

β -ALANINE AND "BIOS"

Sir:

The recent discovery in our laboratory that synthetic β -alanine is highly potent as an agent for stimulating yeast growth has made it possible for the first time in history to grow yeast rapidly from a small seeding on a medium containing only well-recognized pure chemicals.

Investigations in the "bios" field may for our present discussion be placed in two groups: those in which a "sugar and salts" medium is basal, and those in which the basal medium also contains asparagin. Asparagin has been used in the senior author's laboratory because it was early recognized (1920) to be beneficial, and since it was likely to be present in extracts to be tested it was desired to eliminate the effects of all but the unknown factors. The use of asparagin media led to the discovery of "pantothenic acid," its universal occurrence and importance as a "growth substance" for protozoa and green plants as well as yeasts. The importance of pantothenic acid could not have been discovered in an asparagin-free medium because in such a medium pantothenic acid alone is relatively ineffective. On the other hand, the presence of asparagin in a medium (in the usual concentrations) masks the effect of at least one agent, *i. e.*, β -alanine, which is strikingly effective only in the absence of asparagin.

Some of the results obtained with β -alanine are shown in the accompanying table. The basal medium contained 5 mg. of inositol per liter in addition to sugar and salts. "Old process" yeast responded similarly to those listed except

that vitamin B₁ is a necessary supplement. Pantothenic acid is also necessary for maximum growth.

YEAST CROPS
(MG. MOIST YEAST PER CULTURE)

Yeast	Control	1 γ β -alanine added (to 12 cc. culture)	0.75 mg. aspartic acid added	1 γ β -alanine and 0.75 mg. aspartic acid added
Wildiers	0.49	0.55	0.80	2.16
"Gebrüder Mayer"	.28	1.08	.28	1.62
W. Lash Miller	.32	0.92	.58	3.20
"Rasse M" (Kögl)	.42	1.74	.49	3.00

The importance of aspartic acid as a yeast nutrient (which is apparent from the results) is to be discussed in a separate paper from this Laboratory. It will be noted that the concentration of β -alanine used was only one part in 12 million parts of culture medium. At *very* high dilutions β -alanine may be slightly inhibitory, depending apparently upon the physiological state of the yeast. This in itself is not so remarkable because "growth substances" have previously been shown to be inhibitory under some conditions, but the small concentration which can be detected in this way is indeed striking. In a large number of tests we have observed a distinct inhibitory effect when 0.0001 γ was added to a 12-ml. culture. On this basis one gram of our synthetic material would be enough to dose detectably 120,000 tons of medium.

The discovery of the yeast stimulating action of β -alanine raises many interesting questions which are being investigated.

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NEW BOOKS

The Chemistry of the Synthetic Resins. By CARLETON ELLIS, Industrial Research Chemist. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., 1935. Volumes I and II. 1615 pp. 15.5 × 23.5 cm. Price, \$19.50.

The first edition of this valuable compilation appeared in 1923 under the title "Synthetic Resins and their Plastics." Since then the number of such products has increased by leaps and bounds, and is still gaining with steadily mounting velocity. Practically every issue of *Chemical Abstracts* records a long list of new ones. The need for such a new edition, therefore, was urgent and insistent, and the author has handled the enormous mass of

pertinent literature in his usual masterly way. Even a hasty glance at the volumes, with their wealth of literature citations, graphic formulas, tables, charts and illustrations, will impress any one with the magnitude of the task and the painstaking care and thoroughness with which it has been carried out.

The author explains that the change of title does not indicate any change in the field covered, but is a recognition of our advancing knowledge of the causes and nature of resinification. This does not mean any neglect of plastics and plastic molding, for their status is likewise brought as fully up to date as is practicable in an undertaking of this size and scope. All subjects are handled from both their

scientific and their technical aspects. In the eternal competition between natural and synthetic products, rosin has had to face this host of synthetic resins, with results which the naval stores industry of the South knows to its sorrow. A perusal of this book will make clear some of the reasons. The struggle is not unlike that between wood alcohol and synthetic methanol.

