

Multifuge



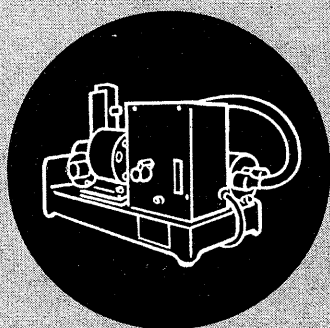
Many heads are better than one. The UV offers over thirty. Plus hundreds of accessories for unlimited applications. Volume lab work? Precision research? The fast and versatile UV handles both. You get 5600 rpm and 4750 g with large capacity heads. With multi-speed attach-

ment, you reach 23,400 rpm and 37,950 g. Your IEC dealer has the UV in stock. Get the one centrifuge that does the work of many. In the meantime, write us for Bulletin UV.



INTERNATIONAL EQUIPMENT CO.

300 SECOND AVENUE • NEEDHAM HEIGHTS, MASS. 02194.



LARGE ANIMAL RESPIRATOR

Model 607 is a piston-type pump handling non-explosive gases, including oxygen. Electronic pump control allows continuous selection of rates from 7-50 strokes/min.; tidal volumes from 30-750 cc. Separate pathways are provided for inspired and expired air.

ASK FOR YOUR FREE COPY OF BULLETIN 607



HARVARD APPARATUS CO., INC.

Dept. A-12, Post Office Box 17
Dover, Massachusetts 02030

CIVIL DEFENSE

A symposium presented at the 1965 Berkeley meeting of AAAS. Arranged by Henry Eyring. 144 pp., paper, July 1966. \$4.00; AAAS members' cash orders: \$3.50.

Participants: Owen Chamberlain, Barry Commoner, Wolfgang K. H. Panofsky, Fred A. Payne, Anatol Rapoport, John Howard Rust, Victor W. Seidel, Edward Teller, and Eugene P. Wigner.

The place of civil defense in the total picture of war and peace is one of the most important and controversial problems confronting the American public today. A major question at issue is whether or not an extensive shelter building program will diminish or increase the possibility of a catastrophic nuclear war.

Scientists who have studied problems related to modern warfare and passive civil defense systems report their findings on these subjects.

AAAS

1515 Massachusetts Avenue, NW
Washington, D.C. 20005

The Mathematical Apparatus for Quantum-Theories: Based on the Theory of Boolean Lattices. Otton Martin Nikodym. Springer-Verlag, New York, 1966. 964 pp. \$36.

Mendelian Inheritance in Man. Catalogs of autosomal dominant, autosomal recessive, and X-linked phenotypes. Victor A. McKusick. Johns Hopkins Press, Baltimore, 1966. 364 pp. \$8.

Modern Microscopy or Seeing the Very Small. V. E. Cosslett. Cornell Univ. Press, Ithaca, N.Y., 1966. 160 pp. Illus. \$5.

Molecular Organization and Biological Function. John M. Allen, Ed. Harper and Row, New York, 1966. 255 pp. Illus. Paper, \$5; cloth, \$9. Eight papers.

Molecular Spectra and Molecular Structure. vol. 3, *Electronic Spectra and Electronic Structure of Polyatomic Molecules.* Gerhard Herzberg. Van Nostrand, Princeton, N.J., 1966. 763 pp. Illus. \$20.

Multiple Integrals in the Calculus of Variations. Charles B. Morrey, Jr. Springer-Verlag, New York, 1966. 518 pp. \$24.

On Invariants and the Theory of Numbers. Leonard Eugene Dickson. Dover, New York, 1966. 120 pp. Paper, \$1.50. Reprint, 1914 edition.

On-Line Computing: Time-Shared Man-Computer Systems. Walter J. Karplus, Ed. McGraw-Hill, New York, 1967. 348 pp. Illus. \$14.50.

Organic Synthesis. vol. 46. E. J. Corey, Ed. Wiley, New York, 1966. 156 pp. Illus. \$5.25.

