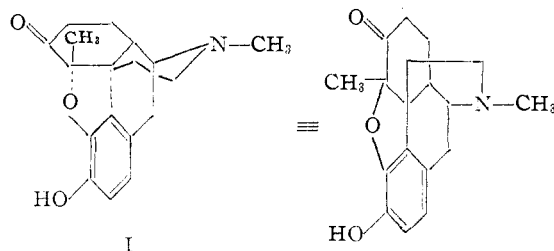


tation with the literature values, was also isolated after the desulfurization.

With the demonstration that isomethylidihydrothebainone and isomethylidihydrocodeinone have



the additional methyl group at position 7, methylidihydrocodeinone and metopon are proved to be 5-methyl compounds since the isomerism of the two methylidihydrocodeinones cannot be the result of epimerism at C₇ (the two isomers are stable to base and give rise to two different enol acetates² and metopon can be represented by structure I.

CHEMICAL LABORATORIES
HARVARD UNIVERSITY
CAMBRIDGE 38, MASSACHUSETTS
CHANDLER LABORATORY
COLUMBIA UNIVERSITY
NEW YORK 27, NEW YORK

GILBERT STORK
LUDWIG BAUER

RECEIVED JUNE 11, 1953

BOOK REVIEWS

The Bacteriostatic Activity of 3500 Organic Compounds for *Mycobacterium Tuberculosis* Var. *Hominis*. Chemical-Biological Coördination Center Review No. 4. BY GUY P. YOUMANS, LEONARD DOUB AND ANNE S. YOUMANS, Parke, Davis and Company, Detroit, Michigan. Publications Office, National Research Council, 2101 Constitution Avenue N.W., Washington 25, D.C. 1953. v + 713 pp. 17.5 × 25 cm. Price, \$5.00.

Despite the spectacular developments of the last ten years, the search for a specific chemotherapeutic agent for the treatment of tuberculosis continues. This is indicated by the list of over 3500 widely diversified organic compounds whose tuberculostatic properties have been evaluated. The assembled data speak much for the efforts of the authors who have evaluated these compounds, as well as for the originality and ingenuity of the chemists responsible for their preparation. This study underscores the importance to both chemists and biologists of a centralized coördination center which can assemble and codify data from many sources dealing with the preparation, evaluation and availability of potential chemotherapeutic agents applicable not only for the treatment and control of diseases in man but in animals and plants as well. In the absence of more precise knowledge of the metabolism of the tubercle bacillus, search for a specific chemotherapeutic agent is of necessity random in nature. The authors of this monograph clearly present the rationale of this approach to the subject and the methods employed. Their use of the virulent human type strain of tubercle bacillus, H37, a strain which has been widely studied by other investigators, increases the value of their study. The limitations of the *in vitro* and *in vivo* methods of determining the tuberculostatic value of various compounds are presented.

Some investigators, including the reviewer, are not in accord with the authors as to the value of mice in determining the chemotherapeutic action of chemicals or antibiotics. The administration of the compound in the feed makes it difficult to quantitate the results. The relation of chemical structure of some of the compounds to their tuberculostatic activity is discussed. Of the 3500 preparations that were investigated 184 were selected for *in vivo* tests on mice. Of these, 8 chemical compounds and 3 antibiotics showed some suppressive effects on the tuberculous process in mice. The method of classifying the 3500 compounds is described in detail. Despite the negative findings this monograph should serve as an excellent reference to both chemists and bacteriologists and should obviate the necessity of preparing and retesting many preparations included in this monograph. A point of minor criticism is the lack of description of Berkfeld and of Swinney filters. Although these names indicate a definite type of filter to the initiated, a brief description of the specification and uses of these filters would

be helpful to the uninitiated. The formula and alphabetical indices are quite complete. The type is clear and the format is excellent.

THE HENRY PHIPPS INSTITUTE
UNIVERSITY OF PENNSYLVANIA JOSEPH D. ARONSON, M.D.
PHILADELPHIA 47, PENNA.

Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water. National Bureau of Standards Handbook 52. Superintendent of Documents, Washington 25, D. C. 1953. iv + 45 pp. 13 × 19.5 cm. Price 20 cents.

The National Committee on Radiation Protection sponsored by the National Bureau of Standards is made up of representatives from organizations which are concerned with the safe use of ionizing radiation and radioactive materials. These organizations include several medical societies, the U. S. Armed Forces, interested Government agencies and the National Electrical Manufacturers Association. It is the responsibility of this National Committee to make health and safety recommendations.

This particular Handbook prepared by the Subcommittee on Permissible Internal Dose under the chairmanship of Karl Z. Morgan, presents recommendations for maximal permissible levels of human exposure to those radioisotopes of greatest current interest which may gain entrance to the body by absorption, inhalation or ingestion.

The levels recommended are based largely on the principal of avoiding greater radiation than the equivalent of 0.3 roentgen per week to any organ other than the skin. Because such radiation produces no easily detectible biological effects this principal is commonly regarded as conservative, particularly for periods of exposure which do not extend over many years. However, there are still so many uncertainties with respect to the absorption, retention and distribution of inhaled or ingested radioactive materials in man, as well as with respect to the equivalent effectiveness of the particulate radiations in producing chronic injury that current estimates of permissible exposure levels to many radioisotopes cannot be made with that accuracy which would finally be desirable. Nevertheless, these recommendations, carefully considered by a competent group of experts, provide a guide for health protection which is not likely to err in the direction of permitting dangerous over-exposure, particularly if the suggested factor of safety is adopted. The associated problem of whether the levels recommended can be economically achieved in industry is not discussed.

The source of the biological data for each case is given in the bibliography to facilitate review of the basis of any recommendation.

UNIVERSITY OF ROCHESTER SCHOOL OF
MEDICINE AND DENTISTRY
ATOMIC ENERGY PROJECT
ROCHESTER, NEW YORK

HENRY A. BLAIR

Annual Review of Nuclear Science. Volume 2. By JAMES G. BECKERLEY (Editor). Annual Reviews, Inc., Stanford, California. 1953. x + 429 pp. 16 × 23 cm. Price, \$6.00.

A quick perusal of the tables of contents of Volumes 1 and 2 and of the projected Volume 3 of the Annual Reviews of Nuclear Science shows the selection pattern being followed by the editors. Physics, biology and chemistry are all represented. The rapidly developing fields, e.g., meson physics and cosmic rays, are reviewed yearly; the slower moving subjects get attention much less often because of the appallingly great variety of material available. From the point of view of timing and interest the subjects chosen thus far have been excellent, and the reviewers have generally done quite well in their presentations. Unlike Volume 1 and the projected Volume 3, Volume 2 contains no material chosen from the biological sciences and virtually none from chemistry; it is devoted to physics, mostly to nuclear physics.

Perhaps the most timely chapter in the book is Konopinski and Langer's report, "The Experimental Clarification of the Theory of Beta Decay," which summarizes the numerous recent experimental and theoretical developments in the study of beta decay and shows that the major question left open in Fermi's original formulation of the theory, the question of which linear combinations to choose from the five possible interaction forms S, V, T, A and P, has now very likely been answered: the combination STP appears to be required to account for the experimental data. Furthermore, it is shown that the coupling constants G_S , G_P and G_T must all be of the same order of magnitude.

Other especially interesting chapters are: E. E. Salpeter's "Energy Production in Stars," a summary of speculations on the roles which several thermonuclear reactions may play in producing or absorbing energy in different types of stars; J. Blair and G. Chew's "Subnuclear Particles," a brief and clear report on π , κ , τ and V particles and mesons; H. Frauenfelder's "Angular Correlation of Nuclear Radiation," devoted mostly to reviewing the results and interpretation of experiments on γ - γ angular correlations; and L. Biermann's "Origin and Propagation of Cosmic Rays."

Other subjects reviewed are: "The Origin and Abundance Distribution of the Elements," by R. A. Alpher and R. C. Herman; "The Production and Distribution of Natural Radiocarbon," by E. C. Anderson; "Recent Progress in Accelerators," by E. L. Chu and L. I. Schiff; "Recent Studies in Photonucleon Reactions," by Karl Strauch; "Radiation Effects in Solids," by G. J. Dienes; "Isotopes," by Jacob Bigeleisen; "Nuclear Moments," by B. T. Feld; "Beta Ray Energetics," by C. D. Coryell; "Advances in Nucleon-Nucleon Scattering Experiments and Their Theoretical Consequences," by G. Breit and R. L. Gluckstern; and "High Energy Fission," by R. W. Spence and G. P. Ford.

DEPARTMENT OF PHYSICS
UNIVERSITY OF ROCHESTER
ROCHESTER 3, NEW YORK

H. W. FULBRIGHT

Electrolyse—Paris, 23 au 27 Mai 1952. Colloques Internationaux du Centre National de la Recherche Scientifique. Service des Publications, Centre National de la Recherche Scientifique, 45 Rue d'Ulm, Paris-V, France. 1952. 146 pp. 21.5 × 27 cm. Price 1500 fr.

This is a collection of thirty papers (mostly accompanied by discussions) which were presented at an international conference held in Paris in May, 1952. About two thirds of the contributors are French and the rest from other countries. It is stated in the Introduction that the papers here presented have all been published in the June, July and August, 1952, numbers of the *Journal de Chimie Physique*.

Although the general subject is indicated by the title (Electrolysis), there is no summary treatment of the whole field and the individual papers range from rather general surveys of methods of study, particularly of molten salts, to such specific matters as the polarography of rhodizonic acid. In the organization of the Conference it was expected that the discussions could be grouped under the general headings "Molten Salt Systems" and "Solvent-Solute Interactions," and this is roughly true of the actual results. The reviewer believes that prospective purchasers of this collection will be either (1) those who desire to accumulate all significant contributions to the field, or (2) those who, having examined the original papers in the *Journal de Chimie Physique* or their subsequently appearing abstracts have noted papers of particular interest to themselves. A list of the participants, and of some of the topics treated is appended: Andrieux, Audubert, Barret, Bockris, Bonnemay, Bonnier, Collet, Doder, Epelboin, Gilbert, Haissinsky, Jolibois, Klemm, Kortum, Lochet, Maronny, Mazur, Owen, Piontelli, Potter, Pouchat, Prigogine, Rousset, Sancelme, Souchay, Sutra, Tatibouet, Valensi, Wynne-Jones, Zarzycki.

Electrolysis of fused hydrides, borates, fluorides and silicates; Cryoscopy in lithium borate; Preparation of Al and of Si-Ti alloys; Mobility separations of isotopic ions; Electrode-electrolyte interactions and electrode poisoning; Molecular diffusion of light in dilute solutions of strong electrolytes; Pulverization by anodic sparks; Electro-osmosis; Mobility and temperature; Effects of magnetic fields; Activity coefficients: pH; Overvoltage and corrosion; Reduction of insoluble compounds suspended in solutions.

CHEMISTRY DEPARTMENT
UNIVERSITY OF WISCONSIN
MADISON 6, WISCONSIN

NORRIS F. HALL

International Tables for X-Ray Crystallography. Volume I—Symmetry Groups. By NORMAN F. M. HENRY and KATHLEEN LONSDALE (EDITORS). The Kynoch Press, Birmingham, England, 1952. xi + 558 pp. 22 × 28.5 cm. Price 5 Guineas.

This book is intended to supersede the "International Tables for the Determination of Crystal Structures" published in 1935; there are so many revisions and additions to the old "Tables," however, that the Editors felt it advisable to change the name slightly.

The basic material in this Volume is essentially that of Volume I of the 1935 Tables together with that of Lonsdale's "Structure Factor Tables," published in 1936; indeed, the inclusion of Lonsdale's structure factors under the same cover as the space group descriptions is a welcome change. In addition, descriptive and structure factor data for the two-dimensional space groups are given. General discussions of crystal lattices, point-groups and space-groups are included, as well as brief descriptions of inequality methods of structure analysis and of other special topics. M. von Laue contributes a very interesting historical introduction.

Two changes in the section on space-group symmetry are worthy of mention. In the first place, the monoclinic space groups are given in each of two settings, the first having the z-axis as the unique axis, and the second setting being the more conventional one wherein the y-axis is unique. It seems likely that confusion will result if any serious attempt is made to use the unconventional (though more logical) first setting in describing crystal symmetry; on the other hand, it is convenient to have diagrams projected along the unique axis—which was not done in the 1935 "Tables," where all projections were made along the z-axis.

The second change—and a serious fault, in this reviewer's opinion—is the omission of diagrams of cubic space groups. The editors state that, according to inquiry, "comparatively little use was being made of the cubic diagrams (in the 1935 tables), and in the interests of economy and compactness it was decided that they should be omitted from the present publication." This decision seems somewhat questionable, since the comparatively few users of cubic space groups undoubtedly find that these diagrams are far more valuable to them than more conventional space group diagrams are to the majority of crystallographers. Indeed, if "economy and compactness" permitted an additional 14 pages for the complete descriptions of the alternate mono-

clinic settings, this reviewer feels that it might have been possible to add the cubic diagrams at a cost of an estimated 20 pages.

In other regards, however, this volume is an excellent compilation. A great deal of effort has obviously been expended in checking and proofreading, and errors are very rare. The printing is large and clear. The binding, though attractive, appears to be of exceptionally poor quality, and it might be appropriate to remark that the pages of this book, as well as their value to the X-ray crystallographer, are practically unbound.

DEPARTMENT OF CHEMISTRY
CALIFORNIA INSTITUTE OF TECHNOLOGY RICHARD E. MARSH
PASADENA, CALIF.

L. Farkas Memorial Volume. Research Council of Israel Special Publication No. 1. By ADALBERT FARKAS, Jenkintown, Pennsylvania, and EUGENE P. WIGNER, Princeton University, Princeton, New Jersey (Editors); Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1952. vi + 309 pp. 18 × 24.5 cm. Price \$6.00.

The volume is a collection of scientific articles by a distinguished group of authors. These contributions are dedicated to the memory of Ladislaus Farkas, who lost his life in a tragic aircraft accident in 1948, while flying from Israel to the United States.

L. Farkas' brilliant scientific career was chiefly spent in Germany and England, when, during the late twenties and early thirties, he became widely recognized for his contributions in the fields of reaction kinetics of free radicals and atoms, the para-ortho hydrogen conversion and varied related topics. Since 1936, as the professor of physical chemistry at the Hebrew University in Jerusalem, he distinguished himself by untiring work in the training of young Hebrew scientists and in the development of Israel's natural resources and its local industry.

The contents of the volume, all in the form of original contributions are spread over a wide range of subjects. Thus E. Wigner and G. Racah discuss in two articles the structure of atomic nuclei. H. Urey analyzes the connection between the vapor pressure curves of some simple compounds and the origin of planets. A considerable number of articles is by authors who are currently engaged in research on various aspects of the area in which Farkas himself was so active, the reactions of atoms and free radicals. Several interesting original contributions are also found in the fields of heterogenous catalysis, of reaction kinetics in liquid media and certain aspects of enzymology. Still other topics are dealt with by such authors as K. Bonhoeffer, F. Simon, M. Polanyi and others.

The volume contains an excellent cross section of current thought in varied areas of physical sciences and as such will be a valuable addition to any scientific library. It is excellently printed and presents a very pleasing appearance.

DEPARTMENT OF CHEMISTRY
HARVARD UNIVERSITY G. B. KISTIAKOWSKY
CAMBRIDGE 38, MASSACHUSETTS

Physical Chemistry of the Hydrocarbons. Volume II. Edited by ADALBERT FARKAS, Ph.D. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1953. x + 411 pp. 16 × 23.5 cm. Price, \$9.00.

This second of two volumes on the physical chemistry of hydrocarbons aims to complete the bringing together in one place the physico-chemical basis of modern techniques used in identification, analysis, separation and some utilization of hydrocarbons. The reader is benefited by having assembled in one place in a convenient form scientific material which is dispersed in many different papers and books.

The seven chapters of the book are written by experts in the respective fields, as follows: S. S. Kurtz, Jr., and A. Sankin, 80 pages, on density and refractive index, including interrelations between these and other properties and their usefulness in analyzing mixtures of hydrocarbons; O. R. Quayle and S. S. Kurtz, Jr., 18 pages, on surface tension

and refractive index; J. G. Aston and S. V. R. Mastrangelo, 31 pages, on heat capacity of hydrocarbons, including the solid, liquid and gaseous states, with sources of data; R. H. Olds, 23 pages, on critical behavior, including critical temperatures, pressures and densities, and relations among them; R. L. Burwell, Jr., 34 pages, on optical activity, including theoretical and experimental considerations, with discussion of the occurrence and preparation of optically active substances and applications of optical activity; R. C. Hansford, 31 pages, on the mechanism of some hydrocarbon reactions, including catalytic cracking, thermal cracking, alkylation, isomerization and polymerization; and A. J. Juhola, 72 pages, on separation and purification by selective adsorption, including theories, experimental methods, selectivity of adsorbents and discussions. In these seven chapters, the authors bring the reader up to date as of about 1950 or 1951, including many references to papers and books in the literature. "For reasons beyond the control of the editor, sections dealing with the distillation and the viscosity of hydrocarbons could not be included in the present volume as originally planned."

This reviewer feels that this Volume II will be every bit as useful to the scientist and engineer working with hydrocarbons as was its companion Volume I. The Editor is to be congratulated on having been successful in selecting good authors and in getting all but two of his topics completed for this volume.

CARNEGIE INSTITUTE OF TECHNOLOGY
PITTSBURGH, PENNSYLVANIA
FREDERICK D. ROSSINI

BOOKS RECEIVED

July 10, 1953—August 10, 1953

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E. H. ERICH PIETSCH (Edited by). "Gmelin's Handbuch der Anorganischen Chemie." Eighth Edition. Verlag Chemie, GMBH, Weinheim/Bergstrasse, West Germany. System No. 9, Sulfur, Section A2. 1952. pps. 61-510. \$35.30. System No. 9, Sulfur, Section B1. 1953. 368 pp. \$29.40.

F. RADT (Edited by). "Elsevier's Encyclopaedia of Organic Chemistry. Series III. Carboisocyclic Condensed Compounds. Volume 12 B. Naphthalene. A. Compounds Containing One Naphthalene Nucleus." Elsevier Publishing Company, 402 Lovett Boulevard, Houston, Texas. 1953. Pages 3261-3964. Single Vol. \$66.00; Series Sub. \$58.00; Complete Sub. \$50.00.