reached a high degree of social differentiation, to which burial habits, human sacrifices, and the presence of largescale mausoleums attest. That the ceremonial center served as an administrative and religious focus and performed an economic redistributive function for nearby villages and hamlets is evidenced by the existence of storage pits, archives of oracle bones, and bronze and other ceremonial utensils as well as the dwellings of the craftsmen who produced them. Invariably, these complexes assumed a square or rectangular form with a north-south orientation, and available evidence suggests that the structures within them corresponded to heavenly constellations, underscoring their cosmic relationship and their orthogenic role and centripetal character on earth.

The Western Chou period (?1122-770 B.C.) saw a significant areal extension of these "dispersed" ceremonial centers, but it was not until the Spring and Autumn period (722-481 B.C.) that the "compact city" emerged. The dense population and workshops which had gathered around the walls of the ceremonial complex were now enclosed by an outer wall without causing serious distortion to the cardinal bearing of the urban settlement as a whole. During the Warring States period (403-221 B.C.), the number of these compact cities grew rapidly owing to disunity and intense strife. Under these conditions, the city enjoyed far more autonomy than it previously had, but it is important to note that this autonomy was ephemeral, for the city lacked ideological, political, or legal basis as an independent entity. Social stratification within the city, except for the presence of royal clans, aristocracy, and priests, was still the same as that found in the society at large. City and countryside shared similar tempo of life, value system, and mores; the wide gap between the two, so typical of modern urbanism, had not yet emerged, even though a certain degree of secularization of the ceremonial center had taken place over this period of time.

Drawing detailed examples from all seven regions of primary urban generation as well as regions of secondary urban generation, Wheatley finds much validity in the assertion that the ceremonial center, despite cultural differences, is "essentially urban in character," not so much in terms of the characteristics of the Western city as in terms

of organizing and regionalizing principles, effective use of space, and its integrating function for the social, political, and economic sectors of human activities.

The author thus maintains that religion was the pervasive, though by no means the exclusive or an entirely independent, factor in the genesis of urbanism. Extracultural factors such as technology (there were no major technological innovations in Shang or early Chou that brought noticeable changes in the method of production), population pressure, commerce, large-scale irrigation (à la Wittfogel), and warfare are merely parametric conditions. Some of these probably contributed indirectly to the process which produced the ceremonial complex; however, they were more important in the transformation of the ecotype which provided the milieu for their validation. While reminding us that the ceremonial center is not a necessary stage in the development of a city, Wheatley argues that "it is likely to prove to have been a functional and developmental phase in the evolution of urban forms in general."

The present study is the first systematic analysis of the origins of the city with special reference to North China. Wheatley makes extensive use of archeological reports on recent excavations which serve as a corrective to the ideological bias of the Chinese classics written in Chou and later times. Though thought-provoking, Wheatley tends to overstate his thesis, and his conclusions are bound to be tentative, not simply because of the pioneering nature of the book but also because of the fact that archeological evidence is biased toward static forms and therefore ill-suited to the processual approach. Furthermore, now that the dust of the Cultural Revolution has settled the Chinese have revived a vigorous interest in their ancient world, and future archeological findings promise to be rich.

Finally, sociological concepts (along with the jargon) are widely used in the book, and when combined with the author's somewhat repetitive style render the book difficult for untrained readers. Occasionally, an inconsistency also creeps in. But these are minor blemishes in an essentially interesting work which should be read by all seriously interested in urban studies.

DAVID PONG

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#### **New Journals Received**

Neurobiology. Biochemistry and Morphology. Vol. 1, No. 1, 1971. Four issues a year. Editors: J. Clausen (Neurochemical Institute, Copenhagen) and H. Pakkenberg (Kommunehospitalet, Copenhagen). Munksgaard, 35 Nörre Sögade, DK-1370 Copenhagen K, Denmark. \$21.50.

New Zealand Journal of Forestry Science. Vol. 1, No. 1, May 1971. Semiannual. Editor: F. A. Bodley. Forest Research Institute, Private Bag, Rotorua, New Zealand, \$4NZ.

South African Journal of Antarctic Research. No. 1, 1971. Annual plus separates. Editor: R. W. Vice (Johannesburg). South African Council for Scientific and Industrial Research, P.O. Box 395, Pretoria. R2.

#### **Books Received**

A Propos du Mécanisme Terrestre. Georges Dubourdieu. Laboratoire de Géologie du Collège de France, Meudon, 1970. 70 pp., illus. Paper.

Advanced Cryogenics. C. A. Bailey, Ed. Plenum, New York, 1971. x, 528 pp., illus. \$25. International Cryogenics Monograph Series.

Advances in Biophysics. Vol. 2, 1971. Masao Kotani, Ed. University of Tokyo Press, Tokyo, and University Park Press, Baltimore, Md., 1971. x, 206 pp., illus. \$12.50.

Advances in Librarianship. Vol. 2. Melvin J. Voigt, Ed. Seminar Press, New York, 1971. xii, 378 pp. \$16.

Advances in Lipid Research. Vol. 9. Rodolfo Paoletti and David Kritchevsky, Eds. Academic Press, New York, 1971. xx, 418 pp., illus. \$22.50.

Advances in Molten Salt Chemistry. Vol. 1. J. Braunstein, Gleb Mamantov, and G. P. Smith. Plenum, New York, 1971. xii, 284 pp., illus. \$17.50.

Analytical Methods in Conduction Heat Transfer. Glen E. Myers. McGraw-Hill, New York, 1971. xviii, 508 pp., illus. \$19.50.

Anthropology Today. Communications Research Machines, Del Mar, Calif., 1971. x, 566 pp., illus. \$24.95.