The Palace of Nestor at Pylos in Western Messenia. vol. 1, pts. 1 and 2, *The Buildings and Their Contents.* Carl W. Blegen and Marion Rawson. Princeton Univ. Press, Princeton, N.J., 1966. 470 pp. Illus. Plates. \$40.

People of the Noatak. Claire Fejes. Knopf, New York, 1966. 380 pp. Illus. \$6.95.

Phonons in Perfect Lattices and in Lattices with Point Imperfections. R. W. H. Stevenson, Ed. Plenum, New York, 1966. 462 pp. Illus. \$22.50. Fifteen lectures given at the Scottish Universities' Summer School, 1965.

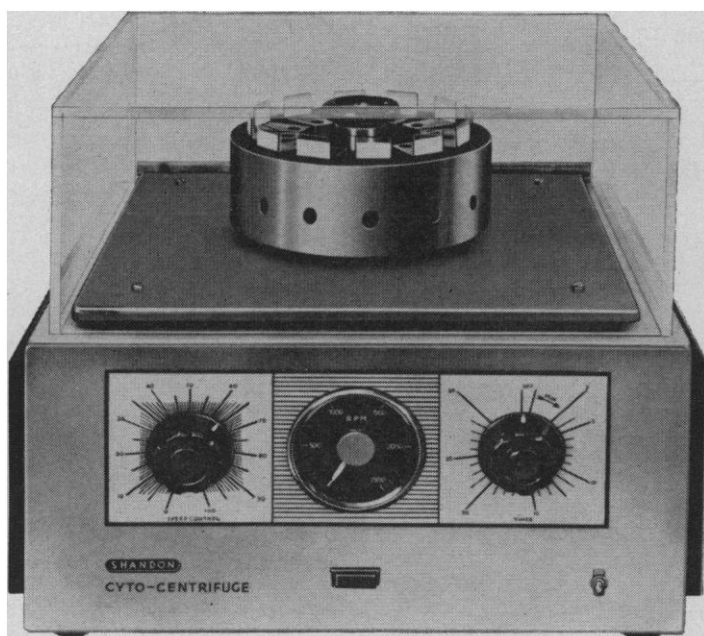
Phylo-Genetic Systematics. Willi Hennig. Translated from the German by D. Dwight Davis and Rainer Zangerl. Univ. of Illinois Press, Urbana, 1966. 271 pp. Illus. \$12.50.

Physical Optics. D. V. Skobel'tsyn, Ed. Translated from the Russian edition (Moscow, 1965). Consultants Bureau, New York, 1966. 280 pp. Illus. Paper, \$27.50.

Miscellaneous Publications

U.S. Geological Survey. Bulletin: No. 1185-C, "The uraniferous zirconium deposits of the Poços de Caldas Plateau, Brazil," Gene E. Tolbert (28 pp., maps, 70¢); **No. 1198-E,** "Geochemical reconnaissance in the Pequop Mountains and Wood Hills, Elko County, Nevada," R. L. Erickson, A. P. Marranzino, Uteana Oda, and W. W. Janes (20 pp., maps); **No. 1198-F,** "Phytoecology of a greenstone habitat at Eagle, Alaska," Hansford T. Shacklette (36 pp., 20¢); **No. 1214-E,** "Element distribution in some shelf and eugeosynclinal black shales," James D.

Cytologists: this machine lets you prepare more slides, in less time, with less fluid



This is the Shandon Cyto-Centrifuge. It employs a unique cell concentrating and distributing technique that permits you to prepare a large quantity of microscope slides using a smaller amount of human blood plasma, synovial fluid, peritoneal exudates, seminal fluid or other body fluids. Centrifugation and slide preparation are performed simultaneously, which eliminates prior centrifugation and saves you time.

The Shandon Cyto-Centrifuge does not damage individual cell structure. Also, processed slides can be rapidly scanned using a preset high power objective without adjustment between consecutive slides. \$885.

