

Applied Chemistry

Analysis of Ancient Metals. Earle R. Caley. Pergamon, London; Macmillan, New York, 1964. xii + 176 pp. \$6.

One of the pleasures of being a chemist is the association with the wealth of interesting subjects on which chemistry has bearing. Volumes could undoubtedly be written on the uses of chemistry in archeology. One important use, the analysis of ancient metals, is described in the volume under review.

Why should the analysis of ancient metals be different from the analysis of ordinary metals? The author, Earle R. Caley, makes this quite clear. With the exception of the noble metals, ancient metallic objects are usually more or less heavily corroded. The prevalence of intergranular corrosion in particular introduces troublesome sampling difficulties. Furthermore, the archeologist is rarely interested in the composition of the corrosion products as such; he would like the chemist to reconstruct for him the composition of the original metal. In turn, the chemical composition can be an important clue to the origin of the object, the source of the ores employed, the state of metal technology, and perhaps the state of trade at the time the object was in circulation—in short all the information that the archeologist really wants. In the case of coins, the composition may even suggest whether the finances of the country were sound or were overly extended. A restriction frequently imposed on the analyst is that he may be working with an irreplaceable object and therefore must rely on nondestructive methods.

Caley gives specific laboratory directions for conducting analyses of ancient metals. He considers the general problem of heterogeneity and sampling, preliminary observations, qualitative tests, and choice of quantitative method, in introductory chapters that precede the chapters in which he deals with gold and its alloys, silver and its alloys, copper and its alloys, various nonferrous metals (principally lead, tin, platinum, antimony, and zinc) and their alloys, and iron and steel. Most of the quantitative chemical analyses described are gravimetric, including electrolytic deposition. Many of them are the result of Caley's original investigations. Other methods, such as specific gravity analysis, neutron acti-

vation analysis, x-ray fluorescence, x-ray diffraction, and emission spectroscopy (useful particularly for trace elements) are described where applicable. An important feature of the book is the extensive composition tables for various ancient alloys of known origin. The book also contains many references to original data.

The preparation of reports is discussed in the final chapter. Caley explains what the archeologist, who is usually untrained in chemistry, expects to obtain from the chemist. This authoritative book is an extremely practical and pleasant guide to one of the less well-known branches of applied chemistry.

MARTIN A. PAUL

Department of Chemistry, Harpur College, State University of New York

Nuclear Science

Nuclear and Radiochemistry. Gerhart Friedlander, Joseph W. Kennedy, and Julian Malcolm Miller. Wiley, New York, ed. 2, 1964. xii + 585 pp. Illus. \$10.75.

It is a pleasure to see the new edition of this standard text. In the 9 years that have elapsed since the last edition, the inexorable accretion of new data and the development of new concepts in nuclear structure have required the authors to reappraise the text and make a thorough-going reorganization of their material. A most unfortunate circumstance, the untimely death of Professor Kennedy immediately after the appearance of the previous edition, deprived Friedlander of the inestimably valuable judgment and acumen of a great pioneer in nuclear chemistry. However, Friedlander was joined by Julian M. Miller in reworking the text, and together they have accomplished the task with insight and discrimination.

The new text runs some hundred pages more than the old—a result in keeping with the necessity for inclusion of new chapters on nuclear models and nuclear processes as chemical probes, as well as the fleshing out of the older material with new data. The attractive format is an improvement over that of the previous editions.

It is the good fortune of students, as well as faculty and interested intelligent nonexperts, that this book has been made available. It should be a

well-thumbed addition to the desks and libraries of all who want a thorough-going and reliable introduction to nuclear science and to the desks and libraries of investigators active in researches on nuclear chemical processes as well.

MARTIN D. KAMEN

University of California, San Diego

New Books

Mathematics, Physical Sciences, and Engineering

Analytical Chemistry of Molybdenum. A. I. Busev. Translated from the Russian edition (Moscow, 1962) by J. Schmorak. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. 253 pp. Illus. \$13.50.

Analytical Chemistry of Ruthenium. T. D. Avtokratova. Translated from the Russian edition (Moscow, 1962) by IPST staff. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 232 pp. Illus. \$12.50.

Analytical Chemistry of Thallium. I. M. Korenman. Translated from the Russian edition (Moscow, 1960) by Z. Lerman. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 144 pp. Illus. \$6.75.

Analytical Chemistry of Thorium. D. I. Ryabchikov and E. K. Gol'braikh. Translated from the Russian edition (Moscow, 1960) by A. Aladjem. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 256 pp. Illus. \$11.25.

Analytical Chemistry of Uranium. A. P. Vinogradov, Ed. Translated from the Russian edition (Moscow, 1962) by N. Kaner. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 382 pp. Illus. \$15.75.

Antarctic Snow and Ice Studies. Malcolm Mellor, Ed. American Geophysical Union, Washington, D.C., 1964. 289 pp. Illus. Plates. \$12. Ten papers: "Glaciological studies at Wilkes Station, Budd Coast, Antarctica" (R. L. Cameron); "Glaciological studies in West Antarctica, 1960–1962" (H. Shimizu); "Horizontal strain and absolute movement of the Ross Ice Shelf between Ross Island and Roosevelt Island, Antarctica, 1958–1963" (J. H. Zumberge); "The Ross Ice Shelf Survey (RISS) 1962–1963" (W. Hofmann, E. Dorrer, and K. Nottarp); "Snow accumulation on the Ross Ice Shelf, Antarctica" (J. A. Heap and A. S. Rundle); "The drainage systems of Antarctica: Accumulation" (M. B. Giovinetto); "Den-sification of snow in Antarctica" (K. Kojima); "Firn stratigraphy studies on the Byrd-Whitmore mountains traverse, 1962–1963" (R. M. Koerner); "Structural glaciology of an ice layer in a firn fold, Antarctica" (J. R. Reid, Jr.); and "Distribution of particulate matter in a firn core from Eights Station, Antarctica" (L. D. Taylor and James Gliozzi).

(Continued on page 838)

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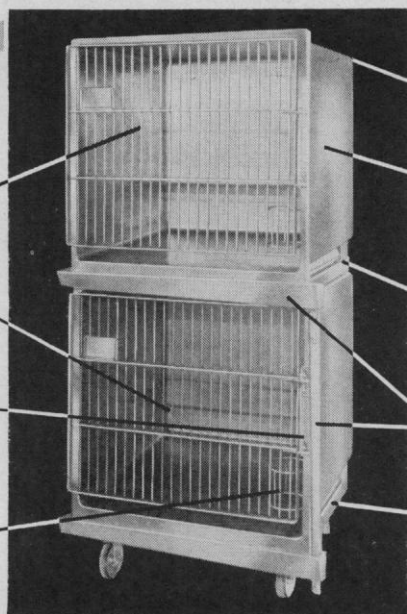
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NEW BOOKS

(Continued from page 761)

Applications of NMR Spectroscopy in Organic Chemistry: Illustrations from the Steroid Field. Norman S. Bhacca and Dudley H. Williams. Holden-Day, San Francisco, Calif., 1964. 208 pp. Illus. \$7.95.

Arctic Communications. Proceedings, 8th meeting, AGARD Ionospheric Research Committee (Athens, Greece), July 1963. B. Landmark, Ed. Published for North Atlantic Treaty Organization by Pergamon, London; Macmillan, New York, 1964. 307 pp. Illus. \$15. 25 papers.

Aspects of Theoretical Mineralogy in the U.S.S.R. M. H. Battey and S. I. Tomkeieff, Eds. Translated from the Russian. Pergamon, London; Macmillan, New York, 1964. 515 pp. Illus. \$30. Thirty-five papers on the definition and classification of minerals, the classification of individual groups of minerals, and the correlation of the properties of minerals with their crystal chemistry.