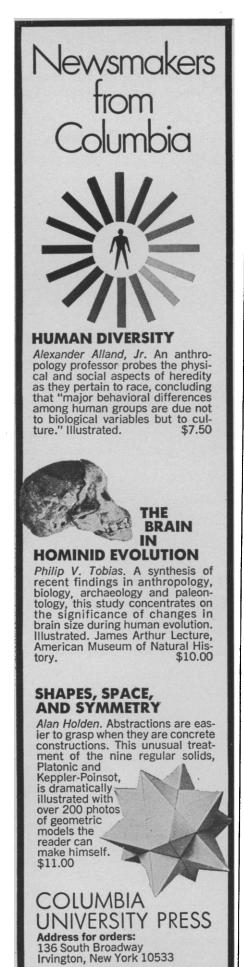
Annual Reports in Medicinal Chemistry, 1970. Cornelius K. Cain, Edward Engelhardt, John Topliss, Lloyd Conover, Irwin Pachter, Charles Smith, and Joseph Cannon, Eds. Academic Press, New York, 1971. x, 300 pp., illus. Paper, \$9.

Annual Review of Astronomy and Astrophysics. Vol. 9. Leo Goldberg, David Layzer, and John G. Phillips, Eds. Annual Reviews, Palo Alto, Calif., 1971. x, 394 pp., illus. \$10.

Appetence for Aggression in Juvenile Damsel Fish. O. Anne E. Rasa. Parey, Berlin, 1971. 72 pp., illus. \$8; with journal subscription, \$7. Journal of Comparative Ethology, Suppl. 7.

Applied Mechanics. G. Wayne Brown. Prentice-Hall, Englewood Cliffs, N.J., 1971. xii, 338 pp., illus. \$10.95

(Continued on page 328)



#### **BOOKS RECEIVED**

(Continued from page 282)

Aspects of Terpenoid Chemistry and Biochemistry. Proceedings of a symposium, Liverpool, April 1970. T. W. Goodwin, Ed. Academic Press, New York, 1971. xiv, 442 pp., illus. \$24.50.

Atlantic Reef Corals. A Handbook of the Common Reef and Shallow-Water Corals of Bermuda, The Bahamas, Florida, The West Indies, and Brazil. F. G. Walton Smith. University of Miami Press, Coral Gables, Fla., 1971. xii, 164 pp.,

Atlas of Human Histology and Ultra-structure. J. L. Matthews and J. H. Martin. Lea and Febiger, Philadelphia, 1971. xiv, 382 pp., illus. \$12.50.

Atlas of Scanning Electron Microscopy in Medicine. Tsuneo Fujita, Junichi Tokunaga, and Hajime Inoue. Shoin, Tokyo, and Elsevier, New York, 1971. vi, 140 pp., illus. \$25.75.

Atlas of the Histology of Brain Tumors. Klaus J. Zülch. Springer-Verlag, New York, 1971. xvi, 262 pp., illus. \$22.60.

Atlas of the Mouse Brain and Spinal Cord. Richard L Sidman, Jay B. Angevine, Jr., and Elizabeth Taber Pierce. Harvard University Press, Cambridge, Mass., 1971. xiv, 274 pp., illus. \$25. A Commonwealth Fund Book.

The Atmospheric Sciences and Man's Needs. Priorities for the Future. National Academy of Sciences, Washington, D.C., 1971. viii, 88 pp., illus. Paper, \$3.50.

Atomic and Molecular Radiation Physics. L. G. Christophorou, Wiley-Interscience, New York, 1971. x, 672 pp., illus.

Atoms and Information Theory. An Introduction to Statistical Mechanics. Ralph Baierlein. Freeman, San Francisco, 1971. xvi, 486 pp., illus. \$13.75.

Background to Migraine. A symposium, London, September 1970. J. N. Cumings, Ed. Springer-Verlag, New York, 1971. xiv, 92 pp., illus. \$6.50.

Basic Systems Analysis. Richard W. Lott. Canfield, San Francisco, 1971. xii, 260 pp., illus. \$10. Behavior of Nonhuman Primates. Mod-

ern Research Trends. Vol. 3. Allan M. Schrier and Fred Stollnitz, Eds. Academic Press, New York, 1971. xviii, 206 pp., illus.

The Biochemistry of Development. Philip Benson, Ed. Spastics International Medical Publications, London, and Lippincott, Philadelphia, 1971. vi, 274 pp., illus.

Biofeedback and Self-Control, 1970. An Aldine Annual on the Regulation of Bodily Processes and Consciousness. Theodore Xenophon Barber, Leo V. DiCara, Jce Kamiya, Neal E. Miller, David Shapiro, and Johann Stoyva, Eds. Aldine-Atherton, Chicago, 1971. xxii, 546 pp., illus. \$12.

Biological Aspects of Radiation Protection. Proceedings of a symposium, Kyoto, Japan, October 1969. Tsutomu Sugahara and Otto Hug, Eds. Igaku Shoin, Tokyo, and Springer-Verlag, New York, 1971. vi, 274 pp., illus. \$18.90.

Biological Chemistry. Henry R. Mahler and Eugene H. Cordes. Harper and Row,

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New York, ed. 2, 1971. xiv, 1010 pp., illus. \$19.

Biological Control. Proceedings of a symposium, Boston, December 1969. C. B. Huffaker, Ed. Plenum, New York, 1971. xx, 512 pp., illus. \$19.50.

Biological Effects of Radiation. J. E. Coggle. Wykeham, London, and Springer-Verlag, New York, 1971. viii, 150 pp., illus. Paper, \$5.40. Wykeham Sciences Series, vol. 14.

