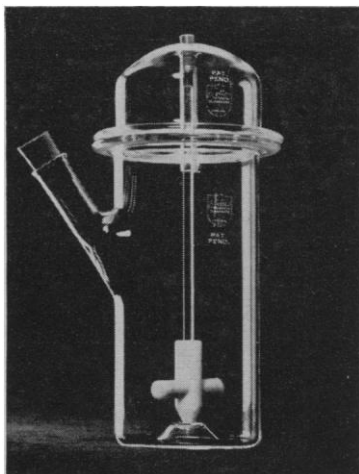


SPINNER FLASKS*

SUSPENDED CELL CULTURE UNIT
for Biochemical & Quantitative Growth Studies



- Standard model offered in 5 sizes, with single or double sidearm.
- Micro and centrifuge types also available.
- Features Teflon impeller assembly.
- Complete unit can be autoclaved.

"research
deserves
the best"

SEND FOR LEAFLET SF-1

BELLCO GLASS INC.

VINELAND, NEW JERSEY



*PAT. PENDING

new

Welch
No. 1377A

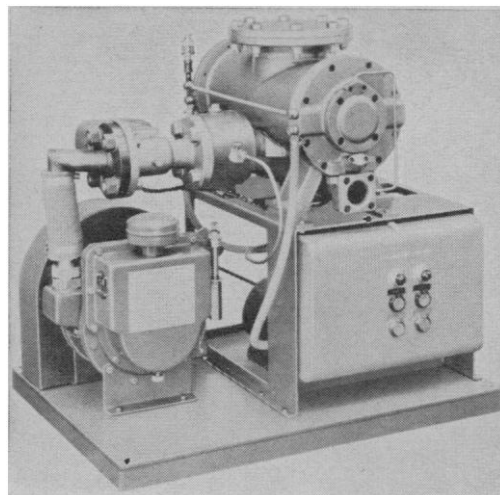
**Ultra High
Vacuum
Pumping
System**

140 Liters per
Second

Ultimate
Vacuum

1×10^{-9} mm
Hg (Torr)

WITH
CONSTANT
SPEED OVER
WIDE
PRESSURE
RANGE



The new Welch No. 1377A Turbo-Molecular Pumping System produces an ultimate vacuum of 1×10^{-9} mm Hg (Torr) and better; constant speed of 140 liters per second over a range of 1×10^{-2} to 1×10^{-8} mm Hg (Torr).

The clean, vapor-free Turbo-Molecular Pump is combined with the well known Welch Duo-Seal No. 1397 two-stage mechanical pump, providing a completely assembled and tested pumping system, ready for use.

Advance design of the Turbo-Molecular Pump permits the use of an air slit ten times the size of previous designs and greatly reduces risk of damage by air impact, heat expansion and dirt particles.

TYPICAL USES:

- Evacuation of power tubes and X-ray tubes
- Solid state research
- Semiconductor production
- Thin film metallizing
- Optic coating

The Welch No. 1377A is particularly useful in processes involving separation of materials or isotopes with different molecular weights, as in particle acceleration work.

Send for Bulletin 1377A
TODAY!

THE WELCH SCIENTIFIC COMPANY

ESTABLISHED 1880

1515 Sedgwick Street, Dept. E.

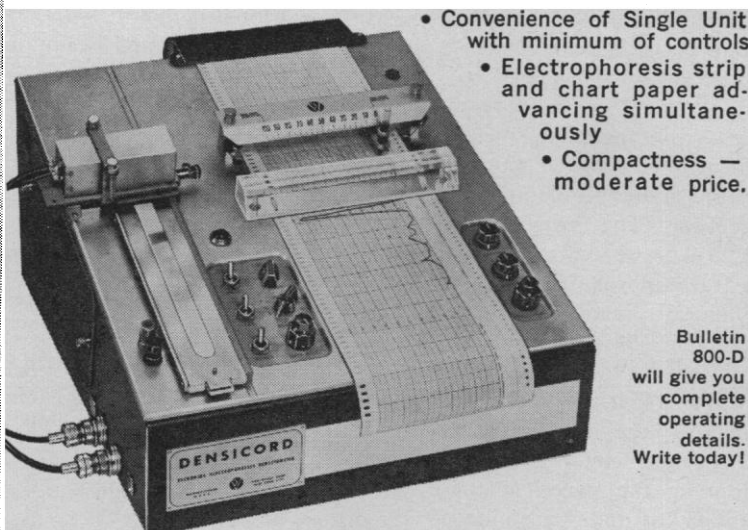
Chicago 10, Illinois, U.S.A.

Manufacturers of Scientific Instrument and Laboratory Apparatus

DENSITOMETRIC EQUIPMENT

Single Unit
Densicord Model 542
for Recording
Electrophoresis

with this system:



- Convenience of Single Unit with minimum of controls
- Electrophoresis strip and chart paper advancing simultaneously
- Compactness — moderate price.

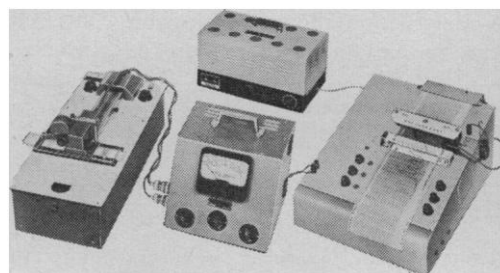
Bulletin 800-D
will give you
complete
operating
details.
Write today!

**which
should
you use?**

Building Blocks
for Electrophoresis
and Chromatography

with this system:

- Choice of manual, semi-automatic, or fully automatic operation
- For strips as well as sheets
- Adapted for agar, gels, and thin-layer chromatographic plates



Bulletin 800-S will give you complete operating details. Write today!

PHOTOVOLT CORP. 1115 Broadway • New York 10, N.Y.

New Products

Galvanometer driver assembly is designed to provide power amplification for driving high-frequency galvanometers. The assembly consists of from one to seven amplifier cards and a power supply unit in a mounting case. When connected to an oscillograph and activated, the unit provides the current necessary to drive the manufacturer's fluid-damped galvanometers to maximum specified deflection. When the unit is used with appropriate matching network, magnetically damped galvanometers can also be driven. Amplifier cards provide variable gain from near zero to a maximum of 2.5 with frequency response within ± 1 percent to 5 kcy/sec. Maximum output voltage is ± 3.6 v. Since each amplifier channel is separate a varying number may be operated; d-c linearity is ± 1 percent, noise is less than 3 mv peak-to-peak, and drift is less than 2.1 mv/deg F referred to input. Common mode rejection is 80 db at 60 cy/sec.—J.S. (Consolidated Electrodynamics Corp., Dept. S454, 360 Sierra Madre Villa, Pasadena, Calif.)

