Book Reviews

Stormy Life. Memoirs of a pioneer of the air age. Ernst Heinkel. Jurgen Thorwald, Ed. Translated from the German. Dutton, New York, 1956. 256 pp. + plates. $5.

This book is the autobiography of one of the great pioneer designers and builders of aircraft, Ernst Heinkel, whose genius resulted in the world's first flight of an aircraft under rocket power alone, in the summer of 1937, and the world's first turbojet airplane flight, on 27 Aug. 1939. It is not a history of scientific and technical development of the airplane but rather an intensely interesting, human, and perhaps somewhat biased, account of the stormy resistance offered by most elements of society to the technologic innovator. As such a case history it is of value to scientists and engineers generally, especially to those who feel that conditions favorable to new ideas were to be found in greater degree in pre-World War II Germany than elsewhere.

Heinkel early demonstrated powers of creative design, an intuitive knowledge of aerodynamics and of the role of aerodynamic improvement in good performance, and a clear vision of the path of technologic progress by way of the monoplane. At first, science as such was absent. But in 1930 Heinkel discovered and recruited two "theoreticians who never flew themselves and were probably incapable of mechanical work. But they both possessed a certain 'something.'" They were Siegfried and Walter Günter, identical twins—one a mathematician, the other an artist with a flair for the proper aerodynamic shape. Thus the scientist joined the designer.

Within a few years the rugged individualist began to feel pressures from the political and bureaucratic environment in which he lived. Throughout the manifold phases of expansion of his factories, with emphasis on production and in the face of many obstacles, Heinkel contributed an amazing number of advanced designs, particularly those incorporating, for the first time, rocket and jet propulsion. The story of their slow acceptance is told in detail. In truth, science and technology exist and advance in an environment of human motivation, of human competition and conflict, as universal as the characteristics of the human race. Scientists would do well to understand the interplay of these forces as well as those of the physical world with which they may prefer to occupy themselves.

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Nouveau Traité de Chimie Minérale. vol. I, *Généralités, Air, Eau, Hydrogène, Deutèrium, Tritium, Hélium et Gaz Inertes.* G. Bouissières, M. Haïssinsky, G. Pannetier, P. Pascal, R. Villard. Masson, Paris, 1956. 1097 pp. Illus.

Nouveau Traité de Chimie Minérale. vol. X, *Azote—Phosphore.* Paul Pascal and R. Dubrisay, Eds. Masson, Paris, 1956. 964 pp. Illus. Cloth, F. 7500; paper F. 6600.

In this new treatise on inorganic chemistry, the plan is to present the material in 19 volumes, which are scheduled to appear between the years 1956 and 1960. So far, volumes I and X have been published.

The first 345 pages of volume I are devoted to a general introduction that discusses such subjects as stable and radioactive isotopes, coordinate systems and phase diagrams, classification of the elements, structure of the atom, structure of ions, simple ions, complex ions, covalence, bond types, bond energies, molecular structure, macrostructure.

The next 80 pages are concerned with the composition and properties of air, followed by 140 pages on water, 122 pages on hydrogen, 233 pages on deuterium, 30 pages on tritium, 133 pages on helium and other enert gases, and 10 pages on radon.

Volume X consists of an exhaustive treatise on nitrogen and phosphorus, 713 pages of which are on nitrogen.

Each of the two volumes contains a bibliography that lists libraries in Paris and also throughout France, together with abbreviations of scientific journals, their exact titles, and the French libraries in which these journals may be found. A list is likewise given of symbols for various constants of nature and for other physical constants used in physicochemical equations, in accordance with the recommendation of the 14th conference of the International Union of Chemistry.

The various sections of the work carry the name or names of the particular authors at the bottom of each page as well as the page on which the list of references is given. For easy consultation, the lists of references are divided into groups of ten references. Each volume has a subject index. The paper used is of good quality, and the printing is clear and pleasing. Tables and graphs are numerous.