Biological Interrelations and Nutrition.
Biologische Wechselbeziehungen und Ernährung. Proceedings of a symposium, Zurich, Switzerland, and Feldbach, Austria, 1969. J. C. Somogyi, Ed. Karger, New York, 1971. viii, 204 pp., illus. \$12.70. Institute of Nutrition Research Series, vol.

Biology and Knowledge. An Essay on the Relations between Organic Regulations and Cognitive Processes. Jean Piaget. Translated from the French edition (Paris, 1967). University of Chicago Press, Chicago, 1971. xii, 384 pp., illus. \$10.

The Biology of Alcoholism. Vol. 1, Biochemistry. Benjamin Kissin and Henri Begleiter, Eds. Plenum, New York, 1971. xxviii, 630 pp., illus. \$32.50.

The Biology of Mycoplasmas. Paul F. Smith. Academic Press, New York, 1971. xii, 258 pp., illus. \$14.50. Cell Biology.

The British Academics. A. H. Halsey and M. A. Trow, with the assistance of Oliver Fulton. Harvard University Press, Cambridge, Mass., 1971. 560 pp., illus. \$12.

C\*-Algebras and W\*-Algebras. Shôichirô Sakai. Springer-Verlag, New York, 1971. xii, 278 pp. \$19.70. Ergebnisse der Mathematik und ihrer Grenzgebiete, vol. 60.

Calendering of Plastics. R. A. Elden and A. D. Swan. G. J. L. Griffin, Ed. Elsevier, New York, 1971. viii, 106 pp., illus. \$7.50.

Canada's Changing North. William C. Wonders, Ed. McClelland and Stewart, Toronto, 1971. vi, 370 pp., illus. Paper, \$3.75. Carleton Library, No. 55.

Cell-Mediated Immunity. In vitro Correlates. A conference, Lyon, France, May 1970. J. P. Revillard, Ed. University Park Press, Baltimore, Md., 1971. xii, 228 pp., illus. \$14.50.

Change and Continuity in Infancy. Jerome Kagan, with the collaboration of Robert B. McCall, N. D. Reppucci, Judith Jordan, Janet Levine, and Cheryl Minton. Wiley, New York, 1971. xvi, 298 pp., illus. \$10.95.

The Changing World Market for Iron Ore, 1950–1980. An Economic Geography. Gerald Manners. Published for Resources for the Future by Johns Hopkins Press, Baltimore, 1971. xvi, 384 pp., illus. \$14.

Baltimore, 1971. xvi, 384 pp., illus. \$14. Charles Kenneth Leith. Scientific Adviser. Sylvia Wallace McGrath. University of Wisconsin Press, Madison, 1971. xii, 255 pp., illus. \$15.

Chemical Zoology. Vol. 6, Arthropoda. Part B. Marcel Florkin and Bradley T. Scheer, Eds. Academic Press, New York, 1971. xx. 484 pp., illus. \$27.20.

1971. xx, 484 pp., illus. \$27,20.

Chemistry. A Cultural Approach. William F. Kieffer. Harper and Row, New York, 1971. xvi, 462 pp., illus. \$10.95.

Chest Injuries. Physiologic Principles and Emergency Management. Emil A.

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Clinical Immunology. Samuel O. Freedman, with contributions by Phil Gold, David Hawkins, and Joseph Shuster. Harper and Row, New York, 1971. xii, 688 pp., illus, \$20.

Collectively Compact Operator Approximation Theory and Applications to Integral Equations. Philip M. Anselone. With an appendix by Joel Davis. Prentice-Hall, Englewood Cliffs, N.J., 1971. xvi, 138 pp.,

Combustion-Generated Air Pollution. A course, Berkeley, Calif., September 1969. Ernest S. Starkman, Ed. Plenum, New York, 1971. viii, 336 pp., illus. \$14.50.

Coming Apart. An Informal History of America in the 1960's. William L. O'Neill. Quadrangle, Chicago, 1971. x, 468 pp. + plates. \$12.50.

Communication and Culture in Ancient India and China. Robert T. Oliver. Syracuse University Press, Syracuse, N.Y., 1971. xiv, 312 pp. \$12.

Communication by Chemical Signals. Papers from a meeting, Auburn, Mass., June 1968. James W. Johnston, Jr., David G. Moulton, and Amos Turk, Eds. Appleton-Century-Crofts, New York, 1971. xii, 472 pp., illus. \$21. Advances in Chemoreception, vol. 1.

Comparative Anatomical Aspects of the Mammalian Brain Stem and the Cord. W. J. C. Verhaart. Van Gorcum, Assen, Netherlands, 1970 (U.S. distributor, Davis, Philadelphia). Vol. 1, Text, xii, 338 pp. Vol. 2, Illustrations and Tables, iv, 312 pp. \$24.50 the set. Studies in Neuro-Anatomy.

Compendium of Organic Synthetic Methods. Ian T. Harrison and Shuyen Harrison. Wiley-Interscience, New York,

1971. xviii, 530 pp., illus. \$11.95.

The Compleat Naturalist. A Life of Linnaeus. Wilfrid Blunt, with the assistance of William T. Stearn. Viking, New York, 1971. 256 pp. + plates. \$14.95. A Studio Book.

Computer Organization and the System/370. Harry Katzan, Jr. Van Nostrand Reinhold, New York, 1971. x, 308 pp., illus. \$12. Computer Science Series.

Computing. A Second Course. Fred Gruenberger. Canfield, San Francisco, 1971. xvi, 256 pp., illus. \$11.

Concepts of Disease. A Textbook of Human Pathology. Joel G. Brunson and Edward A. Gall, Eds. Macmillan, New York, 1971. xvi, 1134 pp., illus. \$23.95.

