

sandstone, siltstone, mudstone, claystone, gypsum, and gray limestone; the latter lithic type characterizes the Fort Apache Member and contains the rich molluscan fauna. The Supai was interpreted as having accumulated marginal to and in a shallow epeiric sea under warm dry conditions; the cyclicity of sedimentation indicates eustatic fluctuations and a periodic encroachment of a Permian sea from the south.

In this memoir Winters provides geologists with details of the stratigraphy in 13 well-located surface sections in addition to detailed systematic description and illustration of their fauna. Three new genera were among the 22 genera of gastropods collected, and 12 new species are described; the 15 genera of pelecypods contain 20 forms. And of the two brachiopods recognized, one is a new productid genus. The fauna is superbly illustrated.

Winters has done a commendable job in providing objective data and subjective interpretation for these Early and Medial Permian sedimentary rocks. The systematic paleontology by itself is an outstanding contribution, because it provides information necessary for biostratigraphic studies in this and contiguous areas. This memoir should prove of inestimable value to stratigraphers and the paleontologists who wish to make documented correlation with the standard West Texas sections. It is self-evident that its value will be enhanced as its utility is applied in such areas as the eastern Great Basin and the Colorado Plateau. The author is to be highly complimented.

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Space Age Aerodynamics

Aerodynamics. A space-age survey. John E. Allen. Harper and Row, New York, 1963. 128 pp. Illus. \$2.95.

Readers of this engagingly written little book should begin in the middle of the volume with the author's account of natural aerodynamic phenomena, for that is a fascinating story, spiced with anecdotes of men lifted by tornadoes, of wind-tunnel tests of the Rock of Gibraltar, of galloping bridges, cables, and circus tents and with accounts of other caprices of the earth's atmosphere.

Equally interesting are the subsequent chapters devoted to the streamlining of cars and trains, to the industrial use of moving air, and, of course, to the airplane. Here the narrative follows the historical acceleration from low speeds through subsonic, transonic, and supersonic to hypersonic flight. It culminates in the aerodynamics of space, including not only guided missiles and re-entry vehicles but also the small molten marbles called tektites whose extraterrestrial origin is being so hotly disputed by the experts. Treatment of such fashionable subjects as radiation and magnetohydrodynamics makes this a thoroughly modern survey of the science of air in motion.

The author is less successful in his first four chapters, where he attempts a brief summary, in simple terms, of all of aerodynamic theory. The specialist would quibble with many details: for example, Figure 5 is almost a "what's wrong with this picture?" puzzle. The nonspecialist—to whom the book is addressed—will be discouraged by a proliferation of mathematical formulas which call for a knowledge of partial differentiation and vector analysis and which could have been avoided with a bit more ingenuity.

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Note

Electronic Spectra

Volume 4 of *Organic Electronic Spectral Data* [Interscience (Wiley), New York, 1963. 1189 pp. \$20], edited by J. B. Phillips and F. C. Nachod, covers spectral data published during 1958 and 1959. The text, which is similar to that of the earlier volumes in the series, is a comprehensive compilation of the data on electronic spectra of organic compounds reported in some 90 journals. Metallic salts and complexes are included. The data consist of listings of the wavelengths of all reported absorption maxima, together with logarithms of molar absorptivities at these maxima for each compound listed. Compounds are cataloged by molecular formula in a manner similar to that used in *Chemical Abstracts*. Solvents or phases used are given, as are references to the sources of the data. Volume 4, which is similar in size and format to the previous

volumes, includes about 18,000 listings. The printing is satisfactory. This series continues to be the most comprehensive available listing of electronic spectra.

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New Books

Mathematics, Physical Sciences, and Engineering

The Adiabatic Motion of Charged Particles. Theodore G. Northrop. Interscience (Wiley), New York, 1963. 123 pp. Illus. \$5.95.

Advances in Glass Technology. pt 2. History papers and discussions of the technical papers of the sixth International Congress (Washington, D.C.), July 1962. Frederick R. Matson and Guy E. Rindone, Eds. Plenum Press, New York, 1963. 428 pp. Illus. \$15.

Advances in Heterocyclic Chemistry. vol. 2. A. R. Katritzky, A. J. Boulton, and J. M. Lagowski, Eds. Academic Press, New York, 1963. 472 pp. Illus. \$14.

Advances in Photochemistry. vol. 1. W. Albert Noyes, Jr., George S. Hammond, and J. N. Pitts, Jr., Eds. Interscience (Wiley), New York, 1963. 453 pp. Illus. \$16.50.

Analytical Chemistry of the Actinide Elements. Alfred J. Moses. Pergamon, London; Macmillan, New York, 1963. 147 pp. Illus. \$6.75.

Astrophysics. The atmospheres of the sun and stars. Lawrence H. Aller. Ronald, New York, ed. 2, 1963. 662 pp. Illus. \$15.

Atlas of Electron Spin Resonance Spectra. Theoretically calculated multicomponent symmetrical spectra. Ya. S. Lebedev, D. M. Chernikova, N. N. Tikhomirova, and V. V. Voevodskii. Translated from the Russian edition. Consultants Bureau, New York, 1963. 233 pp. Illus. \$15.

Atomic Structure Calculations. Frank Herman and Sherwood Skillman. Prentice-Hall, Englewood Cliffs, N.J., 1963. Unpaged. Illus. Paper, \$13.

Automatic Data Processing. Frederick P. Brooks, Jr., and Kenneth E. Iverson. Wiley, New York, 1963. 520 pp. Illus. \$10.75.

Basic Topics in Mathematics. John Riner. Prentice-Hall, Englewood Cliffs, N.J., 1963. 293 pp. Illus. \$6.95.

Biochemistry of Industrial Micro-organisms. C. Rainbow and A. H. Rose. Academic Press, New York, 1963. 728 pp. Illus. \$22.

Boron Hydrides. William N. Lipscomb. Benjamin, New York, 1963. 285 pp. Illus. \$14.

Breakthroughs in Mathematics. Peter Wolff. New American Library, New York, 1963. 285 pp. Illus. Paper, 75¢.

The Changing Concept of the Universe. Directorate of General Education Reading Material Project, Aligarh Muslim University. Asia Publishing House, New York, 1963. 120 pp. \$4.75.

Chemical Analysis by Flame Photom-

etry. Roland Herrmann and C. T. J. Alkemade. Translated from the German edition (Berlin, ed. 2, 1960) by Paul T. Gilbert, Jr. Interscience (Wiley), New York, 1963. 658 pp. Illus. \$16.

The Chemistry of Natural Products. vol. 2. Second International Symposium (Prague, Czechoslovakia), August–September 1962. Butterworth, Washington, D.C., 1963. 231 pp. Illus. \$11.

Chromatographic Methods. R. Stock and C. B. F. Rice. Reinhold, New York, 1963. 214 pp. Illus. \$10.

Classics in the Theory of Chemical Combination. O. Theodor Benfey, Ed. Dover, New York, 1963. 205 pp. Illus. Paper, \$1.85. Volume 1 in the Classics of Science series edited by Gerald Holton.

Collected Works of John von Neumann. vol. 6, *Theory of Games, Astrophysics, Hydrodynamics and Meteorology.* A. H. Taub, Ed. Pergamon, London; Macmillan, New York, 1963. 548 pp. Illus. \$14.

Complexation in Analytical Chemistry. A guide for the critical selection of analytical methods based on complexation reactions. Anders Ringbom. Interscience (Wiley), New York, 1963. 405 pp. Illus. \$15.

Concepts of Modern Physics. Arthur Beiser. McGraw-Hill, New York, 1963. 365 pp. Illus. \$7.95.

Contribution à l'Étude Géologique et Hydrogéologique de la Boucle du Niger. Michel Défossez. Editions Technip, Paris, 1962. 174 pp. Illus. Plates. Paper.

Corrosion Inhibitors. J. I. Bregman. Collier-Macmillan, London; Macmillan, New York, 1963. 334 pp. Illus.

Cosmical Electrodynamics. Fundamental principles. Hannes Alfvén and Carl-Gunne Fälthammar. Oxford Univ. Press, New York, ed. 1963. 240 pp. Illus. \$9.60.