Astronomy Highlights. *Apollo and the Moon*, Franklyn M. Branley (32 pp.); *Birth and Death of the Stars*, Kenneth L. Franklin (32 pp.); *Captives of the Sun: The Story of the Planets*, James S. Pickering (32 pp.); *Design of the Universe*, S. I. Gale (32 pp.); *Man in Space*, Fred C. Hess (32 pp.); *Space Age Astronomy*, Kenneth L. Franklin (32 pp.); *The Sun in Action*, Thomas D. Nicholson (32 pp.); *Time and the Stars*, Joseph M. Chamberlain (32 pp.). Published for the American Museum-Hayden Planetarium by the Natural History Press, Garden City, N.Y., 1964. Illus. Paper, 50¢ each. Popularizations based on lectures given at the Hayden Planetarium. They are intended for junior high school and high school students as well as laymen.

Asymptotic Solutions of Differential Equations and Their Applications. Proceedings of a symposium (Madison, Wis.), May 1964. Calvin H. Wilcox, Ed. Wiley, New York, 1964. 259 pp. Illus. \$4.95. Ten papers presented at a symposium sponsored by the Mathematics Research Center, U.S. Army, at the University of Wisconsin. Papers: "Asymptotic expansions for ordinary differential equations: Trends and problems" by Wolfgang Wasow; "Solvable related equations pertaining to turning point problems" by Hugh L. Turruttin; "Asymptotic methods for the solution of dispersive hyperbolic equations" by Robert M. Lewis; "Asymptotic solutions and indefinite boundary value problems" by Robert W. McKelvey; "Some examples of asymptotic problems in mathematical physics" by C. C. Lin; "On the problem of turning points for systems of linear ordinary differential equations of higher orders" by Yasutaka Sibuya; "Error bounds for asymptotic expansions, with an application to cylinder functions of large argument" by Frank W. J. Olver; "Asymptotic solutions of elastic shell problems" by Robert A. Clark; "The integral equations of asymptotic theory" by Arthur Erdélyi; and "Application of Langer's theory of turning points to diffraction problems" by Nicholas D. Kazarinoff.

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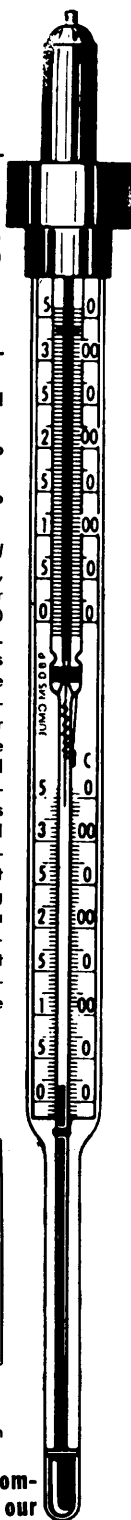
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Elmer Hutchisson. Wiley, New York, ed. 3, 1964. 215 pp. Illus. Paper, \$2.25.

Automation of Continuous Production Processes. V. L. Lossiyevskii and L. G. Pliskin. Translated from the Russian edition (Moscow, 1960) by R. P. Froom. D. K. Ghosh, Ed. Pergamon, London; Macmillan, New York, 1964. 126 pp. Illus. \$6.50.

Boron, Metallo-Boron Compounds, and Boranes. Roy M. Adams, Ed. Interscience (Wiley), New York, 1964. 789 pp. Illus. \$27.50.

Crystal Structures. vol. 2, *Inorganic Compounds* RX_n , R_nMX_2 , R_nMX_3 . Ralph W. G. Wyckoff. Interscience (Wiley), New York, ed. 2, 1964. 596 pp. Illus. \$24.

The Current Interpretation of Wave Mechanics. A critical study. Louis de Broglie. Elsevier, New York, 1964. 104 pp. Illus. \$6.

