as *Lactobacillus bulgaricus* 09 (Cornell collection) and a basal medium[2] fortified with (per tube): vitamin B_{12} 10 mγ, and yeast extract 10 mg., the distribution and properties of the factor(s) have been determined. Whey was found to be a very good source of the growth promoting substance. As it occurs in dried whey the factor is dialyzable, soluble in water, and insoluble in organic solvents. It is adsorbed from acidic aqueous solution by carbon, superfiltrol, Fuller's earth, and IR-A 400. It is eluted from super filtrol and Fuller's earth with difficulty. The factor is extractable by butanol from acidic but not from neutral or alkaline aqueous solution.

In a survey of known compounds, orotic acid (4-carboxyuracil) (10 to 100γ per tube) was found to replace the requirement of the organism for large amounts of natural material. For this particular strain, in the presence of adequate amounts of orotic acid, maximal growth is obtained even in the absence of yeast extract from the medium.

Inactive compounds include uracil, uridine, uridylic acid, cytosine, cytidylic acid, uric acid, asparagine, aspartic acid, lactose, urea, alloxan, allantoin, thymine, γ-aminobutyric acid, 5-carboxyuracil, 4-methyluracil, and 2-amino-4-methyl-6-hydroxypyrimidine.

(2) Skeggs, Huff, Wright and Bosshardt, *J. Biol. Chem.*, **176**, 1459 (1948).

The factor, as it occurs in milk products, like orotic acid, is stable to autoclaving at 120° for one hour with 3 *N* acid. The activity as encountered in other sources such as Wilson's liver faction "L," corn steep solids, and dried distillers solubles is reduced markedly by such treatment suggesting the occurrence of a more highly active derivative of orotic acid.

Orotic acid and 4-carboxyuridine have been suggested[3] as precursors in the biosynthesis of uridine and/or cytidine, and 4-carboxyuridine or some such related derivative of orotic acid very well may be the uncharacterized acid-labile component of natural materials.

(3) Arvidson, Eliasson, Hammarsten, Reichard, Von Ubisch and Bergstrom, *ibid.*, **179**, 169 (1949).

DEPARTMENT OF NUTRITION AND DEPARTMENT OF BIOCHEMISTRY
MEDICAL RESEARCH DIVISION
SHARP AND DOHME, INC.
GLENOLDEN, PENNSYLVANIA

LEMUEL D. WRIGHT
JESSE W. HUFF
HELEN R. SKEGGS
KATHERINE A. VALENTIK
DAVID K. BOSSHARDT

RECEIVED APRIL 7, 1950

BOOK REVIEWS

Artificial Radioactivity. By P. B. MOON, F.R.S., Professor of Physics in the University of Birmingham. (Cambridge Monographs on Physics. General Editors: N. Feather and D. Shoenberg.) Cambridge University Press, (American Branch), 51 Madison Avenue, New York 10, N. Y. 1949. 102 pp. 13.5 × 21.5 cm. Price, $2.50.

This little book should be of real interest to radiochemists and nuclear physicists because of its careful and thoughtful treatment of a selected list of topics in the field of artificial radioactivity. It does not attempt an exhaustive treatment; for example, there is no extensive isotope table. It does, however, discuss such subjects as the nature of beta radioactivity and orbital capture processes in very considerable detail. Its presentation of the theory of beta radioactivity is excellent, and its tables and charts assist one in making theoretical calculations of the Fermi function for a given beta emitter. The most useful of these is Figure 12 on page 47, which is a log plot of the Fermi function *versus* the energy of transition for elements of different atomic numbers and the two signs of the beta particles. The chapter on measurement technique is adequate, though not exhaustive. Chapter IV on radioactive processes in which *Z* does not change is useful in acquainting general workers in the field of radioactivity with the rapid advances made in the technique of establishing decay schemes for gamma ray transitions.

One error of fact apparently occurs in a number of places in the book. This is the half life of K^{40}, which seems now to have returned to the older value of 1.4 billion years as contrasted to the smaller value of approximately 0.4 billion years used by Dr. Moon, which was popular a few months ago. In addition, a few errors of omission occur due to the fact that this book deals with subjects in such a rapidly moving field. In several cases the latest data are not given.

W. F. LIBBY

Monomers. A Collection of Data and Procedures on the Basic Materials for the Synthesis of Fibers, Plastics, and Rubbers. Edited by E. R. BLOUT, Chemical Research Laboratory, Polaroid Corporation, Cambridge, Massachusetts, and W. P. HOHENSTEIN and H. MARK, Institute of Polymer Research, Polytechnic Institute of Brooklyn, Brooklyn, New York. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. 1949. 339 pp. Illustrated. 18.5 × 25.5 cm. Price, $7.50.

The "book" consists of a loose-leaf binder containing individually stapled pamphlets on each of the following monomers: acrylonitrile (37 pages), butadiene (45 pages), isobutylene (32 pages) isoprene (37 pages), methyl methacrylate (36 pages), styrene (63 pages), vinyl acetate (55 pages) and vinyl chloride (32 pages). Sections on acrylic acid, esters of acrylic acid and on esters of methacrylic acid other than methyl methacrylate are reported to be in active preparation. The information on each monomer is presented under the general headings of Production (laboratory and industrial), Purification and Analysis, Care and Handling, Physical Properties, Chemical Reactions, Polymerization and Bibliography.

The methods given for the laboratory preparation of the monomers appear to be generally adaptable to ordinary laboratory conditions. The discussions of industrial methods of preparation include, in some cases, methods