Electron microscope (model TRS-50S) is announced as the first instrument capable of resolving 15 to 20 Å priced to sell for less than \$15,000. Small industry and educational institutions are considered as potential purchasers. The microscope features a "fixed-lens" system wherein all lenses and apertures are permanently mounted within 3 μ of centricity. This pre-aligned construction allows the electron source to be centered with the use of

only two controls. A three-stage electromagnetic lens system provides magnification of 30,000 and 50-kv accelerating potential. A double specimen holder is controlled from outside the vacuum. Astigmatism-free operation is said to be attained within 5 minutes and all components subject to contamination can be rapidly removed for cleaning. Replacement of the specimen holder and re-establishment of a working vacuum are said to require less than 1 minute.—R.L.B. (Bendix Cincinnati, Division of the Bendix Corp., Dept. S449, 3130 Wasson Rd., Cincinnati 8, Ohio)

Pulse propagation meter is a device for measuring the velocity of longitudinal mechanical pulses transmitted in materials of small cross section such as fibers and films. Since the factors of micro or molecular structure that determine mechanical properties also determine the velocity at which mechanical energy is propagated, the measurement of velocity can provide insight into both physical and chemical structure. The instrument has been designed for the continuous measurement of the transit time of a longitudinal pulse traveling between two piezoelectric transducers coupled to a test sample. The transit time per unit length is inversely proportional to the pulse velocity. The transit time may be read directly in μ sec from the panel meter of the instrument or it may be plotted continuously from a suitably connected strip-chart recorder. The range over which accurate measurements can be made extends from approximately 5 to 400 μ sec. Full-scale readings of 40 μ sec are obtainable. Measurement of transit time is made 195 times per second by starting a linear sweep voltage at the time a pulse is introduced into the test specimen by one transducer and stopping the sweep at the time of reception of the transmitted pulse by the second transducer. The maximum sweep voltage, proportional to the transit time, is measured by a

peak-reading voltmeter. To correct for electrical and mechanical time delays inherent in the system, a correction factor determined by extrapolation to zero spacing of the transducers is subtracted from the readings. The excitation pulse is produced by a thyratron pulse generator that applies a negative spike of approximately 500 volts to the transmitting transducer. The transducers are made with Rochelle salt bimorph twister crystals and damping materials mounted in a protective housing. According to the manufacturer, accuracy of transit time measurement will be ± 1 percent when temperature changes are small or when the effects of such changes are measured and taken into account.—J.S. (KLH Research and Development Corp., Dept. S458, 30 Cross St., Cambridge 39, Mass.)

Laser attachment provides extremely short bursts and narrow pulses. The device consists of a reflecting device mounted on a rotating disk. As the disk rotates, the reflecting plane becomes briefly perpendicular to the long axis of the laser rod which is unsilvered at one end. Consequently, after the rod is pumped by the excitation light source, it will oscillate only in the brief interval during which the reflector is perpendicular to the light path. At high speeds of rotation this provides light pulse widths on the order of a tenth of a microsecond and peak power from 0.1 to 1 Mw. Energy output is on the order of 0.3 joule. The speed of rotation and the amount of pump energy determine the number of pulses per burst. Two models of the device are available. The MH-1 has a synchronous motor with fixed speed of 3600 rev/min and is equipped

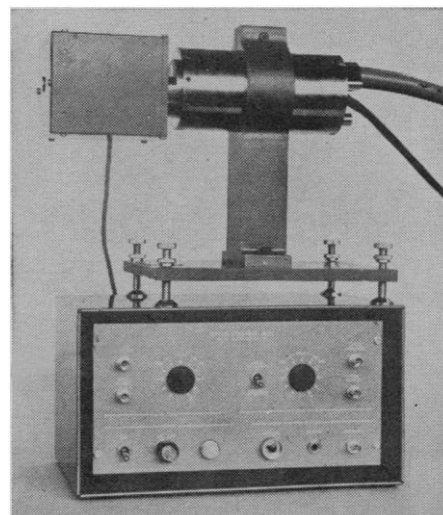
The material in this section is prepared by the following contributing writers:

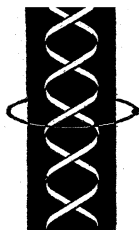
Robert L. Bowman (R.L.B.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

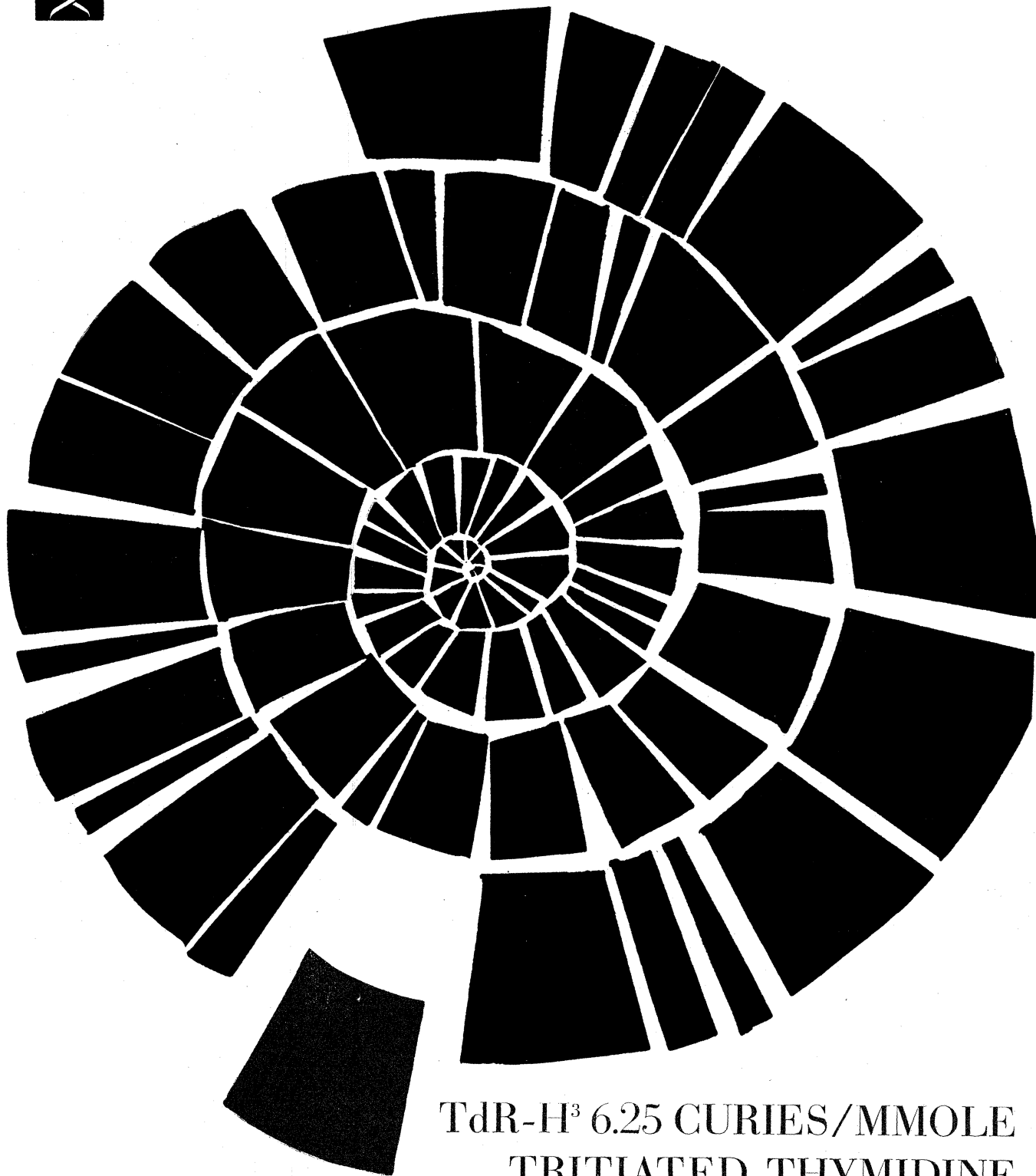
The information reported is obtained from manufacturers and other sources considered reliable. Neither *Science* nor any of the writers assumes responsibility for the accuracy of the information.

Address inquiries to the manufacturer, mentioning *Science* and the department number.