Determination of Molecular Weights of High Polymers. Ch'ien Jên-Yüan. Translated from the Russian edition (Moscow, 1962) by J. Schmorak. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 160 pp. Illus. \$7.95.

Digital Differential Analysers. A. V. Shileiko. Translated from the Russian edition (Moscow, 1961) by D. P. Barrett. A. D. Booth, Translation Ed. Pergamon, London; Macmillan, New York, 1964. 117 pp. Illus. \$6.50.

Dispersion Relations and Their Connection with Causality. Course 29, International School of Physics "Enrico Fermi." E. P. Wigner, Ed. Academic Press, New York, 1964. 274 pp. Illus. \$12.

Dynamics of Structures. Walter C. Hurty and Moshe F. Rubinstein. Prentice-Hall, Englewood Cliffs, N.J., 1964. 473 pp. Illus. \$16.

Electromagnetism for Engineers. An introductory course. P. Hammond. Pergamon, London; Macmillan, New York, 1964. 223 pp. Illus. \$5.

Elementary General Topology. Theral O. Moore. Prentice-Hall, Englewood Cliffs, N.J., 1964. 186 pp. Illus. \$7.95.

Elementary Particle Physics. Gunnar Källén. Addison-Wesley, Reading, Mass., 1964. 560 pp. Illus. \$15.

Energetics of Propellant Chemistry. Bernard Siegel and Leroy Schieler. Wiley, New York, 1964. 254 pp. Illus. \$10.

First Course in Mathematical Logic. Patrick Suppes and Shirley Hill. Blaisdell (Ginn), New York, 1964. 286 pp. Illus. \$6.50.

Functional Analysis. Albert Wilansky. Blaisdell (Ginn), New York, 1964. 299 pp. Illus. \$9.50.

Geochronology in Canada. F. Fitz Osborne, Ed. Published in cooperation with the Royal Society of Canada by the Univ. of Toronto Press, Toronto, 1964. 166 pp. Illus. \$5.95.

Geology of Erie County, New York. Edward J. Buehler and Irving H. Tesmer. Buffalo Soc. of Natural Sciences, Buffalo, N.Y., 1963. 126 pp. Illus. Map. Paper, \$4.

The Groups of Order 2ⁿ (n ≤ 6). Marshall Hall, Jr., and James K. Senior. Macmillan, New York, 1964. Unpagged. Illus. Paper, \$15.

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in Condensed Systems. Morris E. Fine. Macmillan, New York, 1964. 143 pp. Illus. Paper, \$3.40.

Introduction to Probability and Statistics. Henry L. Alder and Edward B. Roessler. Freeman, San Francisco, Calif., ed. 3, 1964. 327 pp. Illus. \$6.

Introduction to Properties of Materials. Daniel Rosenthal. Van Nostrand, Princeton, N.J., 1964. 381 pp. Illus. \$7.95.

Isotopic and Cosmic Chemistry. H. Craig, S. L. Miller, and G. J. Wasserman, Eds. North-Holland, Amsterdam, 1964. 579 pp. Illus. \$15.

Laboratory Physics. pt. A. Berkeley Physics Laboratory. Alan M. Portis, Ed. McGraw-Hill, New York, 1964. 127 pp. Illus. Paper, \$2.25.

Lectures in Theoretical Physics. vol. 6. Lectures delivered at the Summer Institute, Boulder, Colo., in 1963. Wesley E. Brittin and Willard R. Chappell, Eds. Univ. of Colorado Press, Boulder, 1964. 526 pp. Illus. Paper, \$7. Eleven lectures: "The higher order virial equations and their applications to the equilibrium and stability of rotating configurations" by S. Chandrasekhar; "Rigorous results in statistical mechanics" by D. Ruelle; "Consequences of a fundamental length in very high energy scattering" by R. L. Ingraham; "Group theoretical properties of complex angular momenta" by Enrico Beltrametti; "Remarks on the $|\Delta I| = \frac{1}{2}$ rule in weak interactions" by Jean Nuyts; "Some aspects of the liquid helium problem" by W. E. Parry; "Selected topics in modern theoretical physics" by H. Y. Chiu; "Theory of superfluids" by J. G. Valatin; "Recent progress in potential scattering theories" by Tullio Regge; "Nuclear and neutrino processes in stars and supernovae" by William A. Fowler and Joseph L. Vogt; and "The method of complex angular momenta in relativistic quantum theory" by Peter G. O. Freund.