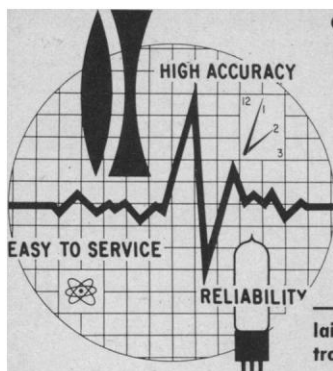
Learn the full story on the Cyto-Centrifuge and other quality scientific tools. Write to Shandon Scientific Company, Inc., 515 Broad St., Sewickley, Pa. 15143. (Pittsburgh District)

SHANDON

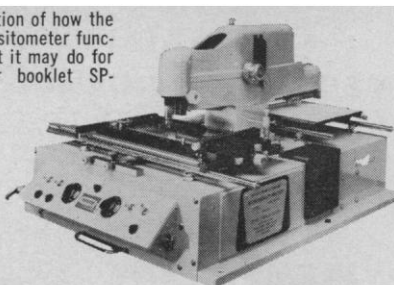
Vine (31 pp., 20¢); No. 1220, "Terrestrial impact structures—a bibliography," Jacquelyn H. Freeberg (91 pp., map, 70¢); No. 1221-C, "Geology of the Florida quadrangle, Puerto Rico," Arthur E. Nelson and W. H. Monroe (22 pp., maps); No. 1222-A, "Geology and mineral deposits of the Mosheim and Johnson anticlines, Greene County, Tennessee," Arnold L. Brokaw, John C. Dunlap, and John Rodgers (21 pp., maps); No. 1222-B, "Geology of the northwest quarter of the Anaconda quadrangle, Deer Lodge County, Montana," Alexander A. Wanek and C. S. Venable Barclay (28 pp., maps); No. 1222-C, "Geology and mineral deposits of the Powell River area, Claiborne and Union Counties, Tennessee," Arnold L. Brokaw, John Rodgers, Deane F. Kent, Robert A. Laurence, and Charles H. Behre, Jr. (56 pp., maps); No. 1222-D, "Jasperoids of the Lake Valley mining district, New Mexico," E. J. Young and T. G. Lovering (27 pp., 15¢); No. 1223, "Nickel deposits of North America," H. R. Cornwall (62 pp., 25¢); No. 1224-G, "The Yakima Basalt and Ellensburg formation of south-central Washington," James W. Bingham and Maurice F. Grolier (15 pp., 10¢); No. 1230-F, "Mineral resources of the Sycamore Canyon Primitive Area, Arizona," Lyman C. Huff, Elmer Santos, and R. G. Raabe (19 pp., maps, 50¢); No. 1232, "Bibliography of North American Geology, 1962," (834 pp., \$2.50); Professional Paper No. 272-G, "Evaporation study in a humid region, Lake Michie, North Carolina," J. F. Turner, Jr. (150 pp., 20¢); No. 302-D, "Micropaleontology of the Mesozoic rocks of northern Alaska," Harlan R. Bergquist (135 pp., maps); No. 341-E, "Geology and mineral resources of the Monlevade and Rio Piracicaba quadrangles, Minas Gerais, Brazil," Robert G. Reeves (58 pp., maps); No. 341-F, "Geology and mineral resources of the Pico de Itabirito district, Minas Gerais, Brazil," Roberts M. Wallace (68 pp., maps); No. 352-G, "Channel and hillslope processes in a semiarid area, New Mexico," Luna B. Leopold, William W. Emmett, and Robert M. Myrick (253 pp., 50¢); No. 398-A, "Tertiary stratigraphy and paleobotany of the Cook Inlet region, Alaska," Jack A. Wolfe, D. M. Hopkins, and Estella B. Leopold (29 pp., map, 70¢); No. 422-H, "River meanders—theory of minimum variance," Walter B. Langbein and Luna B. Leopold (15 pp., 20¢); No. 422-I, "An approach to the sediment transport problem from general physics," R. A. Ragnold (37 pp., 35¢); No. 440-W, "Data of Geochemistry: Chemistry of the iron-rich sedimentary rocks," Harold L. James (61 pp., 45¢); No. 448-F, "Low-flow characteristics of streams in the Mississippi embayment in northern Arkansas and in Missouri," Paul R. Speer, Marion S. Hines, M. E. Janson, and others (25 pp., maps); No. 462-I, "Summary of alluvial channel data from flume experiments, 1956-61," H. P. Guy, D. B. Simons, and E. V. Richardson (96 pp., 70¢); No. 485-B, "Throughfall for summer thunderstorms in a juniper and pinyon woodland, Cibecue Ridge, Arizona," M. R. Collings (13 pp., 20¢); No. 486-C, "Hydrologic regimen of Salton Sea, California," Allen G. Hely, G. H. Hughes, and Burdige Irelan (32 pp., 30¢); No.

JOYCE LOEBL MICRODENSITOMETER

DOUBLE-BEAM
AUTOMATIC RECORDING

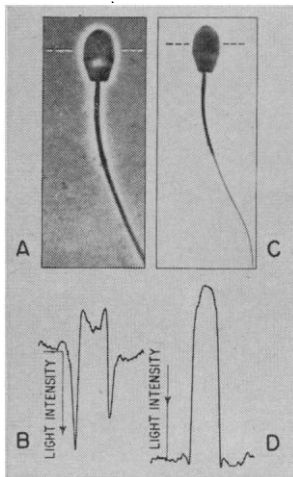


For an explanation of how the J.L.C. Microdensitometer functions, and what it may do for you, send for booklet SP-MDM.



—An instrument in the great tradition of "one-of-its-kind" laid down in ultracentrifugation, X-ray diffraction, and electron microscopy.

Whether it be measuring the CONVEXITY OF a SINGLE BLOOD CELL, making a recording of a HIGH RESOLUTION MASS SPECTROGRAPH plate, analyzing X-RAY DIFFRACTION patterns, scanning U.V. ABSORPTION films taken with the analytical ultracentrifuge—or scores of other applications in BIOCHEMISTRY, PHYSIOLOGY, MEDICINE, and RADIOLOGY—the Joyce-Loebl Microdensitometer and its associated systems are the standard of research everywhere.



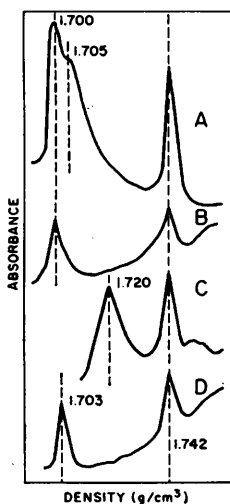
A. Ram sperm by phase contrast. 2300X

B. Microdensitometer record of distribution of light intensity along line in A.

C. Ram sperm by interference contrast. 2300X

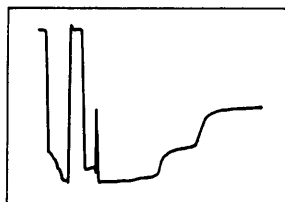
D. Microdensitometer trace of distribution of light intensity along line in C. Unlike phase contrast, interference contrast correctly depicts variations in optical path.

PHYSIOLOGY



Microdensitometer tracings of DNA isolated from whole cells of guinea-pig-liver tissue (A), mitochondrial DNA (B), heat-denatured mitochondrial DNA (C), and renatured mitochondrial DNA (D) centrifuged to equilibrium in a CsCl density gradient. The peak on the right in each tracing corresponds to the density marker, bacteriophage 2C DNA.

BIOCHEMISTRY



Purified conidial rRNA was centrifuged at 52,640 rev/min at 20°C in the Spinco model E analytical ultracentrifuge equipped with ultraviolet optics. This figure shows a typical microdensitometric tracing with two boundaries corresponding to 28S and 19S RNA, respectively. Sedimentation boundaries are shown approximately 20 minutes after acceleration of the rotor was completed.



National Instrument Laboratories, Inc.

In Metropolitan Washington, D. C.
12300 PARKLAWN DRIVE, ROCKVILLE, MARYLAND 20852

PHONE: 933-1144
AREA CODE: 301

491-B, "Effects of juniper and pinyon eradication on streamflow from Corduroy Creek Basin, Arizona," M. R. Collings and R. M. Myrick (12 pp., 20¢); No. 498-A, "Hydrochemical facies and groundwater flow patterns in northern part of Atlantic Coastal Plain," William Back (42 pp., maps); No. 499, "Interpretation of resistivity data," Robert G. Van Nostrand and Kenneth L. Cook (310 pp., maps); No. 503-F, "The Lower Cretaceous (Albian) ammonite genera *Leconteites* and *Brewericerias*," David L. Jones, Michael A. Murphy, and Earl L. Packard (45 pp., plates, 50¢); No. 504-F, "Underground temperatures and heat flow in the East Tintic district, Utah," T. S. Lovering and H. T. Morris (28 pp., maps); No. 507, "Geology and coal reserves of the Kermit and Varney area, Kentucky," John W. Huddle and Kenneth J. Englund (83 pp., maps); No. 508, "Geology and uranium-vanadium deposits of the La Sal quadrangle, San Juan County, Utah, and Montrose County, Colorado," William D. Carter and James L. Gualtieri (82 pp., maps); No. 514, "Measurement of hydraulic diffusivity of wedge-shaped aquifers drained by streams," R. W. Stallman and I. S. Papadopoulos (50 pp., plates, \$4.50); No. 523-C, "Late Pleistocene marine paleoecology and zoogeography in central California," W. O. Addicott (31 pp., 35¢); No. 523-E, "*Tinsleya*, a new genus of seed-bearing callipterid plants from the Permian of north-central Texas," Sergius H. Mamay (24 pp., 30¢); No. 524-B, "Stratigraphy and structure of the Dinkey Creek roof pendant in the central Sierra Nevada, California," R. W. Kistler and P. C. Bateman (14 pp., map); No. 524-C, "Interpretation of Cumberland Escarpment and Highland Rim, south-central Tennessee and northeast Alabama," John T. Hack (16 pp., map); No. 524-D, "History of nomenclature and stratigraphy of rocks adjacent to the Cretaceous-Tertiary boundary, western San Juan Basin, New Mexico," Elmer H. Baltz, Sidney R. Ash, and Roger Y. Anderson (23 pp., map, 55¢); No. 524-E, "Tectonics of the Keeweenaw Basin, western Lake Superior region," Walter S. White (23 pp., 25¢); No. 525-A, "Geological Survey Research 1965," William T. Pecora, Director (376 pp., \$2.25); No. 526-A, "Geology and coal resources of the Livingston coal field, Gallatin and Park Counties, Montana," Albert E. Roberts (56 pp., maps); No. 526-B, "Stratigraphy of Madison Group near Livingston, Montana, and discussion of karst and solution-breccia features," Albert E. Roberts (23 pp., 30¢); No. 537-A, "Chemistry of the lavas of the 1959-60 eruption of Kilauea Volcano, Hawaii," K. J. Murata and D. H. Richter (26 pp., 25¢); No. 537-B, "Petrology of the Kilauea Iki Lava Lake, Hawaii," Donald H. Richter and James G. Moore (26 pp., 30¢); No. 537-C, "An acid fumarolic gas from Kilauea Iki, Hawaii," K. J. Murata (6 pp., 15¢); No. 537-D, "Petrography of the lavas of the 1959-60 eruption of Kilauea Volcano, Hawaii," D. H. Richter and K. J. Murata (12 pp., 20¢); No. 550-B, "Geological Survey Research 1966," (225 pp., \$2.); No. 550-C, "Geological Survey Research 1966," (269 pp., \$2.25). Superintendent of Documents, Washington, D.C., 1966.