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## NEW BOOKS

**FUEL CELLS, THEIR ELECTROCHEMICAL KINETICS.** Edited by V. S. Bagotskii and Yu. B. Vasil'ev (authorized translation from the Russian, Consultants Bureau, New York, 1966, 121).

This is a collection of articles on the theory of fuel cells, presented at the Second Fuel Cell Conference in Moscow; originally published by the Institute of Electrochemistry of the Academy of Sciences of USSR, 1964.

The mechanism of porous electrodes is the subject of most of the papers contributed by renowned Soviet electrochemists. Since the models used by the different authors are necessarily varied in concept and method of approach—from the simple way of empirical curve fitting, to complex mathematical derivations—the reading of this book is an experience in adaption to different ways of thinking. As in any new field, the results do not always completely agree with each other.

The reader soon feels a desire to read something about verification of theories in actual cells or practical experiments, but most generally references to experiments published elsewhere are made. However, since the book is intended to give an understanding of the possible mechanisms involved in the operation of fuel cell electrodes, the reader should not expect technical data about cell or battery performance.

Electrochemical oxidation of organic fuels is discussed in two contributions by the editors. The principal kinetic laws were studied on alcohols, aldehydes, and acids, and adsorption phenomena on the electrode surfaces are considered in detail. Hydrocarbon-fuel electrodes are not discussed. Solid electrolytes for galvanic cells are only mentioned in a short paper about electronic conductivity losses.

The book is of special value for electrochemists. It is stimulating, and should be "required reading" for anyone whose work has something to do with porous electrodes. It is of small value for a plant engineer.

Although this is a book which should be in every scientific library, and will probably be bought by many specialists for their personal use, it is not of "handbook" or "textbook" stature since it is only a collection of papers presented at a special conference.

K. V. KORDESCH  
Parma Tech. Ctr.  
Union Carbide Co.  
Cleveland, Ohio 44101

**THE CONDENSED CHEMICAL DICTIONARY,** Arthur and Elizabeth Rose, eds. (Reinhold Publishing Corporation, 1044 pages, 1966, \$17.50).

Many changes have been made since the 1961 edition of this quick and dependable reference compilation was last published. Although 200 pages shorter than the previous edition, the editors have evidently culled the old and obsolete and added the new to continue a 47-year tradition of their exhaustive coverage of the industrial chemical world.

This edition is sturdily bound for general use and includes impressive photographs of two chemical industries in its endpapers and a conveniently placed periodic chart of the chemical elements. As in previous editions, the Dictionary includes a listing of manufacturers and their addresses, and an expanded discussion of shipping regulations, safety information, and labeling. The greater portion is devoted to an alphabetical listing of definitions of materials, trademark names and pharmaceuticals, and processes of interest to the chemical and allied industries. The information given usually includes physical properties, grades that are available, the containers generally used, uses, and shipping regulations.

The readability of this new compilation is enhanced with a clearer and more legible format than the previous edition but the lack of a thumb-index on the reviewer's copy was found to be inconvenient.

This Dictionary can especially be recommended to every chemical library where it will prove to be an indispensable reference tool to its user.

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LIQUID-PHASE OXIDATION OF HYDROCARBONS, by Nikolai M. Emanuel, Department of Chemical and Biological Processes, Institute of Physical Chemistry; Evgenii T. Desisov and Zinaida K. Maizus, Institute of Chemical Physics, all of the Academy of Sciences, Moscow USSR. Translated by B. J. Hazzard. Foreword by Adalbert Farkas (Plenum Publishing Corporation, New York, 1967, xiv + 350 p, price \$22.50).

This book is composed of nine chapters covering the following topics: Chapter 1 (The Chain Mechanism of Oxidation Reactions, 17 pages) describes the formation of hydroperoxides as primary oxidation products and offers proof that a chain mechanism is involved. Chapter 2 (Experimental Methods for Studying the Kinetics and Mechanism of Liquid-Phase Oxidation Reactions, 51 pages) presents details on a variety of laboratory-scale reaction vessels and methods suitable for determining kinetic data. Brief descriptions also are included of useful analytical procedures available for following the changes in reaction products such as gas and paper chromatography, polarography, radioactive isotope labeling and chemiluminescence. Chapter 3 (Elementary Reactions of Liquid-Phase Oxidation, 35 pages) contains information on the generation of chains in hydrocarbon oxidations, degenerate chain branching, the chemistry of hydroperoxides and chain termination reactions. Chapter 4 (Kinetic Laws of the Degenerately Branched Chain Reactions, 25 pages) represents a theoretical treatment of branched chain reactions using simple model systems. Chapter 5 (Sequences) of the Formation of Oxidation Products, 42 pages) considers the decomposition of hydroperoxides formed from a variety of hydrocarbons into secondary products. Chapter 6 (Initiation and Catalysis of Liquid-Phase Oxidation, 47 pages) discusses the use of a variety of gaseous and solid catalysts as well as photochemical and ionizing radiation methods for initiating oxidation. The theoretical aspects of such catalytic procedures are included. Chapter 7 (Inhibitors in Oxidation Processes, 59 pages) deals with the mechanism of chemical inhibition especially in relation to the chemical structure and reactivity of the inhibitors studied. Chapter 8 (The Kinetic Laws of Induced and Coupled Oxidation, 16 pages) examines mathematical modes of complex chain oxidation reactions and discusses the formation and consumption of oxidation intermediates as well as the subject of auto inhibition. Chapter 9 (The Oxidation of Individual Hydrocarbons, 42 pages) deals with the oxidation of five different hydrocarbons (cumene, tetralin, butane, styrene and cyclododecane) and a paraffin wax. This chapter also includes some information on the oxidation of butane in solvents and the influence of surface type, sulfur-containing compounds, and certain catalysts on the oxidations. The book has no index but does contain a rather

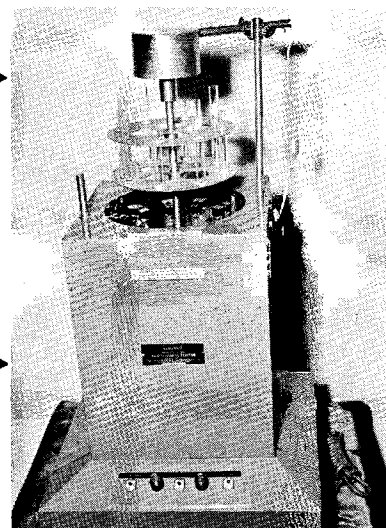
# Rayonet PHOTOCHEMICAL REACTION AND MERRY-GO-ROUND UNITS

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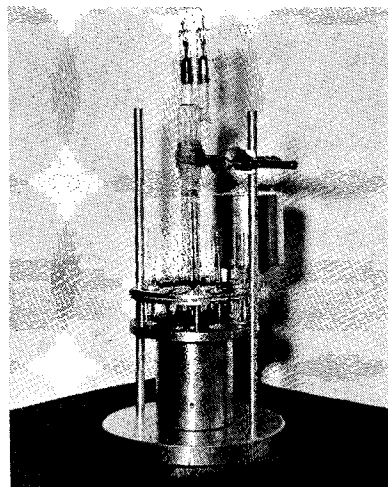
Adjustable wheels accommodate 8 sample tubes ranging from 2" to 10" long. All samples receive equal irradiation. Different samples can be irradiated at the same time. Quartz and Pyrex sample tubes are available from stock.

## RPR-100 Reactor

High intensity ultraviolet light at 2537 Å, 3000 Å, or 3500 Å. Long lamp life up to 3000 hours. Uniform irradiation of up to 6 liter reaction vessels. No water cooling required. Integral power supply operates on 110 V AC. Chamber is 10" in diameter, 15" deep.



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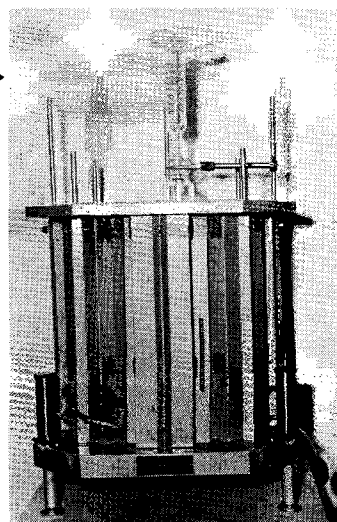
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This model accepts lamps up to 4" in diameter. Complete unit can be immersed in a constant temperature bath. Equal irradiation of all 8 samples allows a determination of relative quantum yields, intersystem crossing ratios and triplet energies. Different samples can be irradiated at the same time. Quartz tubes available.

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Modules can be easily dismantled from base. No special water jacketed vessels required. No dangerous high voltage. New RUL-2537Å, RUL-3000Å, RUL-3500Å interchangeable lamps cover the near ultraviolet spectrum. 120 watts of ultraviolet light (at 2537Å). In the Rayonet RPR-208 type RS Preparative Photochemical Reactor, for the first time, a commercial unit has been made available which can be readily used to irradiate even high-boiling organic compounds in the vapor phase.



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detailed table of contents.

The major emphasis in each of the first eight chapters is on reaction kinetics; only in the final chapter does a limited amount of yield data appear.

The book is concisely written and easy to follow. It is obvious that the authors and translator were painstaking in their labors. The few errors noted appeared to be concentrated in Tables 28 and 29 and on page 137 where the use of incorrect nomenclature (one example is 2,3,3-trimethyl-but-2-ene) and an incorrect formula (1,3,5-trimethyl cyclohexene) was confusing. It also was noted that two different systems were used for referring to certain chapters and paragraphs. In the first and latter portions of the book the system was (III-3) and (3 3), respectively.

The two major complaints which this reviewer has concerning the book are: (1) The book appears to be a rearrangement of the material presented in an earlier book ("The Oxidation of Hydrocarbons in the Liquid Phase," by N. M. Emanuel, Pergamon Press, Oxford, England 1965) and (2) the authors' tendency to make definite short statements based on theses of their students without giving supporting evidence.

Although the book represents little that is new, it is a reasonable contribution to the literature on the basis of its style and readability. It also will challenge the reader to study many of its points in depth and refresh himself on the available literature.

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KINGZETT'S CHEMICAL ENCYCLOPEDIA, 9th Edition, edited by D. H. Hey (D. VanNostrand, 1966, 1092 p, price, not given).

During its 47 years Kingzett's has been revised frequently. The 9th edition lists 15 contributors, 12 of whom are British, three American. The editor states that most items previously included are completely rewritten, that there are numerous new entries and that to make room for these obsolete material has been removed, along with other items that have lost their previous interest and importance. Economic data relating to world production have been omitted from this edition. Completely new is an index with alternative names for text entries. More than 1200 entries are included in this index. The reader is advised to look first in the text entries since these are not duplicated in the index.

The stated purpose of Kingzett's is "to be useful as a work of reference to all classes of the community." It is not intended to serve the specialist in his own field. The entries from Abietic acid to Zwitter Ion include not only individual chemicals and groups of chemicals, but processes, instruments, physical and chemical laws, and principles, as well. The organization is not always consistent; for instance, the 15-page section, Nuclear Chemistry and Radioactivity, deals mainly with principles and applications rather than compounds; under Coal there are eight pages of types and processes involving coal; under Iron eight pages cover minerals and various iron compounds. Most entries are given only a few lines.

Of interest to the oil chemist is a seven-page entry under OILS which includes a table of more than 100 oils complete with data on specific gravities, saponification value, iodine value, refractive index, melting point, and solidification point. Included are a four-page entry under Paints, a three-page entry under Emulsions, a four-page entry under Waxes and a two-page entry under Soaps. Some other items are less adequately covered. Detergents and Surfactants receive much less attention than would be expected in view of their present day prominence. Antioxidants recognizes only those for rubber and related compounds; there is no mention of such important substances as BHA and BHT. There is no entry for hydroperoxides and that for Peroxides does not recognize those formed with fatty acids. In general, accuracy of the entries is commendable; only a few exceptions are noted. Isololenic acid is listed as a prominent component of safflower oil and linolenic acid is stated to be "nearly

colourless and of fishy odour."

The nonbiochemical community will obtain limited information on this discipline from Kingzett's. Antibiotics appear to be well-covered, even to the point of listing more than 40 trade names under Benzylpenicillin. Enzymes and coenzymes are covered in slightly more than three pages without reference to modern enzyme classification. Vitamins occupy the same amount of space. A few other special entries appear; for example, Pasteur Effect.

One must recognize that it is not possible to give full coverage to all subjects which could be listed appropriately in Kingzett's. The authors have compiled a fine volume, which will be found useful, especially by industrialists and occasionally by specialists in the different areas of chemistry.

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HANDBOOK OF ULTRAVIOLET AND VISIBLE ABSORPTION SPECTRA OF ORGANIC COMPOUNDS by Kenzo Hirayama (Plenum Press Data Division, New York, 642 p, 1967, \$40).

This handbook is a compilation of the visible and ultraviolet absorption maxima of approximately 8450 organic compounds. Neither theory nor the interpretation of spectral data is discussed. A chemist interested in organic structure analysis would find this book to be most useful.

The book is divided into two main sections. The first section is a table from which the absorption maxima can be found if the chemical structure is known. The second section is a reverse index of the first section. It is a table of absorbing systems corresponding to the wavelengths of absorption maxima. Included in the data to be found in these tables are wavelength, maximum absorbance, log extinction, coefficient, solvent used, and literature reference to the spectra of approximately 1400 of the 8450 compounds.

The tables are not arranged alphabetically, but are arranged either according to the chromophor present or the structure of the compound. Problems of nomenclature are not encountered; however, an elaborate notation system must be understood before rapid and efficient use of the tables can be achieved.

J. R. ANFINSEN  
Armour Food Research  
Oak Brook, Illinois 60521

## Standardization Seminar To Be Held by ASTM

A Seminar on Standardization will be held at ASTM Headquarters in Philadelphia, April 16-17, 1968, covering the basic principles of standardization in a series of four lectures and discussion groups.

## Houston Sponsors Pollution Control Conference

### Water and Air Pollution Under Study

The nation's first all-encompassing Pollution Control Exposition and Conference was announced recently by its sponsor, the Houston Junior Chamber of Commerce.

The meeting is set for April 3-5, 1968, in the Astrohall, next to the famous Astrodome in Houston, Texas.

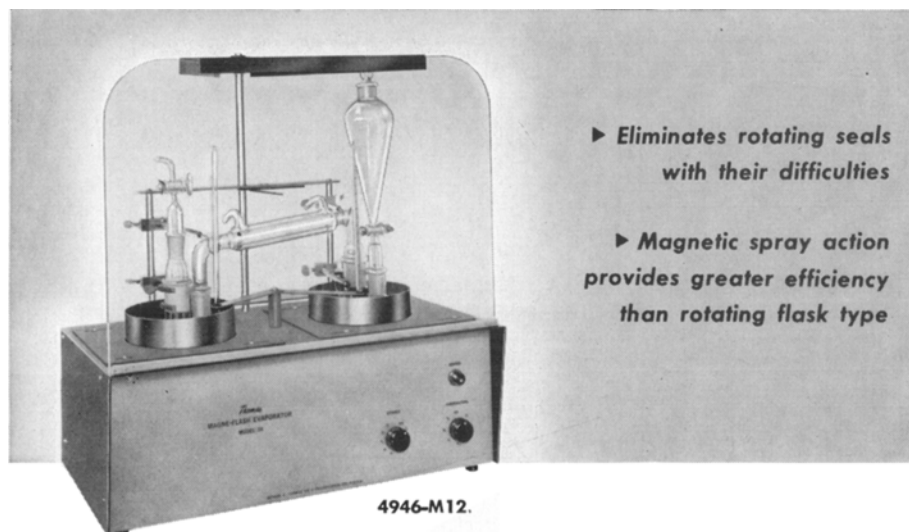
All phases of water and air pollution will be treated in the combined exposition and conference. The show will be devoted both to exhibits by manufacturers of pollution control

equipment throughout the United States and to a three-day conference featuring experts in the field from government and industry.

Among the many speakers representing industry and government will be James Quigley, commissioner of the Federal Water Pollution Control Administration, Department of the Interior.

PACE Management, at 4710 Greeley St., Houston, Texas 77006, A. C. 713, will provide additional information upon request.

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The glassware is mounted on elevator-type support rack by which it can be raised or lowered, as a unit, into the heating and cooling baths in the base housing. In the raised position, the evaporator and condenser flasks can be easily installed and removed without affecting support or alignment of the vapor transfer tube. In the lowered position the greater part of each flask is surrounded by the stainless steel bath walls and the substantial aluminum base cabinet. The glass superstructure units are behind a methacrylate shield.

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