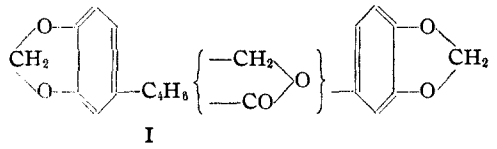
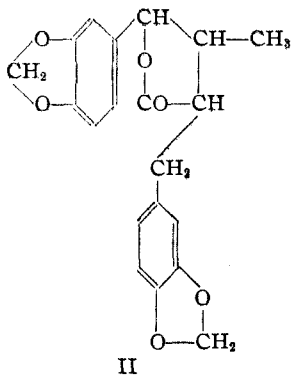
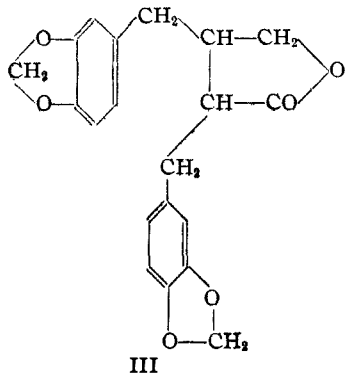
and Bee, *J. Chem. Soc.*, **97**, 1028 (1910)], the constitution (IV) has been proposed for this resinol independently by Haworth (private communication) and the author [Briggs, Peak and Wooloxall, *Proc. Roy. Soc. N. S. Wales*, (in press)].



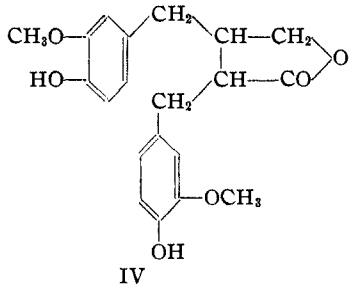
I



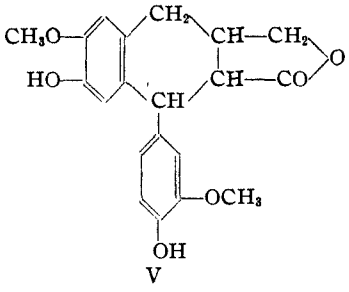
II



III



IV



V

Thus the structure suggested for cubebinolide (III) is very similar both to matairesinol and sulfite liquor lactone (tsugaresinol) (V) [Erdtman, *Ann.*, **513**, 229 (1934); Kawamura, *Bull. Imp. Forestry Expt. Sta. Tokyo*, No. 31, 73 (1932); Emde and Schartner, *Helv. Chim. Acta*, **18**, 344 (1935)].

The transformation of matairesinol into a substance of structure (III) is being attempted to prove this assumption.

DEPARTMENT OF CHEMISTRY
AUCKLAND UNIVERSITY COLLEGE
AUCKLAND, NEW ZEALAND
L. H. BRIGGS

RECEIVED JUNE 19, 1935

THE SOLUTION OF TITANIC HYDROXIDE IN HYDROGEN PEROXIDE

Sir:

Several months ago, in the course of some attempts to crystallize a titanium per-salt, we observed an interesting phenomenon, to which there is apparently no reference in the literature. We found that freshly precipitated and well-washed titanic hydroxide dissolves in dilute hydrogen peroxide to give a clear yellow solution. Thus, 50 cc. of a suspension containing 0.0035 mole of $Ti(OH)_4$, treated with 0.4 cc. of 30% H_2O_2 (0.0035 mole), became clear after one hour at room temperature, or after a few minutes when warmed. Larger amounts of hydrogen peroxide hasten solution; much smaller amounts of hydrogen peroxide give solutions with pronounced opalescence.

The solution has colloidal properties. Diffusion through a collodion bag takes place to only a very slight extent. Nearly complete precipitation occurs on addition of small amounts of electrolytes, but high concentrations of hydrogen peroxide render the precipitation less complete. The precipitates in these cases are yellow and contain hydrogen peroxide.

Gels can be prepared by boiling down the solutions and then cooling. Some were obtained which could be remelted by warming. Some were also obtained which had the property, known for other gels, of temporarily liquefying on vigorous shaking.

The most nearly similar phenomenon of which we are aware is the solution of freshly precipitated and washed manganese dioxide in concentrated hydrogen peroxide (see *C. A.*, **5**, 2470 (1911)).

The solution not only is of some scientific interest, but also may find considerable application in the arts.

DEPARTMENT OF CHEMISTRY
JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND
S. KATZOFF
R. ROSEMAN

RECEIVED JUNE 21, 1935

THE POLYMERIZATION OF ETHYLENE INDUCED BY METHYL RADICALS

Sir:

In continuing our work on chain reactions induced by azomethane, we have found that ethylene is rapidly polymerized at temperatures near 300° by small quantities of azomethane. Over a ninety-fold range of azomethane pressure and a ten-fold range of ethylene pressure, and total pressures all below 60 mm., the initial rate depends

on the square root of the azomethane pressure and the three-halves power of the ethylene pressure. The time–pressure curves behave in the ordinary way, and do not exhibit the increasing rate with time found in the thermal polymerization [Storch, THIS JOURNAL, **56**, 374 (1934)]. The rate constant is 6.5×10^{-6} at 310° and 3.0×10^{-6} mm.$^{-1}$ sec.$^{-1}$ at 290°. No special precautions to remove oxygen from the ethylene were taken.