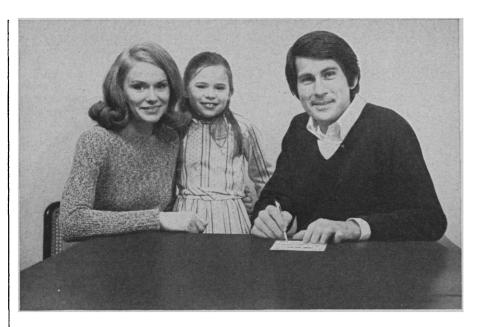
Constructions and Combinatorial Problems in Design of Experiments. Damaraju Raghavarao. Wiley, New York, 1971. xviii, 386 pp. \$17.95.

The Crab Nebula. International Astronomical Union Symposium No. 46, Jodrell Bank, England, August 1970. R. D. Davies and F. G. Smith, Eds. Reidel, Dordrecht, Holland, and Springer-Verlag, New York, 1971. xx, 470 pp., illus. \$30.50.

Critical Micelle Concentrations of Aqueous Surfactant Systems. Pasupati Muker-jee and Karol J. Mysels. National Bureau of Standards, Washington, D.C., 1971 (available as NSRDS-NBS 36 from the Superintendent of Documents, Washington, D.C.). vi, 228 pp., illus. \$3.75.

Crystal Structures. Vol. 6, The Struc-

ture of Benzene Derivatives. Part 2, Mole-



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Current Concepts in the Management of Lymphoma and Leukemia. Proceedings of a symposium, Chicago, March 1970. J. E. Ultmann, M. L. Griem, W. H. Kirsten, and R. W. Wissler, Eds. Springer Verlag, New York, 1971. xiv, 200 pp., illus. \$13.90. Recent Results in Cancer Research, vol. 36.

Current Topics in Bioenergetics. Vol. 4. D. Rao Sanadi, Ed. Academic Press, New York, 1971. xiv, 416 pp., illus. \$22.50.

DNA and Chromosomes. E. J. DuPraw. Holt, Rinehart and Winston, New York, 1971. xii, 340 pp., illus. Paper, \$8.

Dealing with Technological Change. Selected essays from *Innovation*. Auerbach, Princeton, N.J., 1971. vi, 218 pp., illus. \$9.95.

Decision Theory and Human Behavior. Wayne Lee. Wiley, New York, 1971. xii, 352 pp., illus. \$13.95.

Developmental Aspects of Antibody Formation and Structure. Vol. 2. Proceedings of a symposium, Prague and Slapy, June 1969. J. Sterzl and I. Riha, Eds. Academia, Prague, and Academic Press, New York, 1971. pp. 475–1054, illus. \$24.

Developmental Psychology Today. Communications Research Machines, Del Mar, Calif., 1971. xii, 576 pp., illus, \$24,95.

A Dictionary of Immunology. W. J. Herbert and P. C. Wilkinson, Eds. Blackwell, Oxford, 1971 (U.S. distributor, Davis, Philadelphia). xii, 200 pp., illus. Paper, \$5.50.

Dictionary of Organic Compounds. Suppl. 7. J. B. Thomson, Ed. Oxford University Press, New York, ed. 4, 1971. viii, 272 pp., illus. \$29.

Dictionary of Scientific Biography. Charles Coulston Gillispie, Ed. Scribner, New York, 1971. Vol. 3, Pierre Cabanis-Heinrich von Dechen. xvi, 624 pp. Vol. 4, Richard Dedekind-Firmicus Maternus. xvi, 622 pp. \$35 each volume.

A Dictionary of Statistical Terms. Maurice G. Kendall and William R. Buckland. Published for the International Statistical Institute by Hafner, New York, ed. 3, 1971. xii, 166 pp. \$12.50.

Dreamers without Power. The Menomini Indians. George Spindler and Louise Spindler. Holt, Rinehart and Winston, New York, 1971. xvi, 208 pp., illus. Paper, \$3.45. Case Studies in Cultural Anthropology.

Duncan's Dictionary for Nurses. Helen A. Duncan. Springer, New York, 1971. x, 390 pp., illus. Cloth, \$7.50; paper, \$4.95.

Dynamic Programming and Its Application to Optimal Control. R. Boudarel, J. Delmas, and P. Guichet. Translated from the French edition (Paris, 1968) by R. N. McDonough. Academic Press, New York, 1971. xvi, 254 pp., illus. \$15. Mathematics in Science and Engineering, vol. 81.

Dynamics of Violence. Jan Fawcett, Ed. American Medical Association, Chicago, 1971. iv, 198 pp. Paper, \$3.95.

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Early Childhood: The Development of Self-Regulatory Mechanisms. A conference, Philadelphia, January 1970. Dwain N. Walcher and Donald L. Peters. Academic Press, New York, 1971. xx, 250 pp., illus. \$11.

Early Embryology of the Chick. Bradley M. Patten. McGraw-Hill, New York, ed. 5, 1971. xviii, 284 pp. + plates. \$7.

5, 1971. xviii, 284 pp. + plates. \$7. Ecological Genetics. E. B. Ford. Chapman and Hall, London, ed. 3, 1971. xx, 410 pp. + plates, \$16.

410 pp. + plates. \$16.

Ecology of Fresh Water. Alison Leadley
Brown. Harvard University Press, Cambridge, Mass., 1971. xii, 130 pp. + plates.
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Ecology of Leaf Surface Micro-organisms. Proceedings of a symposium, Newcastle upon Tyne, September 1970. T. F. Preece and C. H. Dickinson, Eds. Academic Press, New York, 1971. xviii, 640 pp., illus. \$26.

The Education and Advancement of

The Education and Advancement of Women. Jacqueline Chabaud. Unesco, Paris, 1970. 156 pp., illus. Paper, \$2.

Electronic Instrumentation. Sol D. Prensky. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1971. xx, 536 pp., illus. \$13.95.

L'Electronique Nucléaire. Daniel Blanc. Presses Universitaires de France, Paris, 1971. 128 pp., illus. Paper, 3.70F. Que Sais-je? No. 1438.

Electroplating Engineering Handbook. A. Kenneth Graham, Ed. Van Nostrand Reinhold, New York, ed. 3, 1971. xviii, 846 pp., illus. \$29.95.

Rélinfold, New Tolk, ed. 3, 1371. Avin, 846 pp., illus. \$29.95.

Eléments de Topologie Algébrique.
Claude Godbillon. Hermann, Paris, 1971.
250 pp., illus. Paper, 32 F. Collection Méthodes.

Elmer Sperry. Inventory and Engineer. Thomas Parke Hughes. Johns Hopkins Press, Baltimore, Md., 1971. xx, 348 pp., illus. \$15.

Elsevier's Dictionary of Computers, Automatic Control and Data Processing. In Six Languages: English/American, French, Spanish, Italian, Dutch and German. W. E. Clason, Elsevier, New York, ed. 2, 1971. x, 474 pp. \$23.

Emotion, Obesity, and Crime. Stanley Schachter. Academic Press, New York, 1971. xii, 196 pp., illus. \$7.50. Social Psychology series.

Encyclopedia of Social Work. Sixteenth Issue. Robert Morris, Bess Dana, Paul Glasser, Rachel Marks, Martin Rein, Paul Schreiber, and Beatrice Saunders, Eds. National Association of Social Workers, New York, 1971. Vol. 1, xxxviii + pp. 1–890. Vol. 2, ii + pp. 891–1646. \$22.50.

L'Energie des Séismes et les Mécanismes Géologiques. Georges Dubourdieu. Laboratoire de Géologie du Collège de France, Meudon, 1971. 80 pp. + foldout plate. Paper.

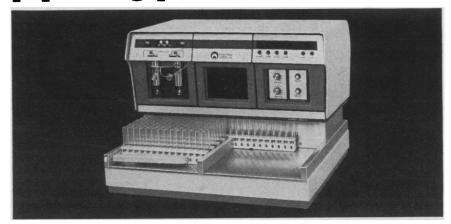
Engineering Properties of Nickel and Nickel Alloys. John L. Everhart. Plenum, New York, 1971. xiv, 230 pp., illus. \$17.50.

Environment and Archeology. An Ecological Approach to Prehistory. Karl W. Butzer. Aldine-Atherton, Chicago, ed. 2, 1971. xxviii, 704 pp., illus. \$15.

1971. xxviii, 704 pp., illus. \$15.

Environmental Quality. The Second Annual Report of the Council on Environmental Quality, August 1971. Council on Environmental Quality, Washington, D.C., 1971 (available from the Superintendent

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The Family and Its Future. A Ciba Foundation Symposium, London, March 1970. Katherine Elliott, Ed. Churchill, London, 1970 (U.S. distributor, Williams and Wilkins, Baltimore). x, 230 pp., illus.

Flame Spectroscopy: Atlas of Spectral Lines. M. L. Parsons and P. M. McElfresh. IFI/Plenum, New York, 1971. viii, 96 pp. \$11.50.

La Fonction du Regard. The Function of Gaze. A colloquium, Paris, May 1969. A Dubois Poulson, G. C. Lairy, and A. Remond, Eds. Institut National de la Santé et de la Recherche Médicale, Paris, 1971. 496 pp., illus. 85 F. Colloques de l'Institut National de la Santé et de la Recherche Médicale, vol. 7.

Fourth Report on the World Health Situation, 1965-1968. World Health Organization, Geneva, 1971 (U.S. distributor, American Public Health Association, Washington, D.C.). viii, 420 pp. Paper, \$8. WHO Official Records, No. 192.

Frontiers in Neuroendocrinology, 1971. Luciano Martini and William F. Ganong, Eds. Oxford University Press, New York, 1971. xii, 420 pp., illus. \$25.

Functional Series. G. M. Fichtenholz. Translated by Richard A. Silverman. Gordon and Breach, New York, 1971. viii, 168 pp. \$12.50. Pocket Mathematical Library, course No. 5.

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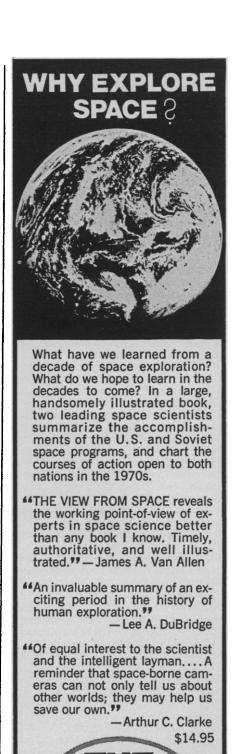
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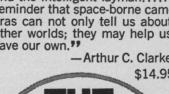
Genetica Vegetale. Francesco D'Amato. Boringhieri, Turin, Italy, 1971. viii, 388 pp., illus. Paper, 7500 lire. Serie di Biologica e Medicina.

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Géophysique Appliquée à l'Hydrogéologie. Jean-Louis Astier. Masson, Paris, 1971. viii, 278 pp., illus. 120 F.