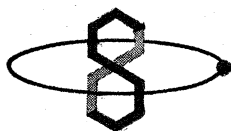
Outstanding Products and Services for Nucleic Acid Research



TdR-H³ 6.25 CURIES/MMOLE TRITIATED THYMIDINE

6.25 c/mmole is the highest specific activity offered anywhere • completely stable and pure—affirmed by isotope dilution and chromatography • an important addition to the largest list of tritiated nucleic acid derivatives available. Write for additional information.

N.B. New symbol to conform with international codification.



SCHWARZ BIORESEARCH, INC. • Dept. LB • Mountain View Avenue, Orangeburg, New York
BIOCHEMICALS • RADIOCHEMICALS • PHARMACEUTICALS *for research, for medicine, for industry*

one of a series



A New Concept in Ion Exchangers

SE-Sephadex®

Introduction of ionic groups into SEPHADEX, a hydrophilic insoluble product derived from cross-linking the polysaccharide, dextran, makes possible an entirely new series of ion exchangers. The SEPHADEX ion exchangers have

- High capacity
- Low nonspecific adsorption

SEPHADEX ion exchangers make possible the purification, separation and fractionation of a wide range of low molecular weight, complex organic compounds, proteins, and related nitrogenous substances with high yields.

A diversity of types, both anionic and cationic, are available to meet specific requirements. Have you investigated—

SE-Sephadex

Active group	sulfoethyl
character	cationic, strongly acidic
capacity	2.0-2.5 meq/g

SE-SEPHADEX is prepared in two forms:

C-25, which is highly effective for separating low molecular weight, complex organic substances, and C-50, which has a far greater binding capacity than C-25 for large size molecules—particularly useful for purification of proteins, enzymes, and related nitrogenous compounds.

SE-SEPHADEX has total exchange capacity of 2-2.5 meq/g. This product is available in the following sieve fractions: Coarse, Medium, and Fine.



PHARMACIA FINE CHEMICALS, INC.
501 FIFTH AVENUE
NEW YORK 17, NEW YORK

☐ Send me information on
SEPHADEX Ion Exchangers.

Name _____

Company _____

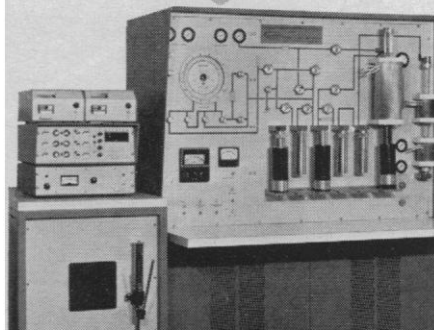
Address _____

with either a flat or a prism reflector. The MH-2 is equipped with a variable-speed d-c motor capable of speeds beyond 6000 rev/min. Reflectors available for the MH-2 include a 50 percent reflecting mirror, a completely reflecting prism, or a prism with one corner removed.—J.S. (Trion Instruments, Inc., Dept. S455, 1200 N. Main St., Ann Arbor, Mich.)

The type CMB11 capacitance comparator is designed to measure capacitance of ceramic capacitors at 1 Mcy/sec. Without balancing, the difference between a standard capacitor and the unknown is measured and indicated in both sign and magnitude. The measuring range is from 1 to 1000 pf full scale and differences as small as 0.02 pf can be read. Measurement accuracy is said to be ± 1 percent of the reading $+1$ percent of full scale or ± 0.05 percent of the capacitance value, whichever is greater. If the terminals for the standard capacitor are left open, the instrument measures directly the capacitance of the unknown in the same meter indication range and with the same accuracy. The circuit is designed so that stray capacitance of the unknown does not affect the measurement. A guard system makes possible remote measurements and permits the capacitor to be placed in a thermostatically controlled oven for measurement of temperature coefficient.—J.S. (Radiometer, Dept. S391, 72 Emdrupvej, Copenhagen NV, Denmark)

The model 420-R 10 frequency measurement extender when used with a 10-Mcy/sec digital counter permits measurement of frequency up to 220 Mcy/sec with accuracy said to be ± 1 cy/sec, subject to the accuracy of the associated counter. The extender uses the 10-Mcy/sec reference output generated by the crystal clock in the counter as a basic reference. A two-position band selector switch and a 13-position incremental selector on the instrument's panel select harmonics of the clock frequency in 10-Mcy/sec increments. The harmonic is heterodyned with the unknown signal in a mixer system that eliminates ambiguity. The circuit locks out all extraneous frequencies except the difference frequency and also suspends delivery of an output signal to the counter until the difference frequency falls within the 10-Mcy/sec bandpass of the instrument's output filter. Thus, as the

Complete Carbon Dating System



SHARP

CDL-14

Sharp Laboratories offers the means for any scientist to date samples up to 45,000 years old with excellent precision. The CDL-14 Carbon Dating Laboratory design is based on conversion of the sample to methane which is used as the counting gas. The sample detectors are of a new type construction, and the electronics are of all solid state design. This combination will give you the best precision with the maximum reliability for C-14 gas counting.

Complete Laboratory includes

- Gas Counters
- Guard Counters
- Optimum Shielding
- All Electronics
- Sample conversion apparatus
- Training course



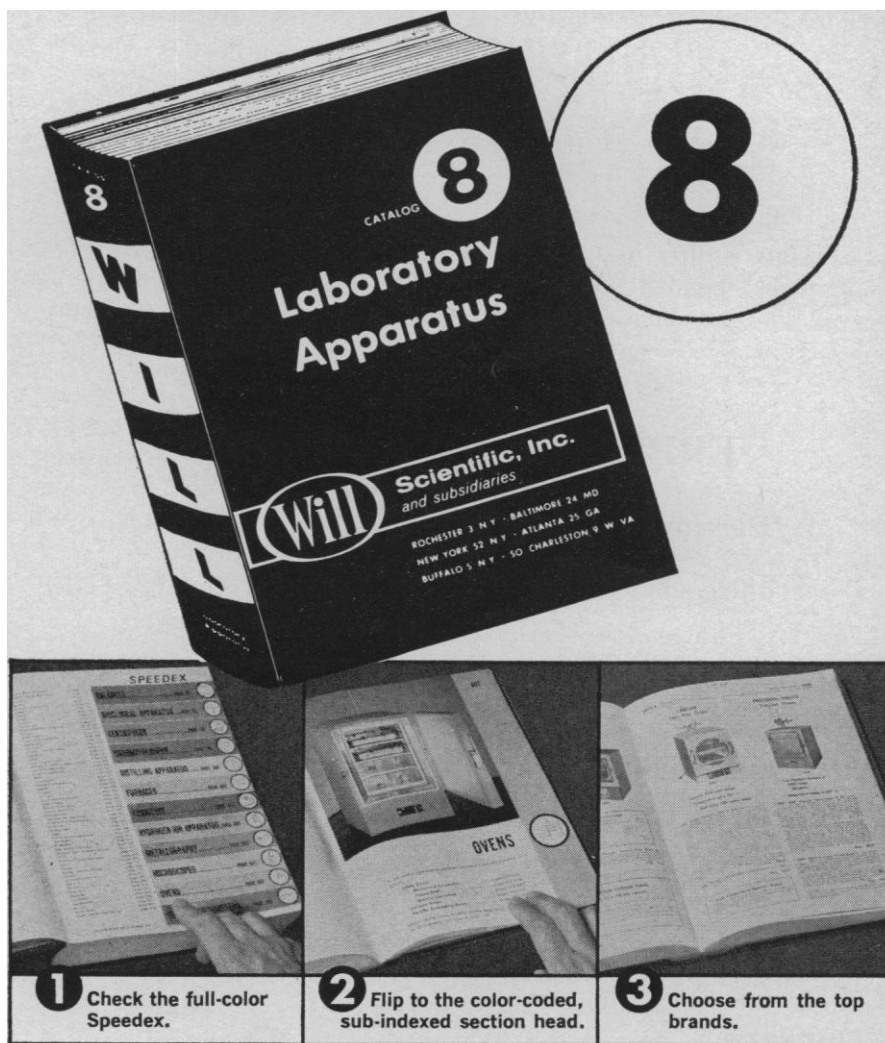
LABORATORIES, INC.
BOX 2078
LA JOLLA, CALIF.
92037

reference frequency control is rotated to successively higher settings, no count is registered until the difference frequency is small enough to be measured. The indicated value, added to the setting of the control dial, equals the frequency of the unknown signal. No fine tuning or interpolation of dial or meter readings is required. Input sensitivity is 2 mv (r.m.s.), 50-ohm impedance, and output amplitude is 2 v peak-to-peak.—J.S. (Transistor Specialties, Inc., Dept. S451, Terminal Drive, Plainview, N.Y.)