After discussing the types of synthetic resins needed, the nature of resinification and of the resinous state, the different groups of synthetic resins are taken up *seriatim*. These include not only hydrocarbon resins of various kinds, synthetic rubber and duprene, phenol aldehyde resins, urea resins, alkyd resins, polyvinyl compounds, etc., but also consideration of hardened rosin, resinates, and esters of natural resins. To give some idea of the comprehensive character of the work, the second volume opens with an excellent thirty-page chapter on the Diels-Alder diene synthesis, and closes with chapters on molding methods, equipment, analytical and other tests, etc.

An extensive glossary of trade names is followed by very complete author and subject indexes.

An encyclopedia of information, no one interested in this field can afford to be without it.

MARSTON TAYLOR BOGERT

Lehrbuch der organischen Chemie. (Textbook of Organic Chemistry.) By PAUL KARRER, Professor at the University of Zurich. Fourth, revised and enlarged edition. Georg Thieme Verlag, Rossplatz 12, Leipzig C 1, Germany, 1936. xxiii + 955 pp. 17 × 25 cm. Price, RM. 34; bound, RM. 36.

As Professor Karrer's excellent textbook is steadily maintaining its popularity the interval between successive editions is short. The new facts of general importance which accumulated in the scant three years between the appearance of the third and fourth editions were too few to require extensive revision of the text. In the field of natural products alone, the new material was sufficiently extensive and important to necessitate the reorganization and enlargement of the chapters dealing with these substances. The remainder of the text is virtually that of the third edition.

E. P. KOHLER

Das optische Verhalten gelöster Elektrolyte. (Optical Properties of Electrolytes.) By Dr. G. KORTÜM, Physico-chemical Institute of the University of Zurich. Verlag von Ferdinand Enke, Hasenbergsteige 3, Stuttgart W, Germany, 1936. 106 pp. 13 figs. 16 × 24.5 cm. Price, RM. 8.20.

The monograph is a survey of the information obtainable about electrolytes using optical methods as the research tool; the subjects treated include refraction, absorption, fluorescence, polarization and Raman effect. The bibliography includes 25 references to review articles and 195

references to original research. Although the author states in the preface that it was impossible to include all of the literature on the subject, the failure to mention Noyes' work in 1904 on the α -brom camphorates seems to the reviewer to be a serious omission, in view of the bearing this work had on ideas regarding electrolytes. The various optical methods have not only contributed much in the way of definite information about ions in solution, but they have also opened up new problems of fundamental significance. The book will be of interest particularly to investigators who have devoted most of their attention to the electrochemistry and thermodynamics of electrolytes, but it can also be read with profit by the general reader.

RAYMOND M. FUOSS

BOOKS RECEIVED

February 15, 1936–March 15, 1936

OLIVER C. DE C. ELLIS AND WILLIAM A. KIRKBY. "Flame." Methuen and Co., Ltd., 36 Essex St., London W. C., England. 106 pp. 3s./-, net.

EMIL J. FISCHER. "Abfallstoffe der anorganisch-chemischen Industrie und ihre Verwertung." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 156 pp. RM. 9; bound, RM. 10.00.

KURT HEISE. "Titanweiss." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 96 pp. RM. 6.00; bound, RM. 7.00.

DOUGLAS W. HILL AND FREDERICK O. HOWITT. "Insulin. Its Production, Purification and Physiological Action." Hutchinson and Co., 32-36 Paternoster Row, London E. C. 4, England. 219 pp. 12s./6d., net.

W. PETERSEN. "Schwimmaufbereitung." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 337 pp. RM. 18; bound, RM. 19.50.

E. RABALD, Editor. "Dechema Werkstoffblätter." Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany. 105 pp. RM. 7.50.

KONRAD SCHULZE. "Die Herstellung und Prüfung homöopathischer Arzneimittel. Eine Anleitung für das Apothekenlaboratorium." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 92 pp. RM. 4.50.

H. SPONER. "Molekülspektren und ihre Anwendung auf chemische Probleme." II, Text. Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany. 506 pp. RM. 36; bound, RM. 37.80.

"Report of the Chemistry Research Board, for the Period Ended 31st December, 1934." British Library of Information, 270 Madison Ave., New York, N. Y. 94 pp. \$0.50.