Gravity and the Organism. Proceedings of a symposium, Tuxedo, N.Y., September 1967. Updated by participants, 1970. Solon A. Gordon and Melvin J. Cohen, Eds. University of Chicago Press, Chicago, 1971. x, 474 pp., illus. \$14.







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Handbook for Automatic Computation. Vol. 2, Linear Algebra. J. H. Wilkinson and C. Reinsch. Springer-Verlag, New York, 1971. viii, 442 pp. \$20.80. Die Grundlehren der mathematischen Wissenschaften, vol. 186.

The Harvard College Observatory. The First Four Directorships, 1839–1919. Bessie Zaban Jones and Lyle Gifford Boyd. Belknap (Harvard University Press), Cambridge, Mass., 1971. xvi, 496 pp., illus, \$15.

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Human Psyche in Psychoanalysis. The Development of Three Models of Psychoanalytic Therapy. Benjamin Wolstein. Thomas, Springfield, Ill., 1971. x, 176

Hydrobiology. Bioresources of Shallow Water Environments. Proceedings of a symposium, Miami Beach, Fla., June 1970. William G. Weist, Jr., and Phillip E. Greeson, Eds. American Water Resources Association, Urbana, Ill., 1971. 386 pp.,

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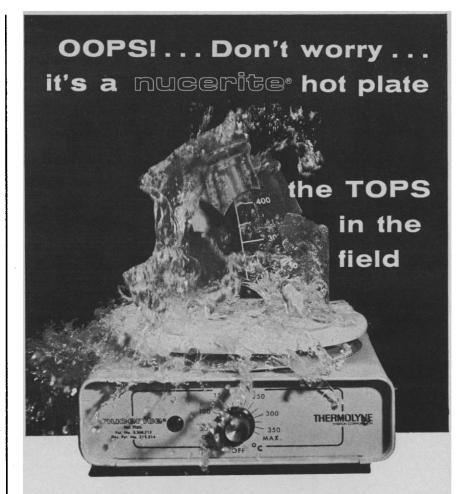
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Ideology, Faith, and Family Planning in Latin America, Studies in Public and Private Opinion on Fertility Control. J. Mayone Stycos with the assistance of S. Betsy Cohen and eight others. McGraw-Hill, New York, 1971. xiv, 418 pp., illus. \$15. A Population Council Book.

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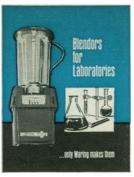




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International Bibliography of the Social Sciences, 1969. Vol. 15, International Bibliography of Social and Cultural Anthropology. International Committee for Social Sciences Documentation. Tavistock, London, and Aldine, Chicago, 1971. lx, 282 pp. \$15.

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Isocyclische Vierring-Verbindungen. Anhang: Cyclopropan-und Cyclobutan-Derivate aus Naturstoffen. D. Seebach, S. Beckmann, and H. Geiger. Thieme, Stuttgart, ed. 4, 1971. xxviii, 568 pp., illus. DM 258. Methoden der organischen Chemie, Band 4/4.

Iterative Solution of Large Linear Systems. David M. Young. Academic Press,

New York, 1971. xxvi, 570 pp. \$25. Computer Science and Applied Mathematics Series.

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Joseph Banks in Newfoundland and Labrador, 1766. His Diary, Manuscripts and Collections. A. M. Lysaght. University of California Press, Berkeley, 1971. 512 pp. + foldout plates. \$40.

Laboratory Studies in the Physical Sciences. George Moriber and Isidore Hudes. Harper and Row, New York, 1971. x,

278 pp., illus. Paper, \$4.95.

Mammalian Neuroendocrinology. B. T. Donovan. McGraw-Hill, New York, 1970. xii, 208 pp., illus. Paper, \$8.95. European Animal Biology Series.

Man and Atom. Building a New World through Nuclear Technology. Glenn T. Seaborg and William R. Corliss. Dutton, New York, 1971. 412 pp., illus. \$10. A Manual for the Study of Meiofauna.

Neil C. Hulings and John S. Gray. Smithsonian Institution Press, Washington, D.C., 1971 (available from the Superintendent of Documents, Washington, D.C.). xii, 84 pp., illus. \$2.75. Smithsonian Contributions to Zoology, No. 78.

Marienthal. The Sociography of an Unemployed Community. Marie Jahoda, Paul F. Lazarsfeld, and Hans Zeisel. Translated from the German edition (1933). Aldine Atherton, Chicago, 1971. xviii, 128 pp. \$5.95.

Mathematical Software. Proceedings of a symposium, Lafayette, Ind., April 1970. John R. Rice, Ed. Academic Press, New York, 1971. xx, 516 pp., illus. \$22. Association for Computing Machinery Monograph Series.

Mathematical Techniques and Physical Applications. J. Killingbeck and G. H. A. Cole. Academic Press, New York, 1971. xviii, 718 pp. \$15. Pure and Applied Physics, vol. 35.

The Medical Garden. Geoffrey Marks and William K. Beatty. Scribner, New York, 1971. xii, 180 pp. + plates. \$6.95. Medicine and Society. Contemporary

Medical Problems in Historical Perspective. Proceedings of four symposia, Philadelphia, 1970-1971. American Philosophical Society Library, Philadelphia 1971. viii, 378 pp. Paper, \$2.50. Library Publication No. 4.

Methods in Enzymology. Vol. 23, Photosynthesis, Part A. Anthony San Pietro, Ed. Academic Press, New York, 1971. xxii, 744 pp., illus. \$29.50.

