presented for our consideration, their occurrence mentioned and the effect on animals and on humans following the consumption of inadequate quantities very clearly presented. One chapter deals with the vitamin content indicating the particular foods which are rich, as well as the particular foods which are poor in each vitamin. A diet is given which will ensure an adequate amount of vitamins, for infants as well as for adults. The reason for the development of vitamin concentrates, and the rôle of vitamins in health and in disease is very effectively presented. The book closes with the suggestion that by proper attention to diet, including optimum vitamin content, we can help the present situation in which almost one-half of our population are physically imperfect and 3,000,000 people annually are seriously ill. Dr. Sure has presented a readable and interesting discussion of this important problem.—JAMES C. MUNCH.

*The Mode of Action of Drugs on Cells.* By A. J. CLARK, B.A., M.D., F.R.C.P., F.R.S., Professor of Materia Medica in the University of Edinburgh, formerly Professor of Pharmacology in the Universities of London and Cape Town. Author of "Applied Pharmacology," 1933, pages vii + 298, 62 figures. Price \$6.25. Publishers, Williams and Wilkins Company, Baltimore, Md.

So much attention has been directed to the qualitative action of drugs (pharmacology), in order to establish this as a science, that our attention has not been concentrated on the quantitative measurements of drug action (bioassays). It is, therefore, very timely to pause and consider just how much information we have regarding the mode of action of drugs on cells and the proper mathematical or statistical consideration of pharmacological data. Within the last five years papers have begun to appear dealing with the statistical consideration of pharmacological data. "The majority of pharmacological data expressing equilibria between drugs and cells approximate to an exponential form." Unfortunately, there has been a tendency to obscure the inherent variations in pharmacological data and hide our ignorance behind a formula, which may or may not have any relation to the law governing drug action.

Dr. Clark has rendered a real service in pointing out the necessity for consideration of proper statistical treatment. In the thirteen chapters of this book the living cell is considered as a physical chemical system, fixation of drugs considered in the light of physical laws, the mechanics of equilibria discussed, various theories regarding the action of drugs presented and used to account for the mode of action of various hormones as well as vitamins; drug antagonism and temperature effects as well as the action of radiation on living cells are presented.

The mathematics are presented in a very interesting fashion and serve as a basis for a conclusion "that the only studies in quantitative pharmacology that are likely to yield results of theoretical interest are those made on the very simplest systems."

Considered from the philosophical standpoint, evidence is presented that "the simplest probable conception of drug action is that potent drugs occupy certain specific receptors on the cell surfaces, and that these specific receptors only comprise a small fraction of the total cell surface." This concept has been adapted from studies in physical chemistry and serves to explain very plausibly some of the rather startling figures: ouabain fixed by a frog heart cannot cover more than 3 per cent of the surface of the cell; the amount of lysin reacting with a human erythrocyte is just sufficient to cover the cell surface with a monomolecular layer; the protein content of