The model MR2A **microminiature relay** is a hermetically sealed unit measuring $\frac{1}{4}$ inch in diameter and $\frac{1}{2}$ inch high. Weight is 0.075 oz. Standard coil voltages available are 6, 12, 24, and 28 v d-c, with others available on special order. Power at rated voltage is 0.280 w. Contact rating is 0.5 amp and 28 v (max.) non-inductive. Operation and release times are each less than 2.5 msec. Life is stated to be 100,000 cycles at rated load. Environmental specifications include operation from -65° to $+125^{\circ}\text{C}$, vibration tolerance without opening of contacts is 20 grav at 5 to 2000 cy/sec, and shock resistance is 50 grav for 11 msec.—J.S. (Miniature Electronic Components Corp., Dept. S460, Holbrook, Mass.)

The type 9120 **precision d-c potentiometer** is a four-dial seven-digit instrument with single-window readout. Resolution is said to be 1 part in 20 million and accuracy $\pm(0.0015$ percent of reading $+0.1 \mu\text{v})$. The total measuring range, 2,099,999.9 volts, is covered without change of range setting. The instrument is designed for use as a general-purpose potentiometer of particular value when voltages requiring use of the first dial need to be compared to a fraction of a microvolt, as when comparing standard cells. The instrument consists of two potentiometers in tandem. The upper potentiometer battery current is controlled by a five-dial rheostat. Dials 1 and 2 give 20 steps of 0.1 volt and 99 steps of 0.001 volt. The lower potentiometer is supplied from a dry cell with Zener-diode control. A standardizing switch connects the galvanometer to the standardizing circuit that incorporates nine resistors of dial 1 and the total of dial 2. The same standardizing switch is used to compare the total of dial 3 with the first step of dial 2. The lower potentiometer gives 99 steps of $10 \mu\text{v}$

New...WILL CATALOG



...FIND IT FASTER!

Here's the handiest catalog you've ever used. 14,214 items, all leading brands! Full-color speed index! Color-coded major equipment sections! Alphabetical listings . . . cross-index . . . prices . . . diagrams . . . full-color illustrations . . . reference tables . . . comparison charts . . . all right at your fingertips. Will Catalog 8 is organized to save you time—to make it easier to find what you want, easier to specify, than any other catalog. See for yourself!

To apply for your free copy of Will Catalog 8, write (on your company letterhead) to Will Scientific, Inc., Dept. C, Rochester 3, New York.



Scientific, Inc.
and subsidiaries

Rochester 3, N. Y. • Baltimore 24, Md. • New York 52, N. Y.
Atlanta 25, Ga. • Buffalo 5, N. Y. • So. Charleston 9, W. Va.

See the exciting new HITACHI HU 11-A Electron Microscope!

. . . at the *AMERICAN CELL
BIOLOGIST'S Meeting, November
5th thru 7th, 1962, at the
Jack Tar Hotel, San Francisco*

The superlative performance of the new HU 11-A features a guaranteed ultra high resolution of 7 AU! Erb & Gray Scientific's trained personnel will be happy to demonstrate the simplicity, ease and excellence of handling of the new Hitachi HU 11-A Electron Microscope.

ERB & GRAY SCIENTIFIC

A Division of The Perkin-Elmer Corporation

home office: 854 S. Figueroa St., Los Angeles 17, Calif.

5927 Riverdale Ave.

New York 71, N. Y.

1103 Westgate Ave.

Oak Park, Illinois

4410 Richmond Avenue, Houston 27, Texas

The AAAS Presents Three New Symposium Volumes . . .

SCIENCES in Communist China

Editor: Sidney H. Gould. 884 pages. 23 illustrations. Author, subject and geographical index. Cloth. June, 1961.

Price: \$14.00*

\$12.00 prepaid, for AAAS members.



OCEANOGRAPHY

Editor: Mary Sears. 665 pages. May, 1961. 146 illustrations. Index. Cloth.

Price: \$14.75*

\$12.50 prepaid, for AAAS members.

GERM PLASM RESOURCES

Editor: Ralph E. Hodgson. 394 pages. 59 illustrations. Index. Cloth. April, 1961.

Price: \$9.75*

\$8.50 prepaid, for AAAS members.

* If you are not a member of the AAAS, you may join now, and order any of these volumes at the special member price. Enclose \$8.50 dues for your first year of membership, along with payment for the volumes you want.

Membership in the AAAS offers many benefits in addition to savings on AAAS volumes. It includes *Science* and the quarterly *AAAS Bulletin*.

Order Today From

AMERICAN ASSOCIATION for the ADVANCEMENT of SCIENCE

1515 Massachusetts Avenue, NW

Washington 5, D.C.

and 99 steps of 0.1 μV . Self-checking facilities are provided. All steps of dial 1 can be compared with the total of dial 2. Groups of 10 steps of dial 2 and 3 can be compared with built-in check resistors. Accessory equipment needed are a galvanometer of proper sensitivity and a stable decade resistance or another potentiometer whose absolute accuracy is not important. Galvanometer sensitivity selection keys generate less than 0.1 μV thermal e.m.f. even though they are self-wiping. The potentiometer as a unit is provided with thermal and electrostatic shielding and thermal insulation.—J.S. (Sensitive Research Instrument Corp., Dept. S461, 310 Main St., New Rochelle, N.Y.)

Portable polarographic analyzer (model 125) for direct measurement of the $p\text{O}_2$ in blood, gas, or other fluids has a range of 0 to 800 mm-Hg $p\text{O}_2$ and 0 to 100 percent O_2 with a claimed accuracy of 1 percent. The instrument is a transistorized electrometer amplifier with a sensitivity that can be conveniently varied externally, according to the size of the electrode cathode and type of membrane used. Some additional features of the instrument are its compact size (10 by 8 by 8 inches); light weight (7.5 pounds including batteries); plug-in battery pack and battery check; and a recorder output (0 to 1 mamp). For further information write for bulletin 125.—R.L.B. (Instrumentation Laboratory, Inc., Dept. S448, 108 Cummington St., Boston, Mass.)

Gage block calibrator (model GBC-1) provides calibration of gage blocks for flatness, parallelism, surface quality, and length. Standard rectangular, square, and circular gages up to 4 inches long are accommodated. Accuracy of measurement of flatness is said to be within 0.6 $\mu\text{in.}$ and of parallelism 0.5 $\mu\text{in.}$ The instrument observes both sides of the gage simultaneously without touching the gage or wringing to optical flats. Gage length is measured by comparison to within 0.6 $\mu\text{in.}$ The calibrator employs a monochromatic light source, wavelength 2.15 $\mu\text{in.}$, from which light is passed through a Kosters prism. After multiple reflection from the gage block, the recombined light rays are transmitted to a binocular eyepiece for viewing. Surface quality is judged by observation of the pattern of interference fringes.—J.S. (Texas Instruments, Inc., Dept. S462, 3609 Buffalo Speedway, Houston, Tex.)

