SCIENTIFIC BOOKS

INDUSTRIAL POISONS

Analytical Chemistry of Industrial Poisons, Hazards, and Solvents. By M. B. JACOBS. New York: Interscience Publishers, Incorporated, 1941. Price, $7.00.

THE tremendous increase in defense production, which includes all types of industrial work, makes the appearance of this type of book a timely one. Few works to date have compiled such chemical studies. Its completeness makes it of great value for the increasing number of medical men, toxicologists, industrial hygienists and chemists coming into contact with these problems.

The contents of the book are quite thoroughly covered by references, some 1,200 in all. The table of contents and subject and author indexes make it possible to locate subject matter quickly.

The appendix, giving a tabular estimation of parts per million and milligrams per liter from molecular weights, is of special value. It also lists limits of inflammability and explosive ranges of industrial compounds; acute physiological responses to gases and vapors; probable safe concentration limits of exposure for vapors, gases, dusts, fumes and smokes according to various codes; minimum lethal doses for a number of lacrymators, lung irritants, vesicants, other war gases, etc.

Analytical methods or reference to methods for the various known compounds used or produced in industry are outlined. In addition to giving chemical methods, sampling equipment and procedures, and gas volume and velocity measurements are described.

The book gives a brief, but very helpful, pharmacological and toxicological consideration of the various compounds.

The book is well written and has a minimum of typographical errors. It is the reviewer's opinion that the price of the book, unfortunately, makes it somewhat prohibitive for the body of individuals who could reap most benefit from its use.

RALPH W. MCKEE

SCHOOL OF PUBLIC HEALTH,
HARVARD UNIVERSITY

ALGEBRA

Algebra. By W. L. FERRAR. vi + 202 pp. Oxford: Clarendon Press. 1941.

THIS book was written to provide a text, principally for university undergraduates, on determinants, matrices and algebraic forms. The only prerequisite training required is that provided by the usual course in college algebra, and thus the author's Part I consists of a 59-page presentation of the classical theory of determinants. Part II, on the theory of matrices of complex numbers, presents in 52 pages the elementary matrix concepts, the notions of characteristic function and latent root, the definitions of elementary transformations over a number field F, and the theory of equivalence of rectangular matrices over F. The final part consists of 49 pages on real quadratic forms and 30 pages on invariants and covariants. The omission of the theory of similarity of square matrices is rather curious in a text presenting the theory of equivalence of *pairs* of real quadratic forms.

The author's sources include no modern treatment of his subject, and this probably accounts for his use of so much obsolete terminology. He states that his omission of any hint of abstract algebra is deliberate, but misses the point that even an elementary exposition of the theory of matrices with complex elements could profit by the adoption of the streamlining of the modern versions.

A. A. ALBERT

THE UNIVERSITY OF CHICAGO

SOCIETIES AND MEETINGS

THE INDIANA ACADEMY OF SCIENCE

THE fifty-seventh annual meeting of the Indiana Academy of Science was held at DePauw University, Greencastle, Indiana, on October 30 and 31 and November 1. Over five hundred scientists from Indiana and Ohio were in attendance, including sixteen past presidents of the academy. The executive committee met on Thursday evening, after which President Paul Weatherwax, Indiana University, made a radio broadcast on "The History and Objectives of the Indiana Academy of Science." The general sessions opened on Friday morning with an address of welcome by President Clyde E. Wildman, of DePauw University, which was followed by a response by President Weatherwax. After a short business session a brief memorial service was held for the eleven members of the academy who had died since the last meeting. Among these eleven were William Albert Noyes, Frank M. Andrews, Charles B. Jordan, Arthur E. Haas, Clinton A. Ludwig and James Troop. The principal addresses of the general session were given by Arthur L. Foley, Indiana University, on "Why? What? Whither?" and Arthur T. Evans, Miami University, on "Some Thoughts on Origin and Evolution."

Friday afternoon was devoted to division meetings, at which about eighty papers were read and discussed. Also the new Psychological Laboratory of DePauw University was dedicated with an address by Archie G. Bills, of the University of Cincinnati.

