learn promptly of work by others that bears closely upon his own problems is increasingly insistent. The IEGs have provided such a means of rapid exchange of information among certain groups of workers with closely related interests; they also provided a forum for controversy and discussion, without the inhibiting influences that would attend formal publication. Scientists moving into new fields of research could make their activities known to others at an early stage, long before publication. All these purposes, and others, can be served by the IEG's, and by similar groups that may arise in the future.

By well-established practice many scientists circulate advance copies of manuscripts that have been accepted for publication to a limited group of colleagues who share their interests. This practice obviously serves the advancement of science, and no journal regards it as a violation of copyright if the number of copies so circulated is fairly small. Such manuscript copies may fail to reach other workers whose research might profit greatly if copies were available to them. Circulation of brief notices of current research among members of an IEG or some similar group might serve to establish communication in cases of this sort.

As editors we recognize the responsibilities of the scientific journals for speeding the process of publication and the distribution of journals after publication. We wish to maintain high standards of care, but prompt reviewing before a paper is accepted, the interval from acceptance to publication should be as short as possible. Some journals have reduced this interval to 2 months, sometimes even less, while maintaining high standards of publication; this of course requires the cooperation of authors in these respects and prompt return of proofs. We recognize the responsibility of the journals to make every effort to shorten publication time.

Distribution of published journals by air can make scientific findings available all over the world within a few days of publication, whereas air mail may take 2 months or more to reach Asia or Australia from Europe or America. The obstacles to circulation of journals by air are not technical but financial. IEG memoranda, as a result of being sent by air mail, reached investigators throughout the world almost simultaneously; this was one of the great merits of the IEG experiment. The overseas copies of some journals are already distributed by air; the editors of others are eager to follow their example, if they can solve the financial problems involved. We believe that the rather moderate costs of such rapid distribution will be far more than repaid by the resulting stimulus to the progress of science, and the strengthening of communication among the members of the worldwide scientific community. We believe that the International Scientific Unions should play an active part in promoting such rapid communication.

In summary: (i) We recognize the value of the IEG's and of similar groups that may be expected to arise in future among scientists with related interests, in promoting rapid communication of material by which the scientists themselves wish to form more such experimental groups, and to find ways of meeting the costs of operating them, such groups may well become more numerous and more varied in the future. (ii) The journals listed below will not consider manuscripts for publication if preprints, of essentially identical content, are to be distributed, in substantial numbers, by an agency independent of the author or of the publisher of the journal. (iii) We recognize that editors and publishers of scientific journals must make every effort to accelerate publication and distribution of papers.


The following members of the Commission were present at the meeting in Vienna and voted to approve these policies: J. T. Edsall (J. Biol. Chem.), J. C. Kendrew (J. Mol. Biol.), H. Neurath (Biochem.), E. C. Slater (Biochem. Biophys. Acta), W. V. Thorpe (Biochem. J.).

W. V. THORPE
Department of Physiological Chemistry, University of Birmingham, P.O. Box 363, Birmingham 15, England

Chemical and Biological Warfare: Is Propriety the Issue?

What is the issue concerning University of Pennsylvania research on Army and Air Force Chemical and Biological Warfare projects? (News and Comments, 13 Jan., p. 174). The issue is muddy in my mind. The more I ponder it, the muddier it becomes. Is the research illegal? Is it immoral? Is it unsportsmanlike? From time to time, the issue of the propriety of certain research at universities does arise, and although I find CBW and spy-related work personally distasteful, my personal tastes don't determine right or wrong. Other factors have to be considered.

In any country, the scholars and scientists (they may not be mutually exclusive) depend on the wealth of that country for support. Actually, the emergence of an urban population superstructure (innovators, scholars, scientists, military, merchants, financiers,
This is a pipette?

**This is a hundred pipettes...even more.**

This is a Warner-Chilcott AUTO SPENSER™ Pipetter. And what a welcome change from that drawerful of pipettes—all extremely fragile, all different sizes, and all slightly different from each other, even those that should be identical.

**50% FASTER.** The AUTO-SPENSER pipetter enables you to pipette and dispense at least 50% faster than you can by comparable manual methods. Not merely a diluter — although it can be used as one — the AUTO-SPENSER Pipetter is ideally suited for semi-automatic chemistries because it eliminates variations in individual pipetting techniques. Micrometer-controlled pumps draw in and deliver precise volumes over and over again. And, no visual meniscus-reading is required.

**FAST CHANGE-OVER.** You can change over to a completely new group of chemical procedures with different reagents and volumes — in only 10 seconds — by making two simple adjustments on the micrometer pumps. That means you can use the AUTO-SPENSER Pipetter for such tests as glucose, calcium, and preparation of protein-free filtrates — a hundred different tests in an afternoon.

Don’t buy pipettes — buy the AUTO-SPENSER Pipetter for semi-automatic chemistries. Price $195.

**BRIEF SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Volume Ranges</th>
<th>Reproducibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 20-250 µl</td>
<td>± 0.5 µl or ± 1% (whichever is greater)</td>
</tr>
<tr>
<td>Reagent 0.5 - 5 ml</td>
<td>± 0.005 ml or ± 0.5% (whichever is greater)</td>
</tr>
</tbody>
</table>

For more details write Warner-Chilcott Instruments Division, 200 South Garrard Blvd., Richmond, California.

WARNER-CHILCOTT INSTRUMENTS DIVISION
government) is related to the ability of the farmers and the production workers to provide a surplus and, conversely, the ability of the farmers and production workers to provide surpluses is related to the ability of the urban population superstructure to provide innovation, new developments, order, and protection.

At times, a country's military defends the country from aggression. Other times, it may aggress. But the action taken by the military may not reflect the actual intent. If we were a nation of pacifists, the entire issue would be quite clear. But then again, if we were pacifists, we very likely wouldn't be here now. Occam's razor doesn't seem to apply here. Why the protests? Do the protesters object to war; to the war in Vietnam; only to the University working on war-related projects; or to receiving the research contracts? How do we rationalize the fact that comparable scientists were mobilized very effectively on equally repugnant projects, such as the atom bomb, during World War II? Even Archimedes consulted for the military.

Somewhere in the issue at Pennsylvania, and perhaps at Michigan State too, is a broader issue that could stand some airing. We are not pacifists. We need a military. But the introduction of weapons-related projects into the University seems to be distasteful. Why?

BERNARD ALFERT

School of Business,
San Francisco State College,
San Francisco, California 94132

As a practicing forester, I use herbicides routinely in my work. They are an excellent aid in the conversion of low-quality hardwood stands to higher valued and more productive pine stands.

I am still in the age group which could be recalled to active duty in case this limited war gets worse. With this in mind, I oppose the petition signed by some of our leading scientists whose motives were humanitarian. As an ex-troop commander, I would not want to be deprived of what I know to be an excellent weapon for reducing the dangers of ambush and guerrilla warfare. Perhaps, when I am older and cannot be sent to a battle area, I will have a different opinion concerning the use of herbicides in warfare. I have not yet reached that philosophical age.

Therefore I urge the continued use of herbicides as defoliants or even against crops to reduce the food supply, as this will help to get our troops out of a
rather unfavorable situation in a difficult area of the world.

By using herbicides we ruin a very rich biological area and very definitely change the ecology. But isn't the sacrifice of this biological area preferable to the increased sacrifice of American lives, whose loss may be traced to the withholding of an effective weapon of war?

HOWARD H. HANDORF
608 Third Avenue,
Farmville, Virginia 23901

Langer implied that scientists engaged in defense research have betrayed humanity and science. I feel that we who are engaged in such research either directly, as consultants, or under grants and contracts have no cause for guilt. It is unfortunate that in all the years of human existence we have not yet learned how to synthesize plowshares from swords. Since we have not, defense research remains a legitimate and honorable career. The facts of life are as they are. No one can rationally believe that we alone are engaged in such studies. Nor if we abandon such studies, is it likely that others will follow. Whether BW or CW is ever used in warfare is really immaterial. The very possibility of their use requires any sane people to learn of their potential and of defense against them.

I wonder why BW and CW are singled out as particularly heinous. All types of weapons are horrible be they fists, stones, bullets, or nuclear bombs. Why is it more horrible to be ill (even acutely ill for a period of time) than to be mangled or dead for all time? Why is it more horrible to expose the enemy's routes of travel by defoliants than by bombing? Certainly both effectively alter the ecology of the area. Does not the destruction by bombs exceed that of defoliants? BW and CW are not alone weapons of so-called mass casualties. No war has ever been limited to the confines of the battlefield; all have been as devastating for civilians as for the warriors.

If my colleagues are a fair sample, there is probably no one in defense research who would not be happier if the wealth of nations and the efforts of its scientists were spent on Great Societies both at home and abroad. But as long as the world is as it now will abandon its defense research?

SINITY J. SILVERMAN

Watkins Acres, 1 D
Frederick, Maryland 21701

10 MARCH 1967
Philbrick...the source for things Analog

Philbrick is the top-value supplier of analog instrumentation components, software, and related accessories for modeling, measuring, manipulating...and much else. We offer the widest variety of advanced-technology analog products available...and the best in total value—which includes price, plus applications assistance, plus field service, plus stock delivery...and Philbrick's 2-year warranty. Only at Philbrick can you obtain all six of the analog product types described below.

**DISCRETE-COMponent OPERATIONAL AMPLIFIERS**
Philbrick Operational Amplifiers are, in the simplest terms, high-gain, low-drift amplifiers designed for use in stable feedback loops to provide precise, predictable operations on one or more input signals. In addition to linear applications, a wide variety of nonlinear functions and operations can be performed using them with passive nonlinear elements or with Philbrick Transconductors.

**IC OPERATIONAL AMPLIFIERS**
Philbrick MICRO-HYBRID Operational Amplifiers combine the best of two technologies—linear monolithic chip and discrete microminiature components—and offer immunity to overloads, shorts and supply-voltage stresses. They provide superior electrical performance and mounting and assembly advantages. There are no equivalents, particularly in high-reliability applications. Philbrick ISOLITHIC* Operational Amplifiers are state-of-the-art monolithic amplifiers, superior electrically and mechanically to present monolithic chip amplifiers. *Trademark.

**TRANSCONDUCTORS**
Philbrick Transconductors are plug-in analog system components for linearizing or embodying nonlinear functions. These analog network devices include natural continuous function and straight-line approximation (piecewise-linear) types. Philbrick transconductors include networks that accurately exhibit logarithmic, trigonometric, and quadratic behavior.

**REGULATED DC POWER SUPPLIES**
Philbrick power supplies are precisely regulated and are essentially noise-free. Typical regulation (including drift) is of the order of 100 PPM, noise and hum less than 1 PPM; and recovery (to within .001%) from a step-change in load is accomplished in microseconds. Philbrick power supplies are available in rack, cabinet, modular, plug-in or built-in models.

**OPERATIONAL MANIFOLDS**
Philbrick operational manifolds offer a new "breadboarding" technique. These all-in-one self-powered analog instruments virtually eliminate wiring problems; components and jumper leads plug into prewired panel jacks. Model MP (with 4 amplifiers) and Model RP (with 5 amplifiers) simplify experimentation, simulation, and instruction in the practical application of feedback techniques, and employ all-silicon solid-state operational amplifiers. Their many uses and habitats include industrial process control, physics and electronic laboratories, educational institutions, as well as in-line analog data processing.

**MODULAR ANALOG COMPUTING INSTRUMENTATION**
Philbrick equipment for the implementation of both analog and hybrid computers, simulators and analyzers includes: arbitrary function fits, universal linear operators, multiplier-dividers and manifolds. Components may be formed into systems by mounting them on Philbrick unique Q-series modular front panels, chassis, adaptors and accessories. Completely-wired modules for amplification, multiplication, and other analog operations are available individually as self-powered instruments or for integral systems use.

**TECHNICAL SUPPORT SERVICES**
For prompt, competent applications engineering advice, call Philbrick in Dedham or one of Philbrick's worldwide Engineering Representatives. Our engineers welcome opportunities to help you apply analog techniques and products in such areas as industrial and scientific instrumentation, process and quality control systems, in-line analog data processing. You are welcome to write to us for technical literature on the product categories of interest. Philbrick Researches, 25-H Allied Drive at Route 128, Dedham, Massachusetts 02026

ELECTRONIC ANALOG COMPUTING EQUIPMENT for MODELLING, MEASURING, MANIPULATING and MUCH ELSE

PHILBRICK
Visit us at IEEE March 20-23, Booth No. 3K 51-52.
Everything about our Mark I™ Liquid Scintillation Computer is there to help you cut down on your work load. To let you handle all sample types and energies, quickly and easily. To give you unmatched counting accuracy and system reliability.

Here are just some of the reasons why the Mark I has what it takes for your kind of work:

1. Exclusive, all-electronic data computer with integrated microcircuits.
2. Three separate, identical counting channels.
3. 150-sample capacity with temperature control.
4. All operating controls located on front panel within easy reach.
5. Automatic external standardization with choice of Ra²²⁶ or Ba¹³³ standard.
6. Three scalers with 0.2 μsec resolution. Crystal-controlled timer.
7. Preset time, preset count, and preset time/preset count control on all three scalers.
8. No high-voltage adjustments necessary.
9. Reproducible, positive-step discriminators and amplifier attenuators with dynamic ranges to cover any beta spectrum.
10. Individual background subtracters on each counting channel.
11. Low-count reject on each counting channel.
12. Foolproof sample-changing and index numbering.
13. Automatic counting of preselected sample groups.
14. Repeat counting for best statistical accuracy and reproducibility comparison.
15. Built-in data conversion for card punch, tape punch, electric typewriter, and Teletypewriter.
16. Wide selection of data listing sequences.
17. Continuous presentation of number of sample being counted.
18. Calibration and operating logic designed for the individual convenience of multiple users.
19. Set-up for single-, dual-, or triple-labelled samples.

Call your Nuclear-Chicago sales engineer or write to us for the complete details on the Mark I.
with the NEW Bausch & Lomb Concentration Computer

Gone are the days of involved calculations, checking tables or figuring formulas. Today, if you want to know the concentration of a solution ... read it! Just attach the new Bausch & Lomb Concentration Computer to your spectrophotometer. Most B&L Spectrophotometers attach directly, several other makes are easily adapted. Now the whole job boils down to three quick steps:

1. Set zero.
2. Calibrate to a known standard.
3. Read the unknown concentration directly.

Simple ... Fast ... Accurate!

The price is just $750 . . . making this the first and only low cost unit that automatically reads concentration directly for any solution obeying Beer's law. We'll gladly send you a descriptive brochure (33-2215) or why not let us show you? Write Bausch & Lomb, 20839 Bausch Street, Rochester, New York 14602.

P.S. Want to know about our full line of spectrophotometers? Just ask us.

BAUSCH & LOMB

“Nuclear reactions and the impulse approximation at high energies”; J. Friedes, “Nuclear physics with high-energy protons”; C. Barnes, “The role of nuclear physics in astrophysics”; H. Y. Chu, “The later stages of stellar evolution.”

Organic Photochemistry

R. Srinivasan and N. C. Yang are chairman and vice chairman, respectively.


Photonuclear Reactions

Paul F. Yergin and Stavros Iallieros are chairman and vice chairman, respectively.

Brinkmann Micro Manipulators are available in over 40 basic models. All are in stock for immediate delivery.

We offer the widest choice of calibrated mechanical drives in various sensitivities, plus numerous accessories, including optional tilting and rotating devices, dual assemblies on common baseplates, magnetic chucks, and instrument holders.

Over 40 basic models to choose from. All available for immediate delivery from stock.

BRINKMANN INSTRUMENTS
CANTIAGUE ROAD, WESTBURY, N.Y. 11590/ED 4-7500

The Amersham Cyclotron

This A.V.F. cyclotron, the first in the world designed and built solely for production of radioisotopes, is in operation at the Radiochemical Centre. It provides an ample and reliable supply of such important radionuclides as sodium-22, cobalt-57, arsenic-74, cadmium-109, zinc-65 and many others.

As primary producers of neutron-deficient isotopes, we are well placed to meet your needs.

For details of compounds and supply arrangements write to:

THE RADIOCHEMICAL CENTRE

Amersham · Buckinghamshire · England
Telephone: Little Chalfont 2701
Telex: 83141 Active Amersham
Cables: Activity Amersham Telex
Thin Films—Structure
Sensitive Properties

R. W. Hoffman and M. H. Francombe are chairman and vice chairman.


Glass

C. R. Kurkjian and F. M. Ernsberger are chairman and vice chairman.

Structure and Properties of Simple Glass-Formers


29 August. P. Dean, “Atomic vibra-
Feel like looking over 2,753 compounds today?
Most likely you will be looking for a specific radiochemical, stable isotope, or nonlabelled compound. Our new 100-page catalog is the fastest way to find it. Set in bold type the manual is completely alphabetized. That way, no prolonged searching for a desired compound. Names of isotopic compounds are printed in red for ready identification. Our new edition also lists all of our high-purity compounds (most in stock) and how much they cost. All in all, Catalog No. 3 is the most comprehensive we have ever presented. And we would like to send you a complimentary copy if you just write or call.

International Chemical & Nuclear Corporation
13332 East Amar Road, City of Industry, California 91743
Tel: 213-962-3475 Cable: ICN-CO
Leading Manufacturer in Chemicals for Research

NOW A SIMPLE, DISPOSABLE ELECTROPHORESIS SYSTEM

WITH 2 DIFFERENT APPLICATIONS:

1. HYLAND LDH ISOZYMES TEST
   for semiquantitative differentiation of lactic dehydrogenase isozymes

2. HYLAND HEMOGLOBIN ELECTROPHORESIS TEST
   for separation, differentiation, and identification of human hemoglobins

The two tests are separately packaged, each comprising an integrated, easily-set-up system for semiquantitative electrophoresis by the agar gel method. Kits contain reference controls, agar gel plates, and all necessary reagents and equipment, except for a power supply, for up to 60 determinations. A power supply which will provide a current of up to 50 mA. is available separately. Write for complete details.

HYLAND LABORATORIES
4501 Colorado Blvd., Los Angeles, Calif. 90039

Send this coupon NOW to:
HYLAND LABORATORIES
P.O. Box 39672, Los Angeles, Calif. 90039
Please send complete information on ELECTROPHORESIS SYSTEM

Name: ____________________________
Organization or Firm: ____________________________
Street: ____________________________
City: ____________________________ State: __________ Zip: __________

10 MARCH 1967

Five new technical reports from Mettler on Simultaneous TGA/DTA/DTG

1) The Influence of Experimental Variables on the Thermogravimetrie Determination of Activation Energies, H. G. Wiedemann, A. V. Tets, H. P. Vaughan


3) A New Semi-Micro Sample Holder Assembly for Simultaneous Thermogravimetric and Differential Thermal Analysis, Hans-George Wiedemann

4) Determination of Strain Energy in Muscovite by Simultaneous Measurement of Enthalpies and Weight Loss, William Lodding

5) Thermal Analysis in Corrosive Gas Atmospheres, Technical Bulletin T-103, Mettler Instrument Corporation

Mettler Instrument Corp., 20 Nassau St., Princeton, N. J.
SPECTRA® Cassegrain Objective for Pritchard Photometer

The SPECTRA CASSEGRAIN OBJECTIVE is a further refinement that permits the already wide range of the PRITCHARD PHOTOMETER to be extended to measure fields from 10 minutes to 10 seconds of arc.

Write Today for Complete Information

PHOTO METERIC RESEARCH corp.
Karl Freund, president
“Photometric Instruments for Science and Industry”
837 No. Cahuenga Blvd. • Hollywood, California 90038 • (213) 462-6673 • Cable: Spectra

Synchronous INFUSION-WITHDRAWAL

Model 600-900 offers extremely accurate (±0.1%) infusion-withdrawal of liquids at 72 separate pumping rates from 38.2 to 0.00079 ml./min. Accepts standard B-D syringes from 2 to 50 ml. Furnished with withdrawal adapters for each syringe.

ASK FOR YOUR FREE COPY OF BULLETIN 900

Proctor Academy

Lasers in Medicine and Biology

Jude R. Hayes and Myron L. Wolbarsht are co-chairmen.

DiGiBit®
solid state
programmer

designed for
schedules of
reinforcement programming

$625 is the f.o.b. price of the entirely self-contained programming unit by BRS. Allows automatic programming of six reinforcement schedules by use of single control switch. Fixed Ratio (FR) available within limits of 1 (CRF) to 63. Fixed Interval (FI) 0.1 to 63 sec. in 0.1 sec. increments and 1 to 63 sec. in 1 sec. increments. Same time limits apply to Differential Reinforcement of Low Rates (DRL), Avoidance and Escape. Combination schedule, Avoidance/Escape also available. Shock durations can be pre set in variations from 0.1 sec. to 31.0 seconds. Internal power supply provides all voltages required; input 115 V.A.C. @ 3 amps. Cat. No. M-SP 2901. Programmer can be used with any commercially available cages, manipulandum, and reinforcement devices or—you may purchase a complete set-up from BRS. Includes Model 2901 Programmer, shocker, feeder and cage, f.o.b. price $995

BRS electronics

DEPT. 505 5451 HOLLAND DRIVE BELTSVILLE, MARYLAND 20705

why pay for 10 when 1 will do the job?

Electrothermal® MULTIMANTLES SERIES MV

MULTIMANTLE makes ordinary heating mantles obsolete. No longer need you buy 10 ordinary mantles to fit a wide range of sizes... ONE MULTIMANTLE FITS THEM ALL! With the same 1-to-10 ratio, MULTIMANTLE is the answer wherever bench space is at a premium. Aluminum housed, multi-purpose, multi-range... most practical of all heating mantles... producing safe, efficient heat transfer through the unique Electrothermal flexible, knitted, conical element. Accepts vessels of different shapes (including funnels) with capacities ranging from 50 ml to 2,000 ml. Other sizes available for vessels with capacities up to 22,000 ml. Element temperatures up to 450 °C. Two or three heating circuits, one or two of which may be switched off when heating smaller vessels. Fitted with support rod brackets and rods.

$63.00 Cat. No. MV 2463 (50 ml-2000 ml)

BUILT-IN VARIABLE ENERGY CONTROL
Eliminates need for external controller

Write for full information and name of your local dealer

ELECTRO-THERMAL SALES CORP.
300 Northern Boulevard, Great Neck, N.Y. 11021 • Phone 516-466-8218
When you place an experiment in a Blickman Vacuum and Controlled Atmosphere Complex, you can be positive of proper vacuum or inert atmosphere readings. That goes for R&D in biological sciences, nuclear projects, metallurgy or any other research that deals with exotic or dangerous materials.

High integrity Blickman Vacuum and Controlled Atmosphere systems help speed the work, maintain valid results and protect against hazards.

Brookhaven National Laboratories uses the illustrated unit for inert atmosphere welding. In it, scientists do experimental welding of rare metals or investigate reactor fuel elements.

The question is what do you want to accomplish? With years of design work and hundreds of these systems behind us, Blickman has a huge engineering library. You concentrate on designing the system, not the "nuts and bolts."

Your system? The coupon brings you details.

S. BLICKMAN, INC.
6903 Gregory Ave., Weehawken, N. J.
☐ Please send book on safety enclosures
☐ Also send catalog on laboratory furniture

NAME__________________________
TITLE__________________________
COMPANY_______________________
ADDRESS_______________________
CITY___________________________
STATE_________________________
ZIP___________________________

SEE US AT BIOLOGY SHOW IN APRIL

---

Scientific safety deposit box

Lipid Metabolism

Konrad E. Bloch and DeWitt S. Goodman are chairman and vice chairman, respectively.


Lysosomes

Christian de Duve is chairman.

Biochemical and Structural Aspects of Self-Degradative Processes in Cells


RESEARCH GRADE
PHOSPHORIC ACID-P³²
NEX-054

0-1 mc-$15
2 mc-17
5 mc-22
10 mc-$30
15 mc-38
20 mc-45

Carrier free in 0.02N HCl. Polyphosphates and heavy metal phosphates < 0.05% as verified by paper chromatography. Write for specifications and 1967 Radionuclide brochure.

High intensity, infrared...

spot heater

Here's clean, quick, precisely controllable heat for small parts. A high-intensity, iodine-cycle lamp with 5400° F tungsten filament provides energy that is concentrated by an elliptical reflector on one very small spot. Heating rate and maximum temperature depend on absorptivity of the part heated. Reflector has provisions for air cooling.

APPLICATIONS: Soldering, glass-metal sealing, stress relieving, igniting, decoating.

R-I CONTROLS
A DIVISION OF RESEARCH, INCORPORATED
BOX 6164H MINNEAPOLIS, MINN. 55424

EXTRA POWER
for paper and thin-layer Chromatography

- Better definition
- Brighter contrast
- Faster identification
- Less eye-strain

Paper chromatogram under ordinary ultraviolet illumination

The transilluminator can be used alone or in conjunction with any Chromato-Vue cabinet. For further information, write:

ULTRA-VIOLET PRODUCTS, INC.
5114 Walnut Grove Avenue
San Gabriel, Calif. 91778

MINERALIGHT® PEN-RAY® BLAK-RAY® CHROMATO-VUE®

NO YOU CAN'T BUY STRIPED PROPIPETTES

BUT YOU CAN CHOOSE FROM 4 COLORS...
YELLOW/RED/BLUE/GREEN
as well as BLACK

$7.60 each

Available from your local supply house or contact:
INSTRUMENTATION ASSOCIATES, INC.
17 West 60th St. New York, N.Y. 10023 (212) 5-0840

Demand the original i/a Propipette — Proven by thousands of users
membrane"; Z. A. Cohn, "Turnover of lysosomal hydrolases"; Th. Peters, "Turnover of catalase and serum albumin."


6 July. Involution and related processes: J. F. Woessner, "Lysosomes in uterine involution and tissue resorption"; R. Lockshin, "Degradative processes in insect metamorphosis"; M. Farquhar, "Disposal of secretory products by lysosomes"; (Speaker and subject to be announced).


Biomathematics

G. D. McCann and John H. Milsum are chairman and vice chairman, respectively.

10 July. Population dynamics (Herbert Landahl, chairman): Richard Lewontin, "Simulation of population genetics"; Prof. Kojiva, "Mathematical models of natural selection." (Speaker and subject to be announced; summary and discussions by chairman and speakers.


Atomic absorption equipment doesn't have to cost as much as a Rolls. Evans Model 140 performance proves it at $2975.

Evans Model 140 Atomic Absorption Spectrophotometer, available from Fisher Scientific, performs outstandingly for most laboratory needs, yet it's surprisingly economical. Model 140 makes routine trace metal determinations fast and accurately.

Industrial analysts use Model 140 to determine various metals in alloys, plating baths, petroleum products, fertilizers and other products. Clinical chemists use it for determining calcium, magnesium, potassium and other metals in serum. Biochemists find it speeds determinations of metals in plant and animal tissues.

Model 140 is space-saving, self-contained and easy to operate. Quick-change, self-aligning, hollow cathode tubes provide the characteristic metal spectrum. For convenience in determining high metal concentrations, there is a rotatable burner. The 8.4-inch readout scale is calibrated directly in absorbance from 0 to 1. No need to convert % absorption to absorbance. That's a real time-saver.

The full line of accessories for Model 140 includes: nitrous oxide burner, lamp conditioner, atomic absorption standards and a methods manual. Of course, technical help and service are always nearby at one of our 15 Fisher branches. Send for our bulletins 14-380 and 14-380-5 on Model 140, the atomic absorption spectrophotometer that fits your needs and your budget. Fisher Scientific Company, 1395 Fisher Building, Pittsburgh, Pennsylvania 15219.

FISHER SCIENTIFIC CO.

Instruments, Apparatus, Furniture and Chemicals for Laboratories

Complete stocks in all these locations: Atlanta • Boston • Chicago • Cleveland • Houston • New York • Philadelphia • Pittsburgh • St. Louis • Union, N. J. • Washington • Edmonton • Montreal • Toronto • Vancouver

10 MARCH 1967
At last...
Actually Visible

For the first time, the hexagonal structure of graphite has been seen, with the Siemens Elmiskop. A 6-sided carbon cell of 5 Å diameter, made up of 3 carbon crystal cells, or only 10 atoms, was photographed by R. D. Heidenreich of Bell Telephone Laboratories in New York and H. Fernandez Moran of the University of Chicago. Although this form of carbon is well known by x-ray and electron diffraction, this is indeed the first time that the structure had been actually visible. The visibility of the hexagonal cells, using axial illumination, indicates that a point to point resolution of 2 Å can be obtained with the Elmiskop I A, due to its short objective focal length of 2.2 mm. Another example of Siemens performance.

Chemistry and Metallurgy of Semiconductors

Raymond C. Sangster and J. W. Faust, Jr., are chairman and vice chairman, respectively.


Chemistry and Physics of Paper

Vivian T. Stannett and Bengt Rånby are chairman and vice chairman, respectively.


July. A. J. Stamm, "Water-cellu-
If your measurement problem is caused by unrelated activity

SIGNAL AVERAGING CAN BE THE ANSWER

The Computer of Average Transients has solved hundreds of measurement problems where repetitive signals are masked by unrelated background activity. As the CAT® sums repeated events, random activity tends to average out, essentially isolating the signal of interest. The result: better signal definition and improved sensitivity.

CAT computers are now operating on-line in such fields as spectroscopy, seismology, nuclear physics, electronics, neurology, ophthalmology and electrocardiography. And our new CAT 1000 offers an even broader range of averaging capabilities: better resolution, larger memory capacity, wider frequency response and greater input and readout flexibility.

In the five years since we introduced the first practical signal averaging computer, TMC has specialized in solving difficult measuring problems. For complete details about how the CAT can help solve your problem, write to: Technical Measurement Corporation, 441 Washington Avenue, North Haven, Connecticut 06473.

* Data courtesy of E. H. Hon, M.D., S. T. Lee, M.D.

TMC
TECHNICAL MEASUREMENT CORPORATION

---

MAIL ORDER INDUSTRIAL MART
UNUSUAL VALUES

Products available by mail, Money-back guarantee. Order by Number. Send check, m.o. or open account to rated firms. $10.00 minimum order.

NEW... TRANSPARENT CRYSTAL MODELS
Set of 15 Basic Symmetries with Built-in Crystallographical axes. For lab study, exhibition, demonstration. Colored threads built into each precision-made hollow plastic model, show position of all axes. Easily marked with china pencil. Cube measures 1.4" others vary. See left in proportion. Packed in poly bag separately in commercial wooden case. $44.00 ppd. Order #76.831W. Edmund Scientific Co., Barrington, New Jersey 08007.

LOW-COST 5X MICROSCOPE

DUPONT PLASTIC LIGHT GUIDE KIT
Experiment with amazing new plastic fiber optic light guides. 1001 puts for mfrs., experimenters, hobbyists. Use for exciting new projects and products. Guides transmit light same as wire conducts electricity. Use to illuminate remote areas, multiple locations from single source, confine light to small areas, conduct sensing and control systems. Includes 2 guides, source, lens, connector, $10.00 ppd. Order No. 76.835W. Edmund Scientific Co., Barrington, New Jersey 08007.

NEW THERMOELECTRIC COOLING SYSTEM
Complete, solid state unit. Amazingly versatile. Exceetnt for experimental use in industry, universities, research labs! Simple to operate. No fluid leaks. At 59°F ambient temp., unit pumps up 72°F/hr. yet keeps transfer far at 24°F—can be locked to 1°F. Save thousands of dollars in producing prototypes, prototypes, models. Ideal at space centers, hospitals, industrial equipment. Wt. 8 lbs. Full line. 49 pages. Order #81.831W. Edmund Scientific Co., Barrington, New Jersey 08007.

SCIENCE TREASURE CHESTS
Hundreds of thrilling experiments plus a Ten Lens Kit to make telescopes, microscopes, etc. Include: extra powerful magnifiers, 10x-200x fiber, compass, one-way mirror film, diffraction grating, many others. $45.50 ppd. Order block #76.424W Deluxe Chest: Above plus crystal-gated, electric motor, 10-lb. set and lots more. $156.50 ppd. Order block #76.522W Edmund Scientific Co., Barrington, New Jersey 08007.

GIANT FREE CATALOG
Creating a 'temperature plateau' to calibrate temperature transducers

The L&N 8411 Fixed Temperature Standard consists of a vertical electric furnace and a cell containing a pure metal sample. It's virtually infallible in providing a known, fixed-reference temperature (such as the zinc-point) for calibrating resistance thermometers or thermocouples. Here's why.

The sample-any of seven metals whose freezing points are used to define the International Practical Temperature Scale-surrounds a Pyrex thermometer well, within the cell. Furnace temperature is raised to a point above the melting point of the sample, then power is reduced. When sample temperature drops to the point of equilibrium between solid and liquid states (freezing point), the design of the 8411 helps hold this temperature constant on a "plateau" for an extended period (up to six hours).

Precise and uniform temperature is assured, since metal samples employed are better than 99.999% pure. Furthermore, the cell is designed to permit the element under test to be immersed in the well to a depth of 18 inches, providing maximum support for the glass tubes of platinum resistance thermometers and assuring adequate heat retention at the thermometer. Cells are interchangeable, so a single furnace can provide any or all of the seven freezing points.

Interested? For further details, contact your nearby L&N Field Office, or write us at 4926 Stenton Avenue, Philadelphia, Pa. 19144.

Chemistry and Physics of Liquids

Marshall Fixman and Cornelius J. Pings are chairman and vice chairman, respectively.


Crystal Inn

Environmental Sciences: Air

E. R. Hendrickson and Walter J. Weber, Jr., are chairman and vice chairman, respectively.

Oxides of Nitrogen

3-7 July. (Speakers to be announced.) "Theory of production, sources, original forms, and control of NO\(_x\) emissions (stationary and mobile)";

Ainsworth

Recording Balances

for weighing in controlled environment

This new catalog gives you complete information and specifications on the full Ainsworth line of recording balances. Use these balances to measure weight change as a function of time in extreme heat or cryogenic cold, in vacuum or pressure, in reactive or inert gas, in magnetic fields or other hostile environments.

Ainsworth

Wm. Ainsworth & Sons, Inc., 2151 Lawrence Street
Denver, Colorado 80206
A701

Gentlemen: Please send me complete information on the Ainsworth line of recording balances.

NAME

TITLE

(For convenience, attach coupon to your letterhead)
“Identification and measurement of atmospheric and source concentrations”; “Oxidation and photochemical reactions of NOx in the atmosphere (omit meteorological aspects at this time)”; “Meteorological aspects of the problem, especially dispersion from mobile sources and the meteorological factors related to the photochemistry”; “Health and other biological effects of various oxides of nitrogen and important nitrogenous reaction products”; “Socio-economic effects (including materials damage and visibility interference) resulting from NOx emissions”; “Development of air quality criteria”; “Specific research needs.” Summary.

Chemistry and Physics of Isotopes

Max Wolfsberg and A. J. Kresge are chairman and vice chairman, respectively.

10–14 July. Condensed phase isotope effects (A. Van Hook, chairman); Physical chemistry of isotopes (W. Spindel, chairman); Kinetic isotope effects in “Non-Boltzmann” systems (F. S. Rowland, chairman); Stable isotope geochemistry (J. R. O’Neil, chairman); Heavy atom isotope effects (A. Fry, chairman); Isotope effects and nature of transition states (A. N. Bourns, chairman); Hydrogen isotope effects in hydrogen (proton) transfer (F. A. Long, chairman); Secondary hydrogen isotope effects (S. Seltzer, chairman); Contributed papers.

Molecular Pathology

Wilbur A. Thomas and Earl P. Benditt are chairman and vice chairman, respectively.


"DIAL" ULTRA-THIN SECTIONS?
Precisely... since the new Reichert "Om U2" ultramicrotome is automated. Now you just dial for single or continuous ultra-thin sections for electron microscopy. With all controls dial or push-button operated, you merely "select" speed, sequence and thickness of sections. The completely inertia-free thermal advance of the "Om U2" represents a major breakthrough in ultramicrotomy.

The "Om U2" gives you the accuracy of the thermal advance and the advantages of a precision, mechanical advance in one instrument. The tedious task of producing useful ultra-thin sections is now a thing of the past.

Request literature and a free demonstration.

William J. Hacker & Co., Inc.
Box 646
W. Caldwell, N.J. 07006
(201) 226-8450

SPORES•FERNS•MICROSCOPIC
ILLUSIONS ANALYZED, VOL. 1
C. S. HIRES
580 pages, approx. 1150 illustrations, 14 color.
Word and name indices.
Simpler more accurate terms.

Exceptional fern photos, enlarged fertile areas, cell structure, glands and projections.

Basic concepts of 3-D spore and tetrad structure. Line drawings of wall arrangements at all angles and focal levels, organized for easy reference. Fine detail.

MISTAIRE LABORATORIES
152 GLEN AVENUE
MILLBURN, N.J. 07041

Dynamics of Quantum Solids and Liquids
Pierre C. Hohenberg and John Wheatley are chairman and vice chairman, respectively.

Medicinal Chemistry

Armin G. Wilson and Murray Weiner are chairman and vice chairman, respectively.

Plasma Physics

Abraham Bers and Norman Rostoker are chairman and vice chairman, respectively.

Instabilities and Turbulence in Plasmas


Laser Interaction with Matter

Alexander J. Glass and Abraham Herzberger are co-chairmen.


FORTHCOMING PUBLICATIONS

COMPUTERS AND BIOMEDICAL RESEARCH: An International Journal
Editor-in-chief: Homer R. Warner
A new journal devoted to informing the biomedical investigator of original research involving the use of computers in biomedicine.
Volume 1, 1967 (Bimonthly) $22.00
Plus $2.00 postage outside U.S.A.

IN TEN VOLUMES . . .

PHYSICAL CHEMISTRY: An Advanced Treatise
edited by H. Eyring, D. Henderson and W. Jost
VOLUME 2: STATISTICAL MECHANICS
edited by Henry Eyring
March 1967, 561 pp., $17.50, $14.88*

IN FOUR VOLUMES . . .

METABOLIC PATHWAYS, 3RD EDITION
edited by David M. Greenberg
VOLUME 1: ENERGETICS, TRICARBOXYLIC ACID CYCLE, AND CARBOHYDRATES
In preparation
VOLUME 2: LIPIDS, STEROIDS AND CAROTENOIDS
In preparation

NUCLEIC ACIDS
edited by Lawrence Grossman and kvie Moldave
Presents the broad spectrum of nucleic acids in which technique detection, isolation, and involvement are described in detail.
In preparation

THE VITAMINS, 2ND EDITION—
Chemistry, Physiology, Pathology, Methods
edited by W. H. Sebrell, Jr., and Robert S. Harris
April 1967, 570 pp., $25.00

METHODS IN CANCER RESEARCH
edited by HARRIS BUSCH
VOLUME 1
The first in a series that will provide an authoritative review of available methods for the analysis of biological, morphological, biochemical, therapeutic, and oncogenic phases of cancer research.
April 1967, about 775 pp., $28.00, $23.80*

VIRAL AND RICKETTSIAL DISEASES OF ANIMALS
edited by A. O. Betts and C. J. York
A comprehensive account of viral and rickettsial infections of domestic animals. Volume 1 deals with the general characteristics of viruses and viral diseases.
Volume 1: July 1967, in preparation

THE MOLECULAR BIOLOGY OF VIRUSES
edited by John S. Colter and William Paranchych
June 1967, in preparation

ADVANCES IN HIGH TEMPERATURE CHEMISTRY, VOL. 1
edited by LeRoy Eyring
October 1967, in preparation

PROGRESS IN THEORETICAL BIOLOGY, VOL. 1
edited by Fred M. Snell
June 1967, about 250 pp., aprox. $9.50
* Subscription price valid on orders for the complete set received before publication of the last volume.

10 MARCH 1967
CHEMICAL PROCESSING AT
ULTRASONIC HIGH FREQUENCY

with the new series of 800 kc MULTISONS® Generators

MODEL 250 FF
RF power output: 125 watts Submersible transducer output: 80 watts Temperature range: up to 212°F
Price: $870.00

MODEL 125 FF
RF power output: 30 watts Submersible transducer output: 18 watts Temperature range: up to 212°F
Price: $495.00

Special transducers available for irradiation in corrosive liquids.

APPLICATIONS
Cell destruction, selective extraction, accelerated dissolution, particles dispersion, sterilization, oxidations, hydrogenation, hydrocarbons decomposition, polymerization, depolymerization, catalysts activation, microscop aerosolization, flame spectro-photometry.

MACROSONICS CORPORATION
1001 Roosevelt Avenue
Carteret, New Jersey
Phone 201-541-4131

Forthcoming Events

March
23-25. Institute of Mathematical Statistics, central regional mtg., Columbus, Ohio. (G. E. Nicholson, Jr., Dept. of Statistics, Univ. of North Carolina, Chapel Hill 27515)
23-25. Underwater Archaeology, 3rd conf., Miami, Fla. (S. Schnier, News Bureau, Univ. of Miami, Coral Gables, Fla. 33124)
26-30. Association of American Geographers, 63rd annual mtg., St. Louis, Mo. (Executive Officer, 1146 16th St., NW, Washington, D.C. 20036)
27-30. Canadian Inst. of Mining and Metallurgy, 69th annual mtg., Ottawa, Ont., Canada. (Secretary, 121 Richmond St. W., Toronto 1, Ont.)

April
1-5. American Soc. of Planning Officials, natl. planning conf., Houston, Tex. (The Society, 1311 60 E St., Chicago, Ill. 60667)
1-5. American Concrete Inst., intern. symp., concrete bridge design, Toronto, Ont., Canada. (Shu-blIeung Li, South Dakota School of Mines and Technology, Rapid City 57701)
2-6. American Assoc. of Cereal Chem-

3-DIRECTIONAL HIGH RESOLUTION PRIOR MICRO-MANIPULATORS

Offering resolutions of 0.0001" in the vertical plane and 0.004" in the two horizontal planes, the Micro-manipulator has both coarse and vernier controls in all directions. Available accessories include Ball & Socket Joints and Adjustable Needle Holders.

Right or left hand unit complete with 3-D tool holder $175
With magnetic base and ON-OFF slide switch $200
Tilt Movement Unit, complete with 3-D tool holder $200
Tilt Movement Unit, complete with 3-D tool holder and magnetic base $225

Eric Sobotka Company, Inc.
110 Finn Ct., Farmingdale, N.Y. 11735 (516) 293-9272

Science, Vol. 155

1320
ists, Los Angeles, Calif. (AACC, 1955 University Ave., St. Paul, Minn. 55104)


2-8. European Soc. of Radiology, 1st congr., Barcelona, Spain. (Prof. Fros, Hospital Civil, Strasbourg, France)

2-8. International Symp. on Tropical Root Crops, St. Augustine, Trinidad. (Symp. Secretary, Dept. of Agriculture and Crop Production, Univ. of West Indies, Trinidad)

2-8. Latin Federation of Medical Electro-Radiological Soc., Barcelona, Spain. (F. Manchon, Aragon 290, Barcelona 9)


3-4. Rubber and Plastics Industry, 18th technical conf., Akron, Ohio. (Office of Technical Activities Board, 345 E. 47 St., New York 10017)

3-5. American Acad. of Pediatrics, spring session, San Francisco, Calif. (E. H. Christophas, Executive Secretary, 1801 Hinman Ave., Evanston, Ill. 60204)

3-5. American Hospital Assoc., Boston, Mass. (E. J. Lanigan, 840 N. Lake Shore Dr., Chicago, Ill. 60611)


3-5. European Soc. of Experimental Surgery, Louvain, Belgium. (J. J. Haxhe, c/o Laboratoire de Chirurgie Experimentale, Univ. de Louvain, 69, rue de Bruxelles, Louvain)


3-7. Nonlinear Function Analysis and Computation Methods, Atlanta, Ga. (Director, Dept. of Continuing Education, Georgia Inst. of Technology, Atlanta)


---

**Progress in Biological Research with Microprobe Analysis**

![Micrographs of biological samples](image)

An ARL **ELECTRON MICROPROBE X-RAY ANALYZER** provides scanning electronmicrographs of the type shown above. The specimens are large blood cells of a salamander, the amphiuma, which is only incidental to our story.

The important features of the micrographs are:

1. Compared to optical micrographs at similar magnifications, the depth of focus is practically infinite.

2. Multielement in situ chemical analysis can be carried out within the detail of the cell structure shown—down to volumes in the order of several cubic microns. The microprobe is capable of differentiating the nucleus from the cytoplasm, or one part of the nucleus from another part, on the basis of chemical composition.

The microprobe provides the next step to further progress in Biochemistry. Applications work carried out to date includes studies related to:

- **Cytchemistry**
- **Histochemistry**
- **Physicochemistry**
- **Chemical pathology**
- **Dental chemistry**

*We will be happy to provide additional information.*

---

**APPLIED RESEARCH LABORATORIES, INC.**

**SUBSIDIARY OF BAUSCH & LOMB**

3717 PARK PLACE, GLENDALE, CALIFORNIA 91208

10 MARCH 1967
Self-sticking labels provide space for identification and ownership plus a red dot to insure correct placement of the slide in projector. Pressure-sensitive adhesive requires no moistening and stick permanently to any surface. Labels may be used on photographs, lantern slides, 2” x 2” mounts, or negatives. May be imprinted. Write for complete information and samples.

**Calorex:**
the absurdly simple heat exchanger

**But safe:** Explosion-proof, doesn’t use electricity.

**But versatile:** Flexible, flat-sided tubing and so can be easily wrapped around any contour of any size (flasks, distillation columns, piping, centrifuges, tanks, tubes, drums, etc., etc.).

**But utilitarian:** Multiple uses in laboratory, pilot plant, production.

**But temperature-tolerant:** Several materials permit wide temperature range for heating or cooling: -75° to +480°F.

**But option-providing:** Three diameters (8, 15 and 30mm.), various lengths (25, 50 and 100 feet).

**But communicative:** As our 16-page brochure demonstrates.

For the Calorex brochure, prices and distributors, request file 118S

Thermoflex, Inc., 128 W. 59th St., New York 10019 • (212)-582-5462
**CONTINUOUS PROFILING OF DENSITY GRADIENT ZONES**

ISCO density gradient fractionation apparatus will force a sucrose or other gradient out the top of the centrifuge tube and through a UV monitor to record UV absorption throughout the density gradient. Microgram quantities of nucleic protein in concentrations as small as 1 microgram per milliliter can easily be detected.

Quantitative analysis with ISCO fractionation equipment is easily accomplished since the area under the UV peaks on the recorder chart is directly proportional to the total mass of material in the corresponding zone.

For complete information, send for brochure DG27C.

**INSTRUMENTATION SPECIALTIES COMPANY, INC.**

5624 SