

Laboratory HEAT 🗌 LIGHT Apparatus **MOTION** for:



most accurate we know about

We do not know ourselves how long a Type 1900 can last. Dealers say many are already 10 years old.

Embedded heating elements, reinforced stainless steel case, strong phenolic feet, simple precise control match each other in durability.

- PRECISE TEMPERATURE CONTROL Holds within 5F up to 200F (93C) holds within 2F over 200F to 700F maximum.
- specially developed by Thermolyne, protect elements, promote even tem-peratures, simplify maintenance and repair.
- EFFICIENT OPERATION—Fast heat up-Demand type thermostatic control gives full power until control point reached -Load determines power flow to maintain set temperature.
- UNDERWRITER'S LABORATORIES, INC. -entire unit listed not just wire or heaters.



PRICE .

NEW 40-Page complete line catalog of heat/light/ catalog of heat/light/ motion items: furnaces, controllers, hot plates, magnetic stirrers, Stir-Plates, constant temp. apparatus, Dri-Baths, culture incubators, PBI Apparatus, lab lights, meters.

. . . \$22.75

Write now for FREE copy of Catalog 65

THERMOLYNE CORPORATION 2555 KERPER BLVD. DUBUQUE, IOWA

Contact Dept. 568 for name of nearest dealer 782

Methods. vol. 2, pt. B, Properties of Polymers and Nonlinear Acoustics. Warren P. Mason, Ed. Academic Press, New York, 1965. 403 pp. Illus. \$14. Six papers: "Relaxations in polymer solutions, liquids, and gels" by W. Philippoff; "Relaxation spectra and relaxation processes in solid polymers and glasses" by I. L. Hopkins and C. R. Kurkjian; "Volume relaxations in amorphous polymers" by Robert S. Marvin and John E. McKinney; "Non-linear acoustics" by Robert T. Beyer; "Acoustic streaming" by Wesley Le Mars Nyborg; and "Use of light diffraction in measuring the parameter of nonlinearity of liquids and the photoelastic constants of solids" by L. E. Hargrove and K. Achyuthan.

Polyesters. V. V. Korshak and S. V. Vinogradova. Translated from the Russian edition (Moscow) by B. J. Hazzard. J. Burdon, Translation Ed. Pergamon, New York, 1965. 564 pp. Illus. \$30.

Principles of Structural Glaciology. The petrography of fresh-water ice as a method of glaciological investigation. P. A. Shumskii. Translated from the Russian by David Kraus. Dover, New York, 1965. 511 pp. Illus. Paper, \$3. A revised version based on translations made in 1957-1958 and 1960-1961.

Probability, Random Variables, and Stochastic Processes. Athansios Papoulis. McGraw-Hill, New York, 1965. 595 pp. Illus. \$19.50. McGraw-Hill Series in Systems Science.

Problems in Higher Algebra. D. K. Faddeev and I. S. Sominskii. Translated by J. L. Brenner. Freeman. San Francisco, 1965. 508 pp. Paper, \$3.95.

Proceedings of the 1965 Heat Transfer and Fluid Mechanics Institute, Los Angeles, Calif., June 1965. Andrew F. Charwat, Ed. Published for the Heat Transfer and Fluid Mechanics Institute by Stanford Univ. Press, Stanford, Calif., 1965. 384 pp. Illus. \$10. Twenty-two papers.

The Quaternary. vol. 1. Kalervo Rankama, Ed. Interscience (Wiley), New York, 1965. 322 pp. Illus. \$15. Four papers: "The Quaternary of Denmark" by Sigurd Hansen; "The Quaternary of Norway" by Björn G. Andersen; "The Quaternary of Sweden" by Jan Lundqvist; and "The Quaternary of Finland" by J. J. Donner.

Quick Calculus. A short manual of self instruction. Daniel Kleppner and Norman Ramsey. Wiley, New York, 1965. 302 pp. Illus. Paper, \$2,25.

Radiative Heat Exchange in the Atmosphere. K. Ya. Kondrat'yev. Translated from the second Russian edition by O. Tedder. C. D. Walshaw, Translation Ed. Pergamon, New York, 1965. 421 pp. Illus. \$15.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed to the publisher or agency spon-soring the publication, not to Science.)

Abstracts for 1964 (Geol. Soc. Am. Spec. Pap. No. 82). Geological Soc. America, New York, 1965. 400 pp. Paper, \$3. Abstracts of papers submitted for meetings in Miami Beach, Fla.; Seattle, Wash.: Baton Rouge, La.; Moscow, Idaho: College, Alaska; and Montreal, Quebec, Canada.

WHO'S RESPONSIBLE FOR THESE FINE **CRYOGENIC CONTAINERS?**



LOX/NITROGEN CONTAINERS

You're right! SULFRIAN! The name's synonymous with the most advanced, most efficient low temperature equipment. The com-plete line also includes Helium/ Hydrogen Containers, Stainless Steel Liquid Helium Research Dewars and related equipment. FAST DELIVERY

STAINLESS STEEL OPEN DEWAR





SCIENCE, VOL. 149



An Archaeological Reconnaissance in the Birch Creek Valley of Eastern Idaho (Idaho State Univ. Museum Occasional Papers No. 13). Earl H. Swanson, Jr., and Alan Lyle Bryan. Idaho State Univ. Museum, Pocatello, 1964. 36 pp. Illus. Paper, \$1.

The British Museum (Natural History) Expedition to East Nepal 1961–62: Introduction and Lists of Localities (Bull. Brit. Museum Zool. 12, No. 3). J. G. Sheals and William G. Inglis. British Museum (Natural History), London, 1965. 20 pp. Illus. Plates. Paper, 12s.

Collaborative Tests. Report of a symposium (Brighton, England), May 1964. Pharmaceutical Press, London, 1965. 58 pp. Illus. Paper, 12s. 6d. Eight papers.

Contributions to the Prehistory of Vancouver Island (Idaho State Univ. Museum Occasional Papers No. 15). Katherine H. Capes. Idaho State Univ. Museum, Pocatello, 1964. 128 pp. Illus. Paper, \$2.

A Critical Review of the Marine Nematode Genus Euchromadora de Man, 1886 (Bull. Brit. Museum Zool. 12, No. 5). John W. Coles. British Museum (Natural History), London, 1965. 42 pp. Illuş. Paper, 13s.

Diabetes-Related Literature Index. By authors and by key words in the title. For the year 1962. (J. Am. Dietet. Assoc. 14, suppl. 1). Irving Graef, Ed. American Diabetes Assoc., New York, 1965. 487 pp. Paper. There are approximately 3200 articles, arranged under both authors and key words.

The Distribution and Abundance of Foraminifera in Long Island Sound. Smithsonian Inst. Misc. Collections 149, No. 1). Martin A. Buzas. Smithsonian Institution, Washington, D.C., 1965. 98 pp. Illus. Plates. Paper, \$1.50.

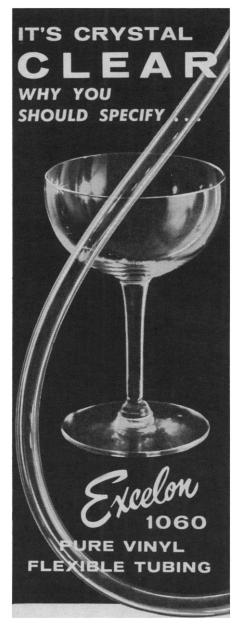
ESCP Reference Series. Nos. 4-6. No. 4, Selected Maps and Earth Science Publications: For the States and Provinces of North America, compiled by William H. Matthews III (44 pp.); No. 5, Free Materials for Earth Science Teachers, compiled by William H. Matthews III and Rolland B. Bartholomew (25 pp.); No. 6, Planetariums, Observatories, and Earth Science Exhibits, compiled by William H. Matthews III (36 pp.). Prentice-Hall, Englewood Cliffs, N.J., 1965. Paper, \$1 per set. Publications of the Earth Science Curriculum Project, an interdisciplinary science program for secondary schools. The project is sponsored by the American Geological Institute.

The Feeding Mechanisms and Preferred Foods of Three Species of Pycnogonida (Bull. Brit. Museum Zool. 12, No. 6). William G. Fry. British Museum (Natural History), London, 1965. 29 pp. Illus. Plates. Paper, 16s.

The First Airplane Diesel Engine: Packard Model DR-980 of 1928 (Annals of Flight 1, No. 2). Robert B. Meyer. Smithsonian Institution, Washington, D.C., 1964. 56 pp. Illus. Paper 60¢ (order from Superintendent of Documents, Washington, D.C.).

Form and Function in the Evolution of the Vermetidae (Bull. Brit. Museum Zool. 11, No. 9). J. E. Morton. British Museum (Natural History), London, 1965. 52 pp. Illus. Paper, 18s.

SCIENCE, VOL. 149



■ Chemically Inert ■ Highly Flexible ■ Standard Diameters Available: ¼4″ to 4″ ■ Custom Sizes & Colors Quoted Upon Request ■ Consistent Properties . . . from Laboratory Experiments to Full Scale Production ■ Nationally Distributed

Available Now...

Excelon Tubing Brochure with Chemical Resistance Chart Physical Properties Chart Pressure Chart Sizes Available Prices Samples Name of Nearest Distributor



The Growth of U.S. Population. Analysis of the problems and recommendations for research, training, and service. Committee on Population, William D. Mc-Elroy, Chairman. Natl. Acad. of Sciences-Natl. Research Council, Washington, D.C., 1965. 35 pp. Paper, \$1.25.

Hexahedrites (Smithsonian Inst. Misc. Collections 148, No. 5). Edward P. Henderson. Smithsonian Institution, Washington, D.C., 1965. 41 pp. Illus. Plates. Paper, \$1.

An Index to the Systematic Collection of Minerals in the British Museum (Natural History). British Museum (Natural History), London, ed. 28, 1965. 32 pp. Paper, 4s.

Industrial Synthesis and Applications of Organometallics (Ann N.Y. Acad. Sci. 125, No. 1). Harold E. Whipple, Ed. New York Acad. Sciences, New York, 1965. 248 pp. Illus. Paper, \$7. Twentyone papers presented at a conference (New York), June 1964.

Intergovernmental Relations in the United States (Ann. Amer. Acad. Polit. Soc. Sci. 359). Harry W. Reynolds, Jr. American Acad. Political and Social Science, Philadelphia, 1965. 267 pp. Paper, \$2.50; cloth, \$3.50. Sixteen papers.

Jare Scientific Reports, Biology. Series E, Nos. 22 and 23. No. 22, Two Small Collections of Copepods from the Antarctic (40 pp.) by Otohiko Tanaka; No. 23, Some Octocorals from the Antarctic Waters off Prince Harald Coast (20 pp.) by Huzio Utinomi. Polar Section, Natl. Science Museum, Tokyo, Japan, 1964. Illus. Plates. Paper.

Kapingamarangi: Social and Religious Life of a Polynesian Atoll (Bishop Museum Bull. No. 228). Kenneth P. Emory. Bishop Museum Press, Honolulu, 1965. 369 pp. Illus. Paper, \$9.50.

The Laser (Ann. N.Y. Acad. Sci. 122, No. 2). Harold E. Whipple, Ed. New York Acad. Sciences, New York, 1965. 264 pp. Illus. Paper, \$7. Twenty-eight papers presented at a conference held in May 1964.