Cryogenic Engineering. J. H. Bell, Jr. Prentice-Hall, Englewood Cliffs, N.J., 1963. 425 pp. Illus. \$16.

Degrees of Unsolvability. Gerald E. Sacks. Princeton Univ. Press, Princeton, N.J., 1963. 186 pp. Illus. Paper, \$3.50.

Digital Computer Design. Logic, circuitry, and synthesis. Edward L. Braun. Academic Press, New York, 1963. 620 pp. Illus. \$16.50.

Digital Computer Programs for Physical Chemistry. vol. 1. Paul A. D. de Maine and Robert D. Seawright. Macmillan, New York; Collier-Macmillan, London, 1963. 447 pp. Illus. \$18.

The Effects of Ultrasound on the Kinetics of Crystallization. A. P. Kapustin. Translation from the Russian edition (Moscow 1962). Consultants Bureau, New York, 1963. 65 pp. Illus. Paper, \$12.50.

Electromagnetic Fields. Sergei A. Schelkunoff. Blaisdell, New York, 1963. 429 pp. Illus. \$9.50.

Electronic Properties of Diamonds. F. C. Chamption. Butterworth, Washington, D.C., 1963. 140 pp. Illus. \$5.25.

Elements of Structural Geology. E. Sherbon Hills. Wiley, New York, 1963. 495 pp. Illus. \$8.50.

Encyclopaedic Dictionary of Physics. vol. 8, *Subject and Arthur Indexes.* J. Thewlis, Ed. Macmillan, New York; Pergamon, London, 1963. 508 pp. vols. 1–8, \$298 Previously published volumes of the

Encyclopaedic Dictionary were reviewed in *Science* [vols. 1–3, in *Science* **136**, 867 (1962), and vols. 4–7, in *Science* **141**, 1025 (1963)] by F. Villars.

Enriched Uranium Processing. Finis S. Patton, John M. Googin, and William L. Griffith. Pergamon, London; Macmillan, New York, 1963. 290 pp. Illus. \$9.50.

Experimental Mechanics. Proceedings of the First International Congress on Experimental Mechanics (New York), November 1961. B. E. Rossi, Ed. Pergamon, London; Macmillan, New York, 1963. 416 pp. Illus. \$21.

Exploding Wires. vol. 2. Proceedings of a conference (Boston), November 1961. William G. Chace and Howard K. Moore, Eds. Plenum Press, New York, 1962. 331 pp. Illus. \$10.50.

Foundations of Differential Geometry. vol. 1. Shoshichi Kobayashi and Katsumi Nomizu. Interscience (Wiley), New York, 1963. 341 pp. Illus. \$15.

General Oceanography. An introduction. Günter Dietrich. Translated from the German edition (Berlin, 1957) by Feodor Ostapoff. Interscience (Wiley), New York, 1963. 604 pp. Illus. \$20.

High Pressure Physics and Chemistry. vols. 1 and 2 (vol. 1, 456 pp., \$15.50; vol. 2, 373 pp., \$12.50). R. S. Bradley, Ed. Academic Press, New York, 1963. Illus.

High Vacuum Engineering. Alfred E. Barrington. Prentice-Hall, Englewood Cliffs, N.J., 1963. 222 pp. Illus. \$12.

How to Solve Problems and Write Equations in General Chemistry. George S. Sasin and Richard Sasin. Littoral Publishers, Ocean City, N.J., 1963. Unpaged. Illus. Paper, \$2.40.

Infrared Band Handbook. Herman A. Szymanski, Ed. Plenum Press, New York, 1963. 496 pp. Illus. \$37.

Infra-Red Spectroscopy and Molecular Structure. An outline of the principles. Mansel Davies, Ed. Elsevier, New York, 1963. 482 pp. Illus. \$13.50.

Introduction to Geological Microbiology. Sergey Ivanovich Kuznetsov, Mikhail Vladimirovich Ivanov, and Natal'ya Nikolayevna Lyalikova. Translated from the Russian edition (Moscow, 1962) by Paul T. Broneer. Carl H. Oppenheimer, Translation Ed. McGraw-Hill, New York, 1963. 270 pp. Illus. \$8.95.

An Introduction to Numerical Mathematics. Eduard L. Stiefel. Translated from the German edition by Werner C. Rheinboldt and Cornelia J. Rheinboldt. Academic Press, New York, 1963. 296 pp. Illus. 54s.

ISA Transducer Compendium. Emil J. Minnar and P. A. Recchione, Eds. Plenum Press, New York, 1963. 585 pp. Illus.

Jet-Stream Meteorology. Elmar R. Reiter. Translated from the German edition (Vienna, 1961). Univ. of Chicago Press, Chicago, 1963. 529 pp. Illus. \$17.50.

The Laws of Physics. Milton A. Rothman. Basic Books, New York, 1963. 262 pp. Illus. \$4.95.

Lectures in Theoretical Physics. vol. 5. Lectures delivered at the summer institute (University of Colorado, Boulder), 1962. Wesley E. Brittin, Ed. Interscience (Wiley), New York, 1963. 593 pp. Illus. \$12.

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Materials Science Research. vol. 1. Proceedings of a research conference (Raleigh, N.C.), March 1962. H. H. Stadelmaier and W. W. Austin, Eds. Plenum Press, New York, 1963. 347 pp. Illus. \$13.50.

Mathematical Theory of Automata. vol. 12. Proceedings of a symposium (New York), in April 1962. Jerome Fox, Martha Crowell, and Rose Meyerson, Eds. Polytechnic Press, Brooklyn, N.Y., 1963. 660 pp. Illus. \$10.

Metal Ions in Aqueous Solution. John P. Hunt. Benjamin, New York, 1963. 136 pp. Illus. \$5.50.

Methods of Quantum Field Theory in Statistical Physics. A. A. Abrikosov, L. P. Gorkov, and I. E. Dzyaloshinski. Translated from the Russian edition and edited by Richard A. Silverman. Prentice-Hall, Englewood Cliffs, N.J., 1963. 369 pp. Illus. \$16.

Modern Applications of Physical Optics. M. Françon. Translated from the French by Scripta Technica. Interscience (Wiley), New York, 1963. 114 pp. Illus. \$4.50.

Modern Fuselage Analysis and the Elastic Aircraft. Basic theory. J. H. Argyris and S. Kelsey. Butterworth, Washington, D.C., 1963. 188 pp. Illus. \$18.75.

Modern Polarographic Methods. Helmut Schmidt and Mark von Stackelberg. Translated from the German (*Die neuartigen polarographischen Methoden-ihre Prinzip und ihre Möglichkeiten*, 1962) by R. E. W. Maddison. Academic Press, New York, 1963. 107 pp. Illus. \$5.50.

Multilinear Analysis for Students in Engineering and Science. G. A. Hawkins. Wiley, New York, 1963. 233 pp. Illus. Paper, \$2.95; cloth, \$6.50.

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Photoelasticity. Proceedings of a symposium (Chicago, Ill.), October 1961. M. M. Frocht, Ed. Pergamon, London; Macmillan, New York, 1963. 316 pp. Illus. \$14.

Physics and Chemistry of the Organic Solid State. vol. 1. David Fox, Mortimer M. Labes, and Arnold Weissberger, Eds. Interscience (Wiley), New York, 1963. 839 pp. Illus. \$25.

Proceedings of the I.G.Y. Symposium. New Delhi, India, February 1961. vol. 1. K. R. Ramanathan *et al.* Council of Scientific and Industrial Research, New Delhi, 1962. 256 pp. Illus. \$5.

Progress in Dielectrics. vol. 5. J. B. Birks and J. Hart, Eds. Academic Press, New York, 1963. 376 pp. Illus. \$13.

Progress in Inorganic Chemistry. vol. 5. F. Albert Cotton, Ed. Interscience (Wiley), New York, 1963. 472 pp. Illus. \$14.

X-Ray Diffraction. In crystals, imperfect crystals, and amorphous bodies. A. Guinier. Based on a portion of and translated from the French edition (1956) by Paul Lorrain. Freeman, San Francisco, 1963. 388 pp. Illus. \$11.