The material of the remaining proposed volumes is distributed as follows: II, lithium, sodium, potassium; III, rubidium, cesium, francium, copper, silver, gold; IV, beryllium, magnesium, calcium, strontium, barium, radium and radioactive derivatives; V, zinc, cadmium, mercury; VI, boron, aluminum, gallium, indium, thallium; VII, scandium, yttrium, lanthanum and the lanthanides, actinium; VIII, carbon, silicon, germanium; IX, tin, lead, titanium, zirconium, hafnium, thorium; XI, arsenic, antimony, bismuth, vanadium, niobium, tantalum, protoactinium; XII, oxygen, sulfur, selenium, tellurium, polonium; XIII, chromium, molybdenum, tungsten; XIV, uranium, and the transuranic elements; XV, fluorine, chlorine, bromine, iodine, astatine, manganese, technetium, rhenium; XVI, iron, cobalt, nickel, and their simple salts; XVII, complexes of iron, cobalt, and nickel; XVIII, ruthenium, rhodium, palladium, osmium, iridium, platinum; XIX, theory and description of metallic alloys.

If completed as planned, this modern treatise on inorganic chemistry will be a welcome addition to the reference library, replacing the older publications which now are so much out of date.

RALEIGH GILCHRIST
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Molybdenum. L. Northcott. Academic Press, New York; Butterworths, London, 1956. $6.80.

This book is the fifth of a series on metallurgy of the rarer metals, published by Academic Press. The quality of both the print and the paper is excellent. The author has collated the information available up to the end of 1955 on molybdenum and its alloys, and the book covers the following topics: history and occurrence in nature, extraction, processing and fabrication, physical properties, mechanical properties of molybdenum and molybdenum alloys, equilibrium diagrams of binary and ternary molybdenum systems, oxidation resistance, protective coatings and joining processes.

The author has given particular attention to the physical metallurgy of molybdenum and to the engineering properties of the metal and its alloys. Special emphasis is placed on the problems involved in the low oxidation resistance of molybdenum, the embrittlement of the metal at low temperatures, and the effects of cold working and heat treatments on its mechanical properties at low temperatures. The various types of protective coatings and available methods for joining molybdenum and its alloys are discussed in some detail.

The greatest use of molybdenum has been as an alloying element in iron and steel. This use of the element is not reviewed in the present book, since the literature on this application is very extensive and suitably covered in other books. Similarly, the specific use of the pure metal in small sections—wire and sheet—for high-temperature service in lamps and electronic valves is not included.

The presentation and arrangement of the data, in general, are very good, and the author has succeeded in keeping the size of the book down to 222 pages. Most of the 50 tables and 104 illustrations are well referenced, and this feature is appreciated by the reader who wishes to obtain further details on the different experimental investigations. Adequate references are given conveniently at the end of each chapter.

G. W. GEIL

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The Growth and Structure of Motives. Psychological studies in the theory of action. James Olds. Free Press, Glencoe, Ill. 277 pp. $5.

In this series of papers the author attempts, by means of the formal, deductive approach made popular in psychology by Hull, to fashion a theory of motivation from a neurological terminology of Hebbian origin. After a brief introductory chapter, there follows a competent, but now dated, review of the experimental literature of secondary reinforcement. There is little continuity between this and the succeeding chapters, and very little future use is made of the material reviewed.

In Chapter 3 a "limited theory of reward" is presented, which culminates in a rather formal listing of postulates and definitions which allegedly constitute a "theoretical explanation of motivated behavior." We are advised at the outset of this chapter that "It is my firm belief that the techniques of measurement and variation suggested here will contribute a lasting increment to the psychology of learned motivation. . . ." However, the author fails to deliver the goods. With the possibility of one exception, he does not even hint at techniques of measurement and in fact scarcely mentions the topic again. The primary fruits of some 19 postulates and seven definitions are a reinterpretation of a number of Tolmanian concepts and a derivation of "latent learning." Finally, he suggests an experimental "program" which yields one variable of interest.

Chapter 4 represents an attempt to interpret the structure developed in the preceding chapter "as an action system as that term has been defined by Parsons, Bales, and Shils." The analogy seems terribly strained and rather pointless. The final chapter, on the other hand, yields an interesting and sometimes ingenious discussion of the sequential properties of behavior and its temporal integration. In my opinion, the book is unlikely to be of interest to those who are not psychologists, and even among them the extent of its potential appeal is problematical.

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Books Reviewed in The Scientific Monthly, March

The Evolution of Human Nature, C. J. Herrick (Univ. of Texas Press). Reviewed by H. S. Burr.

The Historical Background of Chemistry, H. M. Leicester (Wiley; Chapman & Hall). Reviewed by R. Siegfried.