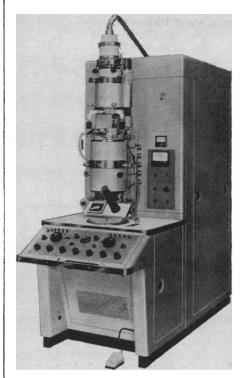
Manual of Tide Observations. U.S. Coast and Geodetic Survey, Washington, D.C., 1965 (order from Superintendent of Documents, Washington, D.C.). 80 pp. Illus. \$2. This is a revision of Special Publication No. 196.

Medical Uses of Radium and Radium Substitutes. Conference summary and conclusions (Chicago, III.), September 1964. U.S. Department of Health, Education. and Welfare, Washington, D.C., 1965. 44 pp. Paper.

Memoirs of the Institute for Protein Research, Osaka University. vol. 7. Kozo Narita and Tatsuo Miyazawa, Eds. Institute for Protein Research, Osaka Univ., Osaka, Japan, 1965. 384 pp. Illus. Paper. Thirty-nine papers and abstracts of 21 papers.

Memory Bibliography 1961–1964. An edited compilation of 430 references to the world literature on memory. Neurosciences Research Program, Brookline, Mass., 1965. 60 pp. Paper.

Methods of Surveying and Monitoring Marine Radioactivity. Report of an *ad hoc* panel of experts. International Atomic Energy Agency, Vienna, 1965. 105 pp. Paper, \$2 (order from Natl. Agen-



COME AND SEE FOR YOURSELF JUST HOW GOOD ELECTRON MICROGRAPHS CAN BE.

Bring your specimens to one of the Fisher demonstration centers listed below and you'll be impressed by what the JEM-7 Electron Microscope can show you. Because the JEM-7 has the highest stability of any electron microscope made today—only 0.1 volt change in 100,000 volts, measured at the filament tip—the micrographs it makes are the clearest and sharpest you've ever seen. When you are thinking of spending some \$43,000 for an instrument, you're entitled to evidence of what it can do. Just make an appointment to check the JEM-7's performance for yourself. T-462

Electron Optics Division



BOSTON 461 Riverside Avenue, Medford, Mass. 02155; 395-7800 (617)

SAN FRANCISCO 832 Mahler Road, Burlingame, Calif. 94010; 697-7322 (415)

MONTREAL 8505 Devonshire Road, Montreal 9, Quebec; 735-2621 (514) cy for International Publications, New York). Safety Series, No. 11.

Mitral Valve Disease (Ann. N.Y. Acad. Sci. 118, No. 10). Harold E. Whipple, Ed. New York Acad. Sciences, New York, 1965. 68 pp. Illus. Paper, \$1.50.

A Monograph of Parmelia, Subgenus Amphigymnia (Contrib. U.S. Nat. Herbarium 36, pt. 5). Mason E. Hale, Jr. Smithsönian Institution, Washington, D.C., 1965. 168 pp. Illus. Paper.

The National Aeronautical Collections (Publ. No. 4255). Smithsonian Institution National Air Museum. Paul E. Garber. Smithsonian Institution, Washington, D.C., ed. 10. 1965. 174 pp. Illus. Paper, \$2.

The Natural Resources of Northern Wisconsin: A Wisconsin Academy Profile (Trans. Wisconsin Acad. Sci. 53, pt. A). Goodwin F. Berquist, Jr., Ed. Wisconsin Acad. Sciences, Arts, and Letters, Madison, 1964. 160 pp. Illus. Paper, \$2.50. Twenty-one papers presented at the 94th annual meeting of the Academy.

New and Noteworthy Amphibians and Reptiles from British Honduras (Bull. Florida State Museum Biol. Sci. 9, No. 3). Wilfred T. Neill. Florida State Museum, Gainesville, 1965. 54 pp. Illus. Paper, 70¢.

The Non-Therapsid Reptiles of the Lufeng Basin, Yunnan, China (Fieldiana, Geol. 15, No. 1). David Jay Simmons. Chicago Natural History Museum, Chicago, 1965. 93 pp. Illus. Paper, \$3.

Observations on Marine Mammals in Florida Waters (Bull. Florida State Museum Bio. Sci. 9, No. 4). James N. Layne. Florida State Museum, Gainesville, 1965. 51 pp. Illus. Paper, 75¢.

Pesticide Handbook-Entoma. Compiled and edited by Donald E. H. Frear. College Science Publishers, State College, Pa., ed. 17, 1965. 315 pp. Paper, \$3; cloth, \$4.

The Planetary Food Potential (Ann. N.Y. Acad. Sci. 118, No. 17). Harold E. Whipple, Ed. New York Acad. Sciences, New York, 1965. 74 pp. Illus. Paper, \$2.50.

Planning for Medical Progress Through Education. Lowell T. Coggeshall. Association of American Medical Colleges, Evanston, Ill., 1965. 117 pp. Illus. Paper, \$2. A report submitted to the executive council of the Association.

A Preliminary Revision of the Indo-Pacific Alosinae (Pisces: Clupeidae) (Bull. Brit. Museum Zool. 12, No. 4). P. J. P. Whitehead. British Museum (Natural History), London, 1965. 42 pp. Illus. Paper, 16s.

Proceedings of the South Dakota Academy of Science. Sioux Falls, April 1964. W. O. Read, Ed. Univ. of South Dakota, Vermillion, 1965. 227 pp. Illus. Paper, \$2. Thirty papers presented at the 49th annual meeting, the award winning paper in the Junior Academy of Science, and abstracts of 44 papers presented before the senior and collegiate sections of the Academy.

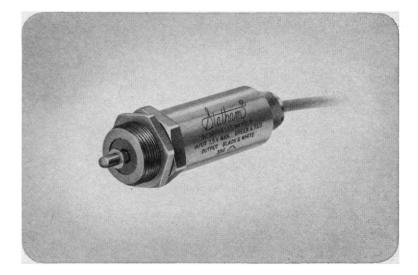
Protein Requirements. Report of a Joint FAO/WHO Expert Group. World Health Organization, Geneva, Switzerland, 1965 (order from Columbia Univ. Press, New York). 72 pp. Illus. Paper, \$1.25. World Health Organization Technical Report Series, No. 301.

Public Health Service Numbered Publi-

13 AUGUST 1965

Statham

The oldest name in Transducers



There is no more precise or rugged transducer system than that which you can build around the Statham Universal Transducing Cell. And it is inexpensive, too.

The Cell itself, which is the heart of the system, costs \$150. Add a \$50 pressure adapter and you are ready to make pressure measurements in any range from 5 to 5,000 psi with ten interchangeable diaphragms at \$20 each. Accuracy? Better than 0.2% terminal linearity and hysteresis. Overload protection? You may be able to wreck the diaphragm, but you cannot possibly injure the sensing Cell itself.

For force measurement loads up to two ounces, use the Transducing Cell alone. Adapters for larger loads of 0.5, 1, 2, 5, 10, 20, 50, or 100 pounds give 0.1% accuracy for just \$75 each. Or for tiny loads, use the Micro-Scale accessory (\$25), which has three positions for 2X, 5X, and 10X mechanical advantage.

You can get the kind of precision we are talking about only from all-DC systems. And so, of course, the Universal Transducing Cell is a Statham unbonded strain gage device. Our patented Zero-Length principle gives us a husky 16 millivolts per input volt from conventional strain gage wire. You cannot damage the Cell by mechanical overload. If you burn it out with excessive input voltage, it will cost you \$15 for our one-day repair service.