EPIDEMIOLOGY OF MENTAL DISORDER

AAAS Symposium
Volume No. 60

Edited by Benjamin Pasamanick

A symposium organized by the American Psychiatric Association to commemorate the centennial of the birth of Emil Kraepelin; cosponsored by the American Public Health Association.

. . . pioneering interdisciplinary studies by investigators from biostatistics, genetics, obstetrics, pediatrics, psychiatry, psychology, public health and sociology.

December 1959, 306 pp., \$6.50
AAAS members' cash orders, \$5.75

English Agents: Bailey Bros. & Swinfen, Ltd.
West Central Street
London W.C.1, England

**American Association
for the Advancement of
Science**

1515 Massachusetts Ave., NW
Washington 5, D.C.

UNIVERSITY OF OTAGO DUNEDIN, NEW ZEALAND

Medical Entomologist

Applications are invited from Medical or Science graduates with experience in medical entomology for the post of Senior Research Officer.

The successful candidate will be attached to the Department of Microbiology in the Medical School and his duties will be whole-time research on arthropods of medical importance found in New Zealand and the Pacific Islands to the north.

The salary scales are: for medical graduates £N.Z.1,900—£N.Z.2,300 (x£N.Z.100, £N.Z.150, £N.Z.150); for science graduates £N.Z.1,750—£N.Z.2,000 (x£N.Z.100, £N.Z.100, £N.Z.50). The initial salary will depend on qualifications and experience.

Further particulars should be obtained from either the Secretary, Association of Universities of the British Commonwealth, Marlborough House, Pall Mall, London, S.W.1, or the undersigned with whom applications close on November 1, 1962.

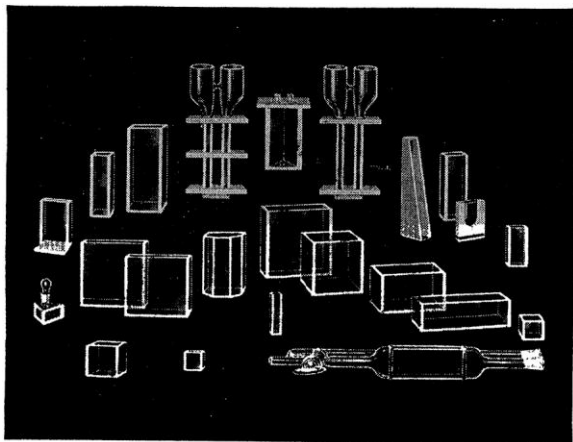
J. W. Hayward
Registrar.

DR. RENÉ DUBOS The Unseen World

A revealing introduction to microbiology. Dr. René Dubos of The Rockefeller Institute relates historical background to contemporary findings in his sprightly presentation of a teeming world influencing all of our lives. * A book for reading and giving. \$4.75

The Rockefeller Institute Press &
Oxford University Press • New York

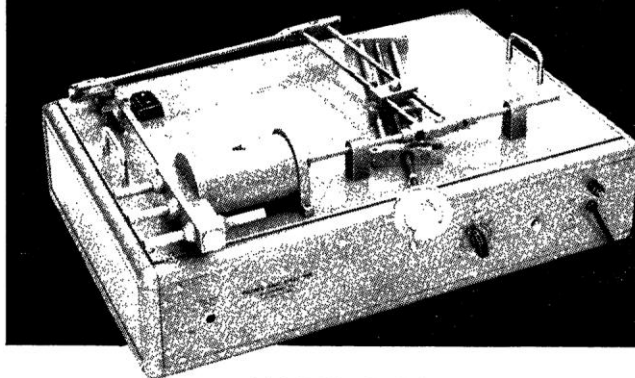
GLASS ABSORPTION CELLS made by KLETT



SCIENTIFIC APPARATUS
Klett-Summerson Photoelectric Colorimeters—
Colorimeters—Nephelometers—Fluorimeters—
Bio-Colorimeters—Comparators—Glass Stand-
ards—Klett Reagents.

Klett Manufacturing Co., Inc.
179 East 87 Street, New York, New York

NEW! REVOLUTIONARY!



MODEL R-14

ANIMAL RESPIRATOR

FEATURES

- Continuously variable rate and volume. Controls may be adjusted while respirator is operating
- Dead air space in respirator eliminated
- Valve system prevents mixing of inspired-expired air
- Volumes to 500 cc per stroke
- Replaceable cylinder assembly for small animals
- Equipped to operate a CO₂ Meter (Bulletin R-16)
- Rate—6 to 60 strokes per minute

Catalog No. 70-887

Write for Bulletin R-14

PHIPPS & BIRD, INC.



Manufacturers & Distributors of Scientific Equipment
6th & Byrd Streets — Richmond, Virginia

COMPARE

Compare walls and reinforced beads for maximum durability in lab and in washing.

Compare clear, extra-flat surfaces that provide undistorted view.

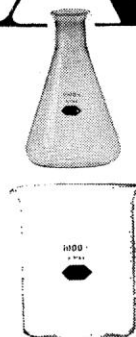
Compare color-coded bottoms and tops that make sorting easier and faster.

Exclusive indexing arrow on bottoms eliminates grease pencil markings.

KIMAX[®]

Look at a Kimax Petri Dish side-by-side with other brand Petri dishes. The differences in favor of Kimax are plain to see. Kimax Petri Dishes, Beakers, and Erlenmeyers offer you many cost-saving, time-saving advantages, yet are competitively priced, keep your glassware expenditures down.

You get more of the better things first from Kimble.



Kimble Erlenmeyer Flasks...
Thicker glass necks reduce breakage from thermal and mechanical shock, handling, and shaking.

Kimble Beakers...
Extra-reinforced beads reduce chipping; special pour-out design reduces dripping.

KIMBLE LABORATORY GLASSWARE
AN **①** PRODUCT

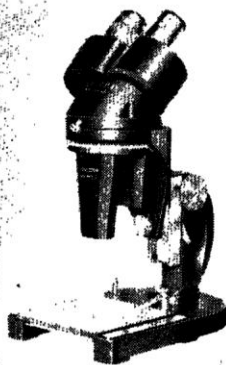
OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

NEW UNITRON stereo microscopesas low as \$110

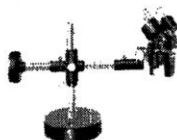
Both models offer ... sharp clear erect image • large depth of focus • wide field • long working distance • interpupillary and diopter adjustments • rack and pinion focusing • coated optics



MSL — a precision, budget priced instrument. Vertical binocular body. Choice of single magnification from 5X to 45X. Extra eyepieces for additional powers. \$19.50 per pair. **\$110**



MSHL — a versatile general purpose instrument with a wide range of magnifications. Inclined binocular body, revolving nosepiece for rapid interchange of objectives. Model MSHL-1 with objectives: 1X, 2X, 3X; eyepieces: 8X, 12X, 15X; magnification range: 8X-45X. Other magnification ranges available. **\$267**



ACCESSORY STAND — For use with binocular head and focusing mechanism of either Model MSL or MSHL. Price (stand only), \$75.

UNITRON INSTRUMENT COMPANY • MICROSCOPE SALES DIV.
66 NEEDHAM ST., NEWTON HIGHLANDS 61, MASS.

AAAS

Symposium Volume

SYSTEMS OF UNITS— NATIONAL AND INTERNATIONAL ASPECTS

Edited by Carl F. Kayan

A look at the growing problems in the conflict between international usages and our own national system of units. This volume considers them both subjectively and objectively in order to alert the technologist to the clamor, needs, and proposals to ameliorate the confusion of measurement. **\$6.75**

AAAS members discount price **\$5.75**

Order from

**AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE**
Room 103 1515 Massachusetts Ave., NW
Washington 5, D.C.

26 OCTOBER 1962

physicists and space scientists **SPACE- ORIENTED RESEARCH**

The Scientific Research Staff at Republic Aviation has immediate openings in the following areas:

SPACE RADIATIONS. Current studies encompass: solar and galactic cosmic radiations and geomagnetically trapped radiations; interaction of radiation with matter (protons, secondary neutron and gamma production, bremsstrahlung effects); space radiation shielding (physical protection of astronauts); radiation safe corridor concept; IBM-7090 space radiation shielding program; magnetic shielding; solar cell radiation damage. Requirement: Theoretical & Experimental Physicists, PhD.

SPACE SENSORS. Program of vehicle-borne sensors includes: miniature spark chamber spectrometer and other radiation detectors; infrared spectrometer; sensors for planetary atmospheres; and biological sensors. Requirement: Physicist, PhD.

SPACE SCIENCES. Research in physical sciences embraced in unmanned exploration of the moon and planets. Requirement: Space scientist, PhD.

SCIENTIFIC PAYLOADS. Research and development leading to fabrication of scientific payloads for space vehicles. Areas of scientific interest include aeronomy, energetic particles and fields, ionosphere physics and space astronomy. Requirement: Space scientist, PhD.

ADSORPTION SYSTEMS RESEARCH. Investigations include a new physical theory of adsorption (applicable to stable and radioactive gas-adsorber systems); experimental investigations of CO₂ adsorption; and studies of CO₂ adsorption systems. Requirement: Physicists or Physical Chemist, PhD.

NEW RESEARCH DEVICES. Included are: encapsulated spark chambers for laboratory and space use; pulsed high-voltage power supplies for spark chambers; thin chemically-milled Al and Mg plates for spark chambers; ultra-thin Mg foils for cross-section experiments; thin-walled Be containers for liquid hydrogen; chemically-milled thin-walled cylinders; radiation detectors and dosimeters. Requirement: Experimental Physicist.

Write in confidence to Mr. George R. Hickman,
Professional Employment Manager, Dept. 35K-3A

REPUBLIC
AVIATION CORPORATION

FARMINGDALE, LONG ISLAND, NEW YORK
An Equal Opportunity Employer

COMPARE

Compare the extra-strength neck that resists breakage in handling and in washing.

Compare the extra reinforced bead that reduces chipping.

Compare the uniform glass distribution that provides best mechanical shock resistance.

Compare the extra-large, easy-to-read size identification.

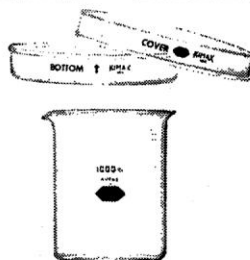
Compare the oversize marking diamond in new matte finish for easy writing, easy reading, easy erasing.

Compare the extra glass in shoulder and bottom that cuts costly breakage.

KIMAX[®]

Compare Kimax Beakers, Erlenmeyers, and Petri Dishes with other brands of scientific glassware. See for yourself why Kimax gives you extra value at competitive prices.

You get more of the better things first from Kimble.



Kimax Petri Dishes...

Markings save sorting time. Indexing arrow saves time and confusion in series dilutions.

Kimax Beakers...

Pour-outs specially designed to prevent dripping. Reinforced bead reduces edge chipping. New matte marking area is easy to mark, easy to read, easy to wipe clean.

KIMBLE LABORATORY GLASSWARE
AN **®** PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

PERSONNEL PLACEMENT

POSITIONS WANTED

Biophysical Chemist. Ph.D. 1954, 36, family. Concentration—protein structure, specificity. Excellent bibliography. Research position desired. Box 225, SCIENCE. X

Botanist. Ph.D. Anatomy, microtechnic. Science faculty fellow. Now available for university position. Experienced. Publications. D. A. Yos, Box 27, Lambertville, New Jersey. EX. 7-1463. X

Medical Biologist. Ph.D. tumor cell biology, virology, tissue culture. Experienced research, teaching, administration. Senior position. Box 223, SCIENCE. 11/2

(a) **Ph.D. Microbiologist,** microbial genetics, food microbiology, interests; prefers teaching, research. (b) **Ph.D. Biochemist** (physiology), some computer background; prefers research, teaching. (Please write for information regarding these and other scientists, senior and junior, in all fields; nationwide and very active service.) Science Division, The Medical Bureau, Inc., Burneice Larson, Chairman, 900 N. Michigan Avenue, Chicago 11, Illinois. X

POSITIONS OPEN

BIOCHEMIST

Intermediary Metabolism

Ph.D. in biochemistry or biochemical pharmacology. Experience desirable in lipids and/or blood coagulation.

Salary range \$10-12,000

Prominent ethical drug mfr.
in Metropolitan N.Y. area.

Box 220, SCIENCE

BIOCHEMIST or PHYSIOLOGIST

Ph.D. Level

For appointment as group leader cardiac and vascular metabolism section. Experience in lipid metabolism, coagulation and/or physiologic techniques desirable.

In confidence send complete resume & salary requirements to
C. K. Fetzner

SCHERING CORP

Bloomfield, New Jersey

BIOCHEMIST-PHYSIOLOGIST

An expanding midwestern pharmaceutical company has opportunity for Ph.D. biochemist-physiologist to conduct fundamental research related to atherosclerosis and/or obesity. Post-doctoral experience preferred. An equal-opportunity employer. Please send complete resume to

Technical Employment Coordinator

The Upjohn Company

Kalamazoo, Michigan

CLINICAL CHEMIST OR BIOCHEMIST

Ph.D. or M.Sc. to supervise Clinical Chemistry Division of laboratory of large general hospital. Laboratory well equipped and staffed, research encouraged. Salary dependent on qualifications.

Inquiries to A. C. Pickles, M.D., Medical Director, Regina General Hospital, Regina, Saskatchewan, Canada.

POSITIONS OPEN

POSITIONS OPEN

Histochemist / Cytologist

Physiology department requires experienced Ph.D. or equivalent for basic research in histology and histo- and cytochemistry in experimental production of disease-like conditions for basic studies on physiology of hormones and drugs.

Independent as well as collaborative

research with endocrinologists, biochemists and pharmacologists.

Liberal benefit program includes paid relocation, medical and life insurance.

Send resume and salary requirements to Employment Department

WARNER-LAMBERT RESEARCH INSTITUTE

Morris Plains, New Jersey

An Equal Opportunity Employer

THE SQUIBB INSTITUTE FOR MEDICAL RESEARCH

SQUIBB DIVISION **Olin**

offers Excellent Opportunities
in Pharmaceutical Research, to

SENIOR SCIENTISTS

Biochemist—Drug Metabolism

Strong background in Organic Chemistry for metabolic studies on new drugs and related fields.

Biochemist—Microbiologist

To study fermentation processes with special emphasis on enzyme technology as well as application of principles of genetics and biochemistry—microbial biosynthesis and characterization of microbial products.

Toxicologist

To work on toxicological problems on new drugs and related products.

Pharmacist

Expanded facilities have created senior and junior research positions in area of Tablet Formulations.

Physiologist

Good general background in mammalian physiology, preferably with special interest and experience in calcium metabolism. Training in biochemistry is desirable.

Endocrinologist

Research in reproductive physiology or inflammation. Training in biochemistry and histology is desirable.

Publication of assigned or elective research encouraged. Opportunities are excellent for advancement on both administrative and scientific ladders. Experience preferred but not essential.

All replies confidential and acknowledged. Send resume to:

Business Manager

SQUIBB INSTITUTE

FOR MEDICAL RESEARCH

New Brunswick, New Jersey

POSITIONS OPEN

BIOLOGIST

B.S. or M.S. to participate in program of chemotherapy of neoplastic and viral diseases. Strong background in either virology, tissue cell culture, or general microbiology desirable. Excellent benefits. Salary open. Equal opportunity employer. Send complete résumé to Personnel Director, **Bristol Laboratories, P.O. Box 657, Syracuse 1, New York.**

LIFE SCIENTIST, Physiologist. Nature designed man's body for grounding's life, never more than tree-top height above the earth's surface. Physicians with a specialty in physiology who are interested in analysis and experimentation in man's response to null magnetic fields, acceleration and other unusual environmental factors are invited to apply to: **J. H. Rentschler, Cornell Aeronautical Laboratory, Inc. Buffalo 21, New York.**

LITERATURE SEARCHERS

Excellent opportunities available in technical library of prominent ethical drug manufacturer for bibliographers for assignment in chemical and biological research.

Candidates should have degrees in chemistry or biology preferably with several years laboratory or literature experience. Knowledge of languages desirable; library science degree helpful.

Excellent salary & benefit programs.
In confidence please send full resume to Miss T. Bross

SCHERING CORP.

Bloomfield, New Jersey
10 miles from New York City
An Equal Opportunity Employer

NEW PRODUCT DEVELOPMENT PHARMACIST

Leading midwestern manufacturer of animal health and feed medication products has opening for a pharmacist to supervise section and perform work in connection with appropriate processes for formulation and manufacture of new products and improvement or modification of existing products. Applicants should have Ph.D. in pharmacy or pharmaceutical chemistry with 3 to 5 years' industrial experience; age 25 to 45; and have strong interest in developmental research. Reply with complete résumé to **Box 213, SCIENCE.**

PALYNOLOGIST

Palyнологist position with major oil company in large research laboratory with excellent facilities in suburban location. Experience desirable. Submit complete resume of training, experience and salary required in strict confidence to:

Box 221, SCIENCE

PUBLISHING OPPORTUNITY

Do you like to travel and make new friends? Are you tired of being chained to a desk? Do you have a college background in the biological sciences? We have an outstanding position with an excellent future for this kind of man in our expanding textbook department. Write or call **Leonard A. Batterson, The C.V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.**

ZOOLOGISTS, Ph.D.

Experience preferred. Background in general zoology, anatomy, cytology, genetics and cytogenetics. Some graduate teaching; research. Roman Catholic university. New science building. Write and include résumé to Chairman, Department of Biology,

**Villanova University
Villanova, Pa.**

POSITIONS OPEN

ANALYSTS—BIOASTRONAUTICS U.S. Government positions in Washington, D.C., for Senior Analysts in space associated sciences. Ph.D., M.D. or equivalent, training in medicine, physiology or experimental psychology, primary interest in evaluating research. Must have been a U.S. citizen for minimum 5 years and in good health. Salary to \$13,510 per annum, numerous other benefits, active training program. Send résumé to **Box #75, Suite 1200, 230 West 41 St., New York 36.**

CLINICAL BIOCHEMIST

wanted in a 500-bed general voluntary hospital with well-equipped and staffed laboratories performing most tests. Good income and opportunity for research if desired. Write giving full details about yourself to—

**Director of Pathology, The Toledo Hospital
2142 North Cove Blvd., Toledo 6, Ohio**

CLINICAL BIO-CHEMIST

Rapidly expanding biochemical development and manufacturing section requires BS in medical technology (or equivalent) with 1-3 years clinical laboratory experience to develop methods of control, manufacture and process improvement on clinical diagnostic, reagent products.

Full benefit program includes: paid relocation, tuition refund, medical & life insurance programs, etc.

Send resume stating salary required to

Employment Dept.

WARNER-CHILCOTT DIVISION

Morris Plains, N. J.

An Equal Opportunity Employer

E. LEITZ, INC., NEW YORK

Distributor of Leitz Scientific and Optical Instruments offers challenging position to Sales Engineer with background in Science and Technology. We will train you.

Submit résumé with salary requirements to: **E. Leitz, Inc., 468 Park Avenue South, New York 16, N.Y.—Attn. Mr. Keller.**

Ph.D. CLINICAL CHEMIST

Large midwestern pharmaceutical company needs man with doctorate in analytical or biochemistry to head growing clinical pathology laboratory associated with clinical investigation group. Experience in clinical laboratory procedure is necessary. Write, sending summary of experience and training to **Technical Personnel Manager, Parke, Davis & Company, Ann Arbor, Michigan.**

PROTEIN CHEMIST (Ph.D.): To collaborate in research on plasma proteins in chronic diseases. About \$9000.

NEUROCHEMIST (M.S. or equiv.):—For research on brain tissue in sphingolipidoses. About \$7000. Modern university—Affiliated Research Institute in N.Y. City area. Send résumé to **Box 219, SCIENCE.**

POSITIONS OPEN

LEA & FEBIGER, publishers in medicine and the biological sciences, are looking for personable college graduates, age 25-35, with knowledge of medical or biological sciences to fill college editorial position. Territories in East and Midwest. Liberal travel allowance and generous fringe benefits. Position includes obtaining new manuscripts, their evaluation for publication, and textbook promotion. Write full particulars, including salary expected, to **F. C. Lea, Jr., 600 S. Washington Square, Philadelphia 6, Pa.**

(a) **Ph.D. Protein Chemist**, research only, academic rank; around \$11,000; Midwest. (b) **Experimental Psychologist**, physiology, chemistry, mathematics background; central pharmaceutical house. (c) **Virologist**, Ph.D./M.S., university leukemia research; Mideast. (d) **Ph.D. Physiologist**, cardiovascular, renal or endocrinology background; research; West. (e) **Neuropharmacologist**, chemotherapy research; central pharmaceutical firm. (f) **Ph.D. Clinical Chemist**, laboratory director, Southwest; around \$14,000. (g) **Faculty Appointment: Bacteriology/Immunology**, midwestern college. (h) **B.S./M.D. Biology/Chemistry**, brain research studies; central university. Please write Science Division, **The Medical Bureau, Inc., Burnice Larson, Chairman, 900 North Michigan Avenue, Chicago 11, Illinois.** X

TWO PHYSICISTS

APPLIED PHYSICIST or MECHANICAL ENGINEER (M.S.) for research in direct conversion of gas kinetic energy into electrical energy, involving problems in thermodynamics, fluid dynamics, and electrostatics, such as supersonic expansion, viscous flow, two-phase flow, condensation, ionization, high vacuum, and high voltage systems. **EXPERIMENTAL PHYSICIST (Ph.D.)** for laboratory research with a gas dynamic facility for producing two-phase flows by condensation of vapors in expanding gas. Also research on direct conversion of gas kinetic energy into electrical energy.