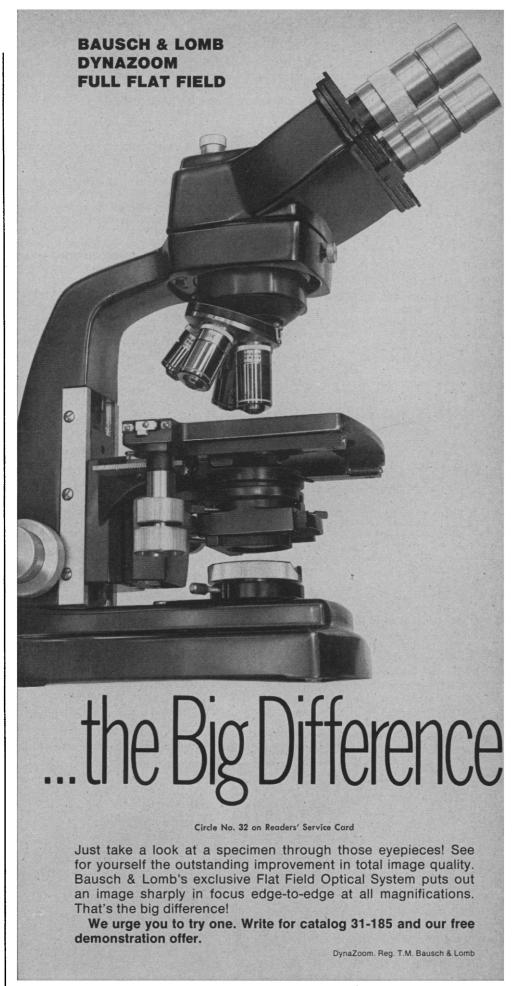
Methods in Microbiology. Vol. 5B. J. R. Norris and D. W. Ribbons. Academic Press, New York, 1971. xiv, 696 pp., illus. \$27.50.

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Modern Biology at a Glance. Concise Outline of Modern Biology. Maurice Bleifeld. Barron's Educational Series, Woodbury, N.Y., ed. 3, 1971. vi, 112 pp., illus. Paper, \$1.25.

Modern Developments in Powder Metallurgy. Proceedings of a conference, New York, July 1970. Henry H. Hausner, Ed. Vol. 4, Processes, xiv, 594, pp. Vol. 5, Materials and Properties, viii, 494 pp. Plenum, New York, 1971. Illus. \$29.50 each.

Monograph of Shallow-Water Indo-West Pacific Echinoderms. Ailsa M. Clark and Francis W. E. Rowe. British Museum (Natural History), London, 1971. x, 238 pp. + plates.

The Mutagenicity of Pesticides. Concepts and Evaluation. Samuel S. Epstein and Marvin S. Legator. M.I.T. Press, Cambridge, Mass., 1971. xx, 220 pp., illus, \$12,50.

Multiplicative Theory of Ideals. Max D. Larsen and Paul J. McCarthy. Academic Press, New York, 1971. xvi, 300 pp. \$17. Pure and Applied Mathematics, vol. 43.

The Narrowing of NMR Spectra of Solids by High-Speed Specimen Rotation and the Resolution of Chemical Shift and Spin Multiplet Structures for Solids, E. R.

Andrew. Pulsed NMR in Solids. P. Mansfield. Pergamon, New York, 1971. vi, 104 pp., illus. Paper, \$5.75. Progress in Nuclear Magnetic Resonance Spectroscopy, vol. 8, part 1.

Natural Resources of the Soviet Union. Their Use and Renewal. I. P. Gerasimov, D. L. Armand, and K. M. Yefron, Eds. Translated from the Russian by Jacek I. Romanowski. W. A. Douglas Jackson, Transl. Ed. Freeman, San Francisco, 1971. xviii, 350 pp., illus. \$12.50.

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Numerical Initial Value Problems in Ordinary Differential Equations. C. William Gear. Prentice-Hall, Englewood Cliffs, N.J., 1971. xviii, 254 pp. \$12.95.

On the Earth's Mechanism. Georges Dubourdieu. Translated from the French by Noël Lindsay. Laboratoire de Géologie du Collège de France, Meudon, 1971. 62 pp. Paper.

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The Organic Chemistry of Palladium. Vol. 1, Metal Complexes. Peter M. Maitlis. Academic Press, New York, 1971. xvi, 320 pp., illus. \$19. Organometallic Chemistry.

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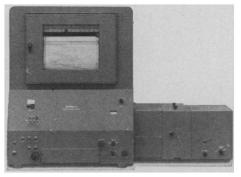
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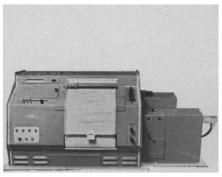
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Pattern Recognition and Machine Learning Proceedings of a seminar, Nagoya, Japan, August 1970. K. S. Fu, Ed. Plenum, New York, 1971. x, 344 pp., illus. \$16.50.

Peces de Agua Dulce del Ecuador. Y Perspective para Desarrollar Su Cultivo. Michael M. Ovchynnyk. Departamento de Piscicultura, Quito, Ecuador, 1971 (U.S. distributor, Michigan State University Latin American Studies Center, East Lansing). 68 pp., illus. Paper. Monograph Series, No. 1.

Persistent and Slow Virus Infections. John Hotchin. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). xii, 212 pp., illus. \$14.65. Monographs in Virology, vol. 3.

Perspectives in the History of Science and Technology. Based on a symposium, Norman, Okla., April 1969. Duane H. D. Roller, Ed. University of Oklahoma Press, Norman, 1971. x, 308 pp. + plates. \$9.95. Physical Chemistry. An Advanced Trea-

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Physiology and Pharmacology of Vascular Neuroeffector Systems. Proceedings of a symposium, Interlaken, Switzerland, July 1969. J. A. Bevan, R. F. Furchgott, R. A. Maxwell, and A. P. Somlyo. Karger, New York, 1971. viii, 350 pp., illus. \$17.30.