Hailstorms of the United States, S. D. Flora (Univ. of Oklahoma Press). Reviewed by S. S. Visher.

Earth Satellites, P. Moore (Norton). Reviewed by H. E. Newell, Jr.

Things Maps Don't Tell Us, A. K. Lobeck (Macmillan). Reviewed by W. W. Ristow.

Theory and Dynamics of Grassland Agriculture, J. R. Harlan (Van Nostrand). Reviewed by J. Hancock.

Calder Hall, K. Jay (Harcourt, Brace). Reviewed by U. M. Staebler.

Botanical Exploration of the Trans-Mississippi West, 1790–1850, S. D. McKelvey (Arnold Arboretum). Reviewed by J. Ewan.

The Earth Beneath Us, H. H. Swinnerton (Little, Brown). Reviewed by H. G. Richards.

New Books

Jaarboek der Koninklijke Nederlandse Akademie van Wetenschappen 1955–1956. North-Holland, Amsterdam, 1956. 311 pp.

Heterocyclic Compounds. vol. 5, *Five-Membered Heterocycles Containing Two Hetero Atoms and Their Benzo Derivatives.* Robert C. Elderfield, Ed. Wiley, New York; Chapman & Hall, London, 1957. 744 pp. $20.

Technical Aspects of Sound. vol. II, *Ultrasonic Range, Underwater Acoustics.* E. G. Richardson. Elsevier, Amsterdam, 1957 (distributed by Van Nostrand, Princeton, N.J.). 412 pp. $11.75.

Reptiles. Angus d'A. Bellairs. Hutchinson's University Library, London, 1957 (distributed by Rinehart, New York). 195 pp. $1.50.

An Atlas of Diseases of the Eye. E. S. Perkins and Peter Hansell. Little, Brown, Boston, 1957. 91 pp. $10.

How to Use a Tape Recorder in Your Business . . . in Your Home. Dick Hodgson and H. Jay Bullen. Hastings House, New York, 1957. 216 pp. $4.95.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Subject Index of School of Aviation Medicine Research Reports, January 1942–December 1955. Air University, School of Aviation Medicine, USAF, Randolph AFT, Tex., 1956. 60 pp.

Laboratory Manual in General Bacteriology. Eric B. Fowler and C. H. Werkman. Burgess, Minneapolis, 1957. 103 pp. $2.75.

Physical Society (London) Yearbook, 1956. Physical Society, London, 1956. 76 pp. 10s.

Noise Characteristics of Air Force Turbojet Aircraft. WADC Technical Note 56–280. ASTIA Document No. AD110680. Kenneth M. Eldred and Demos T. Kyrazis. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, 1956 (order from ASTIA Document Service Center, Knott Bldg., Dayton 2, Ohio). 31 pp.

Institut pour la Recherche Scientifique en Afrique Centrale (I.R.S.A.C.), Septième Rapport Annuel, 1954. The Institute, 42, rue Montoyer, Brussels, 1956. 267 pp.

The Succession of Life through Geological Time. Kenneth P. Oakley and Helen M. Muir-Wood. British Museum (Natural History), London, ed. 3 and revised, 1956. 94 pp. 4s.

Conditioning and Sexual Behavior in the Male Albino Rat. Acta Psychologica Gothoburgensia, I. Knut Larsson. Almquist & Wiksell, Stockholm, 1956. 269 pp. Kr. 23.

Application of Basic Science Techniques to Psychiatric Research. Psychiatric Research Repts. No. 6. Robert A. Cleghorn, Ed. American Psychiatric Assoc., Washington 6, 1956. 211 pp. $2.

Seminole Music. Smithsonian Institution, Bur. of American Ethnology Bull. 161. Frances Densmore. Smithsonian Institution, Washington, 1956 (order from Supt. of Documents, GPO, Washington 25). 223 pp. Paper, $1.

Plants. Instructions for Collectors No. 10. British Museum (Natural History), London, 1957. 72 pp. 2s.

Student Mental Health: an Annotated Bibliography 1936–1955. Prepared by Daniel H. Funkenstein and George H. Wilkie for an International Conference on Student Mental Health, Princeton, N.J., 5–15 Sept. 1956. World Federation for Mental Health, London, 1956. 297 pp.

The Rockefeller Foundation Annual Report, 1955. The Foundation, New York, 1957. 350 pp.