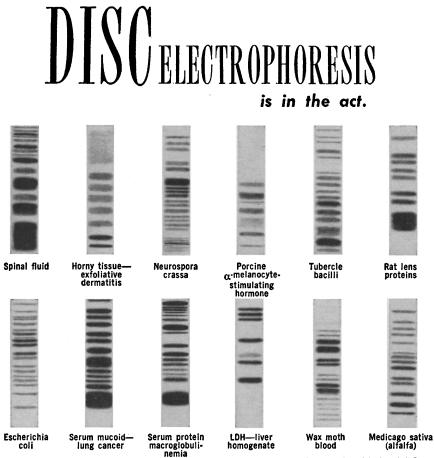
We have a good companion readout box (accuracy $1/2^{0/0}$) for just \$150. It has a battery power supply, a balancing and calibrating network, and a precise long-scale meter with taut-band movement. There is an output jack for an additional oscilloscope or recorder.

Soon to be announced are accessories for the measurement of strain and of the spherical radii of convex and concave surfaces. Your Universal Transducing Cell puts you on our mailing list for regular notification every time another new accessory becomes available.



STATHAM INSTRUMENTS, INC. 12401 W. Olympic Blvd., Los Angeles, Calif. 90064

Where the finest separation, analysis and purity evaluation of protein systems is being carried out ...



Copyright 1965 Canal Industrial Corp.

Now in use in more than 2000 laboratories, Disc Electrophoresis offers unequalled sensitivity (to 0.01 microgram), speed (separation in 10-30 minutes), simplicity and reproducibility. Disc Electrophoresis is applicable to almost every area of protein research and clinical investigation, improving over separations by other methods and giving new separations never before possible by any technique.

In Disc Electrophoresis, migration of sample substances through specially prepared columns of polyacrylamide gel produces exceptionally sharp bands of isolated fractions, "stacked" in disc-like zones as little as tens of microns thick. A random sample of the recent literature

or polyacrylamide gel produces exceptionally sharp bands or isolated fractions, "stacked" in disc-like zones as little as tens of microns thick. A random sample of the recent literature reporting uses of Disc Electrophoresis includes: SOURCES: Amoebae, E. coli, flu virus, micobacteria, neurospora, polio virus, ribosomes, slime mould, staphylococci, tubercle bacilli; algae, cats, cattle, dogs, earthworms, fish, guinea pigs, hamsters, horses, humans, insects, lobsters, mice, pigs, plants, quail, rabbits, rats, sea urchins, sheep, snails, squid; tissue extracts of aorta, brain, horny tissue, kidney, lens, muscle, pancreas, parotid, pituitary, skin, thymus, thyroid; fluids such as axoplasm, blood, cerebrospinal fluid. SUBSTANCES SEPARATED: Proteins, including C-reactive proteins, glycoproteins, mucoproteins, nucleic acids, nucleo-proteins and thyroxin-binding proteins; hemoglobins and haptoglobins; globulins, histones, human and bovine growth hormones, ovine follicle stimulating hormone, human chorionic gonadotropin, enterotoxins, Hageman factor, α -crystallin, collagen, diglyceride and prolactin; amylase, aminopeptidase, phosphatases; β -galactosidase, carbonic anhydrase, carboxypeptidase, dehydrolipamide dehydrogenase, glycogen phosphyrylase, lipase, lactic and malic dehydrogenase, Phosphorylase, ribonuclease, sialidase, transaminase and transpeptidase. DIAGNOSIS OF: Acute schizophrenia, cancer of the breast and lung, glomerulonephritis, liver pathology, lupus erythematosus, macroglobulinemia, milk allergy, myeloma, myocardial infarction, nephrosis, normal and abnormal pregnancy, pneumonia, primary tumor sites, rheumatic fever, sickle cell anemia, thalassemia, tuberculosis and uremic-hemolytic syndrome. See how you can apply the benefits of Disc Electrophoresis to your own research. Send now for

See how you can apply the benefits of Disc Electrophoresis to your own research. Send now for complete information, including bibliography, without cost or obligation. Write

ALCO CANAL INDUSTRIAL CORPORATION 4935 Cordell Avenue E-81 Dept. Bethesda, Maryland / (301) 656-2333

Sales and Service Offices in • Boston • Houston • New York • Seattle • Chicago • Los Angeles • Pittsburgh • Washington, D. C. • Cincinnati • Memphis • St. Louis • Toronto • Cleveland • Minneapolis • San Francisco

cations: A Catalogue 1950-1962. U.S. Department of Health, Education, and Wel-Washington, D.C., 1965 (order Superintendent of Documents, fare, from Washington, D.C.). 198 pp. Paper, \$1.