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Western Reserve University Press, Cleveland, 1971. xx, 150 pp., illus. \$5.95.

Polymer Characterization. Interdisciplinary Approaches. A symposium, Chicago, September 1970. Clara D. Craver, Ed. Plenum, New York, 1971, viii, 280 pp., illus. \$14.50.

Population and Family Planning Manpower and Training. Lee L. Bean, Richmond K. Anderson, and Howard J. Tatum. Population Council, New York, 1971 (distributor, Key Book Service, Bridgeport, Conn.). xvi, 118 pp. Paper, \$3.95.

The Post-Industrial Prophets. Interpretations of Technology. William Kuhns. Weybright and Talley, New York, 1971. viii, 280 pp. \$6.95.

A Primer of Population Biology. Edward O. Wilson and William H. Bossert. Sinauer, Stamford, Conn., 1971. 192 pp., illus. Paper, \$3.95.

The Principles of Chemical Equilibrium. With Applications in Chemistry and Chemical Engineering. Kenneth Denbigh. Cambridge University Press, New York, ed. 3, 1971. xxii, 494 pp., illus. Cloth, \$14; paper, \$4.95.

Principles of Instrumental Analysis. Douglas A. Skoog and Donald M. West. Holt, Rinehart and Winston, New York, 1971, xii, 170 pp., illus. \$13.95.

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W. E. Stevens, Eds. University of Alberta
Water Resources Centre, Edmonton, 1971.
xvi, 360 pp., illus. Paper, \$6.
Progress in Bioorganic Chemistry. Vol.

Progress in Bioorganic Chemistry. Vol. 1. E. T. Kaiser and F. J. Kézdy, Eds. Wiley-Interscience, New York, 1971. xiv, 370 pp., illus. \$14.95.

Progress in Elementary Particle and Cosmic Ray Physics. Vol. 10. J. G. Wilson and S. A. Wouthuysen, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1971. xii, 396 pp., illus. \$25.

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Public Policy and the Expert. Ethical Problems of the Witness. Daniel D. McCracken. Commentary by Bruce Arden, Victor C. Ferkiss, and Roger L. Shinn. Council on Religion and International Affairs, New York, 1971. 128 pp. Paper, \$1.75. Special Studies, No. 212.

Pulmonary Reactions to Coal Dust. A Review of U.S. Experience. Marcus M. Key, Lorin E. Kerr, and Merle Bundy, Eds. Academic Press, New York, 1971. xvi, 216 pp., illus. \$14. Environmental Sciences series.

Pulse and Fourier Transform NMR. Introduction to Theory and Methods. Thomas C. Farrar and Edwin D. Becker. Academic Press, New York, 1971. xiv, 116 pp., illus. \$7.50.

Pyrogens and Fever. A Ciba Foundation Symposium, London, July 1970. G. E. W. Wolstenholme and Joan Birch, Eds. Livingstone, Edinburgh, 1971 (U.S. distributor, Williams and Wilkins, Baltimore, Md.). xii, 232 pp., illus. \$11.50.

Rate Distortion Theory. A Mathemat-

Rate Distortion Theory. A Mathematical Basis for Data Compression. Toby Berger. Prentice-Hall, Englewood Cliffs, N.J., 1971. xiv, 312 pp., illus. \$16.95.

Ratio Correlation. A Manual for Students of Petrology and Geochemistry. Felix Chayes. University of Chicago Press, Chicago, 1971. viii, 100 pp. Cloth, \$6; paper, \$2,25.

Readings in Marine Ecology. James W. Nybakken, Ed. Harper and Row, New York, 1971. xviii, 544 pp., illus. Paper, \$9.

Sixteenth Century North America. The Land and the People as Seen by the Europeans. Carl Ortwin Sauer. University of California Press, Berkeley, 1971. xii, 320 pp., illus. \$10.95.

Sporopollenin. Proceedings of a symposium, London, Sept. 1970. J. Brooks, P. R. Grant, Marjorie Muir, P. van Gijzel, and G. Shaw, Eds. Academic Press, New York, 1971. x, 718 pp., illus. \$23.

York, 1971. x, 718 pp., illus. \$23.

Structural Change in a Developing
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Schultz, and Robert L. Slighton. Princeton
University Press, Princeton, N.J., 1971.
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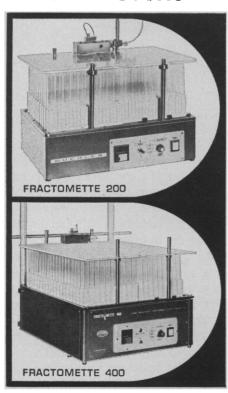
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Vegetation of the Life Zones in Costa Rica. John O. Sawyer and Alton A. Lindsey. Indiana Academy of Science, Indianapolis, 1971. x, 214 pp., illus. Paper, \$4. Indiana Academy of Science Monograph No. 2.

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Visual Science. Proceedings of a symposium, Bloomington, Ind., April 1968.

John R. Pierce and John R. Levene, Eds.

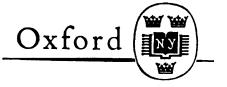
Indiana University Press, Bloomington, 1971. xxii, 408 pp., illus. \$20.

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Wirkungsmechanismen von Fungiziden, Antibiotika und Cytostatika. Mechanisms of Action of Fungicides, Antibiotics and Cytostatics. A symposium, Reinhardsbrunn, Germany, May 1969. H. Lyr and W. Rawald, Eds. Akademie-Verlag, Berlin, 1970. viii, 376 pp., illus. Paper, 48



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