Lectures on Magnetoionic Theory. K. G. Budden. Gordon and Breach, New York, 1964. 96 pp. Illus. Paper, \$1.95; cloth, \$3.95.

A Manual of Physical Methods in Organic Chemistry. F. L. J. Sixma and Hans Wynberg. Wiley, New York, 1964. 356 pp. Illus. Paper, \$8.75.

Mathematics: The Study of Axiom Systems. G. E. Witter. Blaisdell (Ginn), New York, 1964. 332 pp. Illus. \$6.50.

Matter and Energy. The foundations of modern physics. James H. MacLachlan, K. G. McNeill, and John M. Bell. Noble and Noble, New York, 1964. 416 pp. Illus. \$5.48.

Methods of Real Analysis. Richard R. Goldberg. Blaisdell (Ginn), New York, 1964. 373 pp. Illus. \$9.50.

The Microscopical Characters of Artificial Inorganic Solid Substances: Optical Properties of Artificial Minerals. Alexander Newton Winchell and Horace Winchell. Academic Press, New York, ed. 2, 1964. 453 pp. Illus. \$14.50.

New Sources of Energy. Proceedings, United Nations Conference (Rome), August 1961. vol. 2, pt. 1, *Geothermal Energy*. Jesús Ruiz Elizondo, Ed. United Nations, New York, 1964. 428 pp. Illus. Paper, \$5. This volume contains papers,

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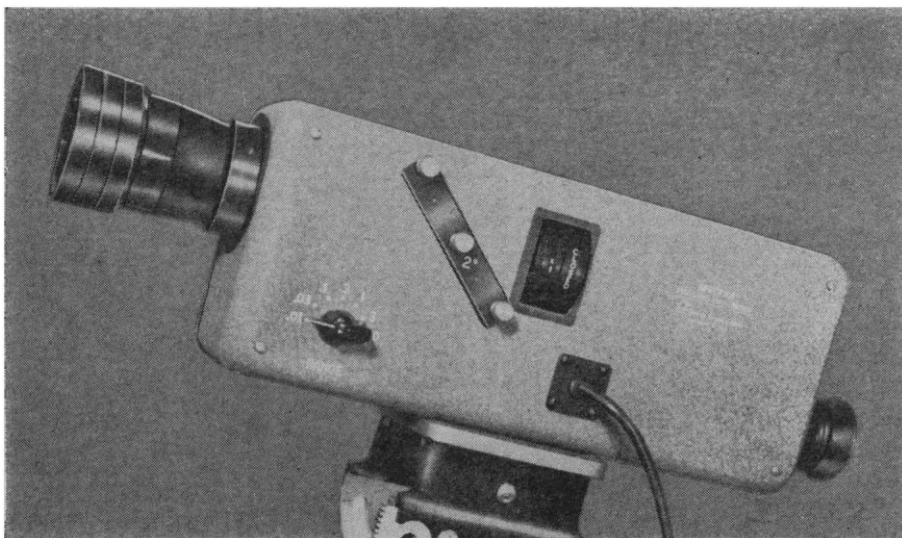
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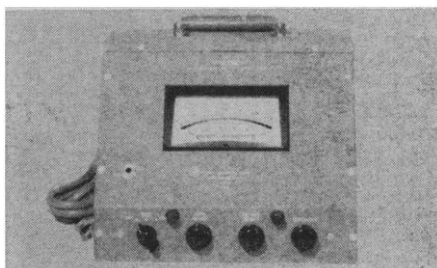


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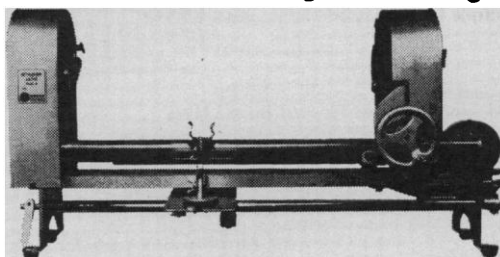


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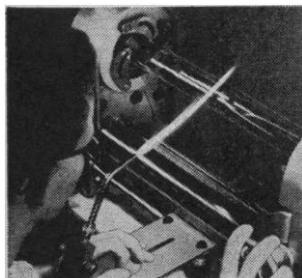
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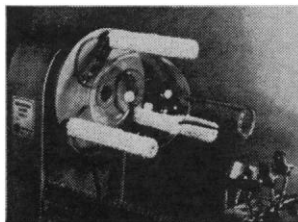


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most of which are summarized in both French and English, relating to the agenda item "Prospection of geothermal fields and investigations necessary to evaluate their capacity." The papers are presented in alphabetical order by the authors' names. Six additional volumes of proceedings papers have been announced.

Partial Differential Equations: An Introduction. Günter Hellwig. Blaisdell (Ginn), New York, 1964. 279 pp. Illus. \$9.50.

The Physical Chemistry and Mineralogy of Soils. vol. 1, *Soil Materials*. C. Edmund Marshall. Wiley, New York, 1964. 398 pp. Illus. \$12.

Physics Laboratory Manual. Edward B. Nelson. Brown, Dubuque, Iowa, ed. 2, 1964. 150 pp. Worksheets. Illus. Paper, \$4.50.

Physics of III-V Compounds. Otfried Madelung. Translated from the German by Dietrich Meyerhofer. Wiley, New York, 1964. 425 pp. Illus. \$13.

Physics of the Air. W. J. Humphreys. Dover, New York (reprint, 3rd edition, 1940), 1964. 692 pp. Illus. Paper, \$3.

Phytochemistry. A symposium. Proceedings of a meeting (Hong Kong), September 1961. H. R. Arthur, Ed. Hong Kong Univ. Press, Hong Kong; Oxford Univ. Press, New York, 1964. 270 pp. Illus. \$10. 46 papers on structural and biosynthetic relationship in plant products (5 reports); isolation, structure, and chemistry of plant products (32 reports); and survey reports (9 reports).

Plutonium. Mieczysław Taube. Translated from the Polish edition (Warsaw, 1964) by Eugeniusz Lepa and Zbigniew Nanowski. Pergamon, London; Macmillan, New York, 1964. 264 pp. Illus. \$8.50.

Principles of Physical Geography. F. J. Monkhouse. Philosophical Library, New York, ed. 5, 1964. 537 pp. Illus. \$10.

Problems in Modern Mathematics. S. M. Ulam. Wiley, New York, 1964 (reprint of 1960 edition). 168 pp. Illus. Paper, \$1.95.

Problems of Metal Fatigue. V. I. Belvaev. Translated from the Russian edition (Minsk, 1962) by Ch. Nissenbaum. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 84 pp. Illus. Paper, \$3.95.

Progress in Boron Chemistry. vol. 1. H. Steinberg and A. L. McCloskey, Eds. Pergamon, London; Macmillan, New York, 1964. 495 pp. Illus. \$20. Ten papers: "The chemistry of compounds which contain boron-boron bonds" by R. J. Brotherton; "Some aspects of the coordination chemistry of boron" by T. D. Coyle and F. G. A. Stone; "The structures of the boron hydrides" by George W. Campbell, Jr.; "Boron compounds in cancer therapy" by Albert H. Soloway; "Heteroaromatic boron compounds" by Michael J. S. Dewar; "Organoperoxyboranes" by Alwyn G. Davies; "Organoboron heterocycles" by Roland Köster; "The reactions of diazoalkanes with boron compounds" by C. E. H. Bawn and A. Ledwith; "The chemistry of boronic and borinic acids" by Kurt Torssell; and "Nuclear magnetic reso-

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nance spectroscopy of boron compounds" by Riley Schaeffer.

Projective and Related Geometries. Harry Levy. Macmillan, New York, 1964. 415 pp. Illus. \$11.

Projective Geometry. H. S. M. Coxeter. Blaisdell (Ginn), New York, 1964. 176 pp. Illus. \$5.

The Propagation of Electromagnetic Waves in Plasmas. V. L. Ginzburg. Translated from the Russian edition (Moscow, 1960) by J. B. Sykes and R. J. Tayler. Pergamon, London; Addison-Wesley, Reading, Mass., 1964. 555 pp. Illus. \$14.75.

Research in Geophysics. vol. 1, *Sun, Upper Atmosphere, and Space* (598 pp.); vol. 2, *Solid Earth and Interface Phenomena* (619 pp.). Hugh Odishaw, Ed. M.I.T. Press, Cambridge, Mass., 1964. Illus. \$12.50 each.

Scientific Uncertainty and Information. Leon Brillouin. Academic Press, New York, 1964. 178 pp. Illus. \$6.50.

Selected Papers on the Theory of Thermal Convection. With special application to the earth's planetary atmosphere. Barry Saltzman, Ed. Dover, New York, 1962. 471 pp. Illus. Paper, \$3. Twenty-five papers selected from the writings of such men as Lord Rayleigh, H. Jeffreys, S. Chandrasekhar, H. von Helmholtz, and H.-L. Kuo.

Size Effect in Wear and Fatigue of Steel. D. A. Draigor and G. I. Val'chuk. F. P. Belyankin, Ed. Translated from the Russian edition (Kiev, 1962) by A. Wald. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964. 93 pp. Illus. \$3.95.

Solar Plasma, Geomagnetism, and Aurora. Sydney Chapman. Gordon and Breach, New York, 1964. 151 pp. Illus. Paper, \$1.95; cloth, \$4.95.

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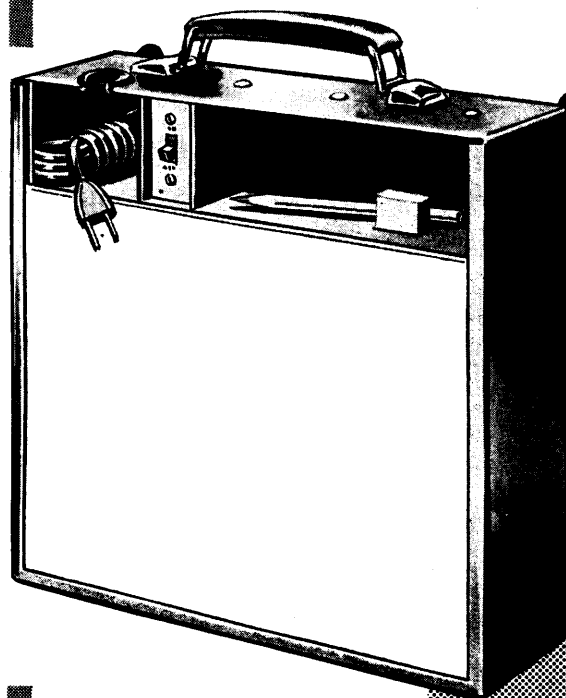
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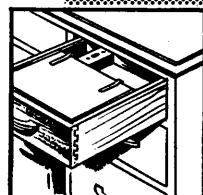
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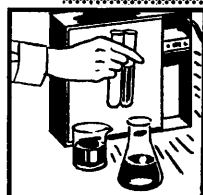
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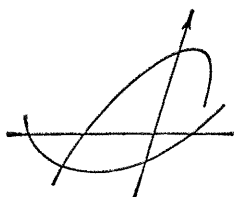
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