Revision of the Family Pneumoridae (Orthoptera: Acridoidea) (Bull. Brit. Museum Entomol. 15, No. 10). V. M. Dirsch. British Museum (Natural History), London, 1965. 74 pp. Illus. Paper, 26s.

The Science of Geography. Report of the Ad Hoc Committee on Geography, Earth Sciences Division. Nat. Acad. Sciences-Natl. Research Council, Washington, D.C., 1965. 88 pp. Paper, \$2.50.

Silurian Polyzoa from Benthall Edge, Shropshire (Bull. Brit. Museum Geol. 10, No. 4). D. E. Owen. British Museum (Natural History), London, 1965. 25 pp. Plates. Paper, 27s.

The Slide Rule Handbook. James Owen Perrine. Baywood, New York, 1965 (available from Gordon and Breach, New York). 112 pp. Ilus. Paper, \$3; cloth, \$5.

Soviet Antarctic Expedition: Informa-tion Bulletin. vol. 3. Translated from the Russian by Scripta Technica and the Geophysical and Polar Research Center, University of Wisconsin. Elsevier, New

York, 1965. 389 pp. Illus. \$15. A Study of the Early Tertiary Con-dylarthran Mammal Meniscotherium (Smithsonian Inst. Misc. Collections 149, No. 2). C. Lewis Gazin. Smithsonian Institution, Washington, D.C., 1965 (order from Superintendent of Documents, Washington, D.C.). 102 pp. Illus. Plates, Paper, \$2.

The Systematics, Evolution and Zoogeography of Staphlinid Beetles Associated with Army Ants (Coleoptera, Staphylinidae) (Fieldiana, Zool. 47, No. 2). Charles H. Seevers. Chicago Natural History Museum, Chicago, 1965. 215 pp. Illus. Paper, \$5.50.

Taxonomy and Nomenclature of the Bronzed Cowbird (Fieldiana, Zool. 44, No. 22). Kenneth C. Parkes and Emmet R. Blake. Chicago Natural History Mu-seum, Chicago, 1965. 10 pp. Paper, 50¢.

Ten Conferences on the Training of Teachers of Elementary School Mathematics. Report No. 11. Committee on the Undergraduate Program in Mathematics, Berkeley, Calif., 1965. 144 pp. Paper.

The Three-C Site, an Early Pueblo II Ruin in Chaco Canyon. (Univ. New Mexico Publ. Ser. Anthropol. No. 13). Gordon Vivian. Univ. of New Mexico Press, Albuquerque, 1965. 48 pp. Illus. Paper, \$2.

Transactions of the Wisconsin Academy of Sciences, Arts and Letters. vol. 53. Goodwin F. Berquist, Jr., Ed. Wisconsin Acad. Sciences, Arts and Letters, Milwaukee, 1964. 287 pp. Illus. Paper, \$4. Sixteen papers.

The Types of Proctotrupoidea (Hymenoptera) in the British Museum (Natural History) and in the Hope Department of Entomology, Oxford (Bull. Brit. Museum Entomol. Suppl. 1). L. Masner. British Museum (Natural History), London, 1965. 154 pp. Paper, 50s.

Vernacular Maize Names and Some African Tribal Migrations (Ann. N.Y. Acad. Sci. 118, No. 12). Harold E. Whipple, Ed. New York Acad. Sciences, New York, 1965. 20 pp. Paper, \$1.50.

SCIENCE, VOL. 149