A chain decomposition is also set up in propionaldehyde and isobutane by azomethane. Although 1% of azomethane completely decomposes acetaldehyde [Allen and Sickman, *ibid.*, **56**, 2031 (1934)], 6.5% azomethane in propionaldehyde leads to only 60–70% decomposition. The suggestion of Semenoff [Semenoff, *Z. physik. Chem.*, **28B**, 62 (1935)], that reactions of this type are "degenerate explosions" and that traces of azomethane should lead to complete decomposition cannot apply to propionaldehyde.

MALLINCKRODT LABORATORY O. K. RICE
HARVARD UNIVERSITY DARRELL V. SICKMAN
CAMBRIDGE, MASS.

RECEIVED JUNE 21, 1935

NEW BOOKS

An Introduction to Inorganic Chemistry for B.Sc. Students of the Indian Universities. By SATYA PRAKASH, D.Sc., Lecturer in Chemistry, University of Allahabad. Kala Press, Allahabad, India, 1934. iv + 478 pp. 16.5 × 24.5 cm. Price, six rupees; or ten shillings.

This is a textbook designed primarily for the advanced student of science in Indian universities. It assumes some knowledge of the principles of elementary chemistry. The treatment is essentially descriptive and any discussion of physical chemistry, except for a brief chapter on colloid chemistry, is purposely omitted.

The book is chiefly of interest to an American because the subject is dealt with so far as possible from the Indian point of view, the occurrence of various substances in India being treated at length and Indian practice in the various branches of chemical manufacture being set forth in considerable detail. This information, according to the author's preface, is not available elsewhere.

The presentation is clear and judging by the few sections examined, particularly the one on heavy water, is up-to-date.

ARTHUR B. LAMB

Annual Survey of American Chemistry. Volume IX, 1934. Edited by CLARENCE J. WEST, Director, Research Information Service, National Research Council. Published for the National Research Council by Reinhold Publishing Corporation, 330 West 42d Street, New York City, 1935. 396 pp. 14 × 22 cm. Price, $4.50.

The high quality of the earlier volumes of the Survey has been maintained. The general topics selected for consideration have been reviewed by men whose knowledge, contributions to the literature of chemistry, and judgment make them particularly well fitted for the important work. A chapter on biochemistry has not been included, because this field is now covered by another publication. Since the subjects treated vary from year to year, those in the present volume are listed. It is of interest to note that about one-half of the topics are in the field of applied chemistry. The subjects are as follows: Theories of Solution, The Kinetics of Homogeneous Gas Reactions, Subatomics, Thermodynamics and Thermochemistry, Colloids, Contact Catalysis, American Photochemistry During 1933 and 1934, Radioactivity—Natural and Artificial, X-Ray Examination of Materials, Aliphatic Compounds, Carbocyclic Compounds, Heterocyclic Compounds, Non-Ferrous Metals, Advances in Electrochemical Practice, Food Chemistry 1933 and 1934, Fermentation, Alcoholic Fermentation and Beverages, Trade Waste Treatment, Fertilizers, Coal and Coal By-Products, Petroleum Chemistry and Technology, Textile Chemistry, Dyeing and Finishing, Rubber, Solvents, Chemical Engineering.

The book contains an author index, subject index, and references to all the papers mentioned. The Annual Survey has become a necessity to those who wish to know something of the current contributions of Americans to Chemistry.

JAMES F. NORRIS

Dizionario di Chimica Generale e Industriale. (**Dictionary of General and Industrial Chemistry.**) By Prof. MICHELE GIUA and Dr. CLARA GIUA-LOLLINI. Unione Tipografico-Editrice Torinese, Corso Raffaello 28, Torino 116, Italy, 1933–1934. 20.5 × 29.5 cm. Vol. I, A–E. iii + 1083 pp. 565 figs. Vol. II, F–Z. iii + 1211 pp. 521 figs. Price, lira 165 and 175.

The authors state in the preface that a modern Dictionary of Chemistry, of limited size, but at the same time dealing with diverse branches of Theoretical and Applied Chemistry, is lacking in Chemical Literature. While the older encyclopedias, such as those of Fehling, Muspratt Würtz, Guareschi, have mainly a theoretical and descriptive character, the more recent ones, *e. g.*, those of Thorpe, and of Ullmann, give greater emphasis to Industrial Chemistry.

The aim of this encyclopedia is to provide the elements for the study of chemistry both in its theory and in its