The annual dinner was held on Friday evening with one hundred fifty in attendance after which the president's address was given by Paul Weatherwax, Indiana University, on "The Indian as a Corn Breeder." The following officers were then chosen for the coming year: *President,* M. G. Mellon, Purdue University; *Vice-president,* Theodore Just, Notre Dame University; *Secretary,* Winona H. Welch, DePauw University; *Treasurer,* William P. Morgan, Indiana Central College; *Editor of the Proceedings,* P. D. Edwards, Ball State Teachers College; *Press Secretary,* C. M. Palmer, Butler University; *Member of Research Grant Committee,* A. L. Foley, Indiana University; *Division Chairmen:* Archeology, C. F. Voegelin, Indiana University; Bacteriology, L. S. McClung, Indiana University; Botany, Ray C. Friesner, Butler University; Chemistry, K. N. Campbell, Notre Dame University; Geology and Geography, G. T. Wickwire, Hanover College; Mathematics, Will E. Edington, DePauw University; Physics, O. H. Smith, DePauw University; Zoology, T. M. Sonneborn, Indiana University. J. L. Riebsomer, DePauw University, was elected a fellow of the academy.

Saturday was devoted to meetings of the Indiana Society of Taxonomists under the chairmanship of M. S. Markle, Earlham College, and the Indiana Society of Entomologists, with George E. Gould, Purdue University, as chairman.

The Junior Academy of Science, composed of forty high-school science clubs, also held its meetings and exhibits on Saturday under the sponsorship of Howard E. Enders, Purdue University. About three hundred high-school students and teachers were in attendance and a number of papers were presented on their program. A special feature was a lecture and demonstration of liquid air by F. J. Allen, Purdue University. The following officers were chosen for 1942: *President,* James Sarasien, Elmhurst High School, Fort Wayne; *Vice-president,* Jack Moseley, Greencastle High School; *Secretary,* Selma Heaton, Mishawaka High School. Honorary memberships in the American Association for the Advancement of Science were awarded to Don Courtney, Sullivan High School, and Jean Ross, Hammond High School.

The next annual meeting of the academy and the junior academy will be held at Notre Dame University as a part of the Centennial Celebration of that university.

WILL E. EDINGTON,
Press Secretary

DEPAUW UNIVERSITY

SPECIAL ARTICLES

EXPERIMENTAL AIR-BORNE INFECTION WITH POLIOMYELITIS VIRUS[1]

THE work of W. F. Wells and his associates[2] has shown the importance of transmission of both bacterial and virus infections by dried droplet nuclei, such as are formed by evaporation in the air of moist droplets expelled from the nose and mouth. These minute nuclei remain suspended in air for considerable periods of time, during which they constitute a potential source of infection by inhalation. As far as we are aware, the possibility of poliomyelitis being transmitted in this manner has never been put to experimental test, probably because the apparatus and technique developed by Wells have not been widely available. During the past year we have constructed an apparatus based on that of Wells[3] but modified in some respects, with which we have made a number of experiments and obtained some positive results. These, we believe, justify a preliminary report.

Apparatus. The infecting chamber consists of a Monel metal box 18″ × 18″ × 24″ with four port holes with rubber diaphragms through which the heads of the monkeys are inserted. The atomizing apparatus used in the first two series (32 monkeys) was found to give a poor delivery of material into the infecting chamber and was replaced by a better one designed for us by Mr. F. H. Osborn of this city. Compressed air mixed with 5–10 per cent. CO_2 (to increase the depth of respiration) was passed through a flow meter into the atomizer at an average rate of about 6.6 liters per minute, run continuously throughout each experiment. Test runs with suspensions of Chr. prodigiosum showed an even distribution of colonies on plates placed in the position later occupied by the animals' heads—evidence of satisfactory formation and dispersion of droplet nuclei and absence of large, moist droplets.

Animals used. A total of 48 rhesus monkeys (*M. mulatta*) and of 13 cynomolgus monkeys (*M. irus*) have been exposed. Of these, 31 rhesus and 6 cyno-

[1] From the Department of Pediatrics, Stanford University School of Medicine, San Francisco, California. Sponsored by the National Foundation for Infantile Paralysis, Inc.

[2] (a) W. F. Wells, *Am. Jour. Hyg.,* 20: 611, 1934. (b) W. F. Wells and H. W. Brown, *Am. Jour. Hyg.,* 24: 407, 1936. (c) W. F. Wells and M. W. Wells, *Jour. Am. Med. Assn.,* 107: 1698 and 1805, 1936.

[3] W. F. Wells, SCIENCE, 91: 172, 1940.