Experience desirable; recent graduates considered. Research at excellent Government laboratory, Dayton, Ohio, under guidance of senior research Scientists. Computer available. Publication encouraged. Appointment: one year with opportunity for extensions or permanent position. Salary commensurate with qualifications. Send résumé in duplicate and salary requirements to:

**OHIO STATE UNIVERSITY
RESEARCH FOUNDATION
1314 Kinnear Road Columbus 12, Ohio**

The Market Place

BOOKS AND MAGAZINES

Your sets and files of scientific journals

are needed by our library and institutional customers. Please send us lists and description of periodical files you are willing to sell at high market prices. Write Dept. A3S, **CANNER'S, Inc., Boston 20, Massachusetts**

SUPPLIES AND EQUIPMENT

• HYPOPHYSECTOMIZED RATS

Shipped to all points via Air Express
For further information write
**HORMONE ASSAY LABORATORIES, Inc.
8169 South Spaulding Ave., Chicago 29, Ill.**

1919 - 1962

LaMotte Chemical

Chestertown, Maryland, U.S.A.

Specialists in

Colorimetric Techniques

Reagents-Standards-Comparators

Send for Illustrated

Controls Handbook

Dept. H

Now taking orders for:

INBRED

C3H+ C3H- AKR A C57BL C58

BALB/c DBA/2

F1 Hybrid of any of the above strains bred on request

RANDOM BRED

TIMCO SWISS MICE and YALE SWISS MICE

Contact us for information about producing your nucleus of inbred and random bred strains.

TEXAS INBRED MICE CO.

305 Alameda-Genoa Rd; R.F.D. 7, Box 1232-C
Houston 36, Texas

COMPARE

Compare the unique pour-out especially designed for dripless action.

Compare the heavy reinforcing bead that resists chipping in the lab and in washing operations.

Compare the instant size selection through extra large markings.

Compare the new matte finish on larger marking diamond; easier to mark, easier to wipe clean, easier to read.

Compare uniform wall thickness that provides greater mechanical strength.

Compare the extra glass in shoulders and bottom that cuts costly breakage.

KIMAX[®]

Stand up a Kimax Beaker, Erlenmeyer, or Petri Dish side-by-side with other laboratory glassware. See for yourself why Kimax Brand glassware gives you more value, more life.

You get more of the better things first from Kimble.



Kimax Petri Dishes...

Bottoms and covers marked for faster sorting. Index arrows speed series dilution procedures.

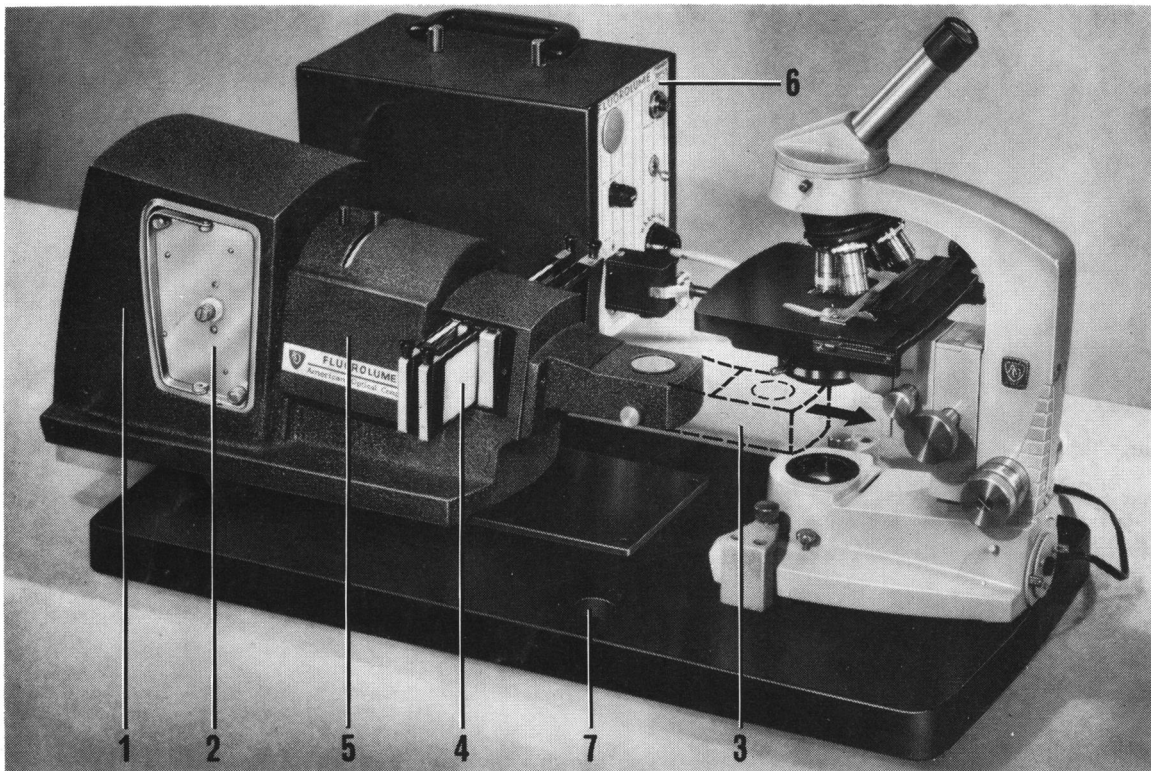
Kimax Erlenmeyer Flasks...

Uniform glass thickness protects against thermal and mechanical shock. Heavy bead protects lip against chipping.

KIMBLE LABORATORY GLASSWARE
AN **①** PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

NEW! AO Spencer Fluorolume brings unprecedented efficiency to fluorescence microscope techniques



The new AO Spencer Fluorolume is designed to meet the most exacting requirements for antibody — antigen fluorescence microscopy and add new time-saving conveniences to fluorescence microscope techniques. Only the AO Spencer Fluorolume Illuminator offers all these advantages.

1 Light-tight Housing: Completely enclosed, fan-cooled, cast-aluminum housing excludes stray light . . . assures transmission of light rich in excitation radiation.

2 Easy Lamp Adjustment and Replacement: Convenient external adjustment knobs permit unprecedented ease in centering lamp and reflector and in replacing lamp.

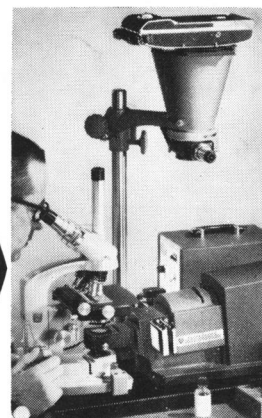
3 Instant Illumination Change: Illuminator rides on track . . . slides back to expose tungsten lamp of in-base microscope illuminator . . . returns to positive stop, in perfect alignment, for mercury arc illumination.

4 Quick Selection of Filters: Multiple sliding filter holders provide convenient selection and interchange of correct exciter filter, opal or ground glass for non-fluorescence viewing.

5 Efficient Heat Absorption: Glass cell for liquid filters . . . may also be used with water for efficient heat absorption. Also, there is alternate provision for a 3" x 3" heat absorbing glass.

6 Compact Power Supply: Toggle switch provides instant external setting for L1 or L2, 200 watt, high-pressure mercury lamp. Includes a re-start switch for quick, reliable starts while lamp is still hot.

7 Fluorescence Photomicrography: Base accepts upright post of AO Spencer Photomicrographic Camera . . . Fluorolume, microscope and camera are all combined into one compact unit.



American Optical
COMPANY
INSTRUMENT DIVISION, BUFFALO 15, NEW YORK

Dept. J4
Gentlemen:

☐ Please send information on AO Spencer Fluorolume.
☐ Please send information also on AO microscopes and photomicrographic cameras.

Name _____

Address _____

City _____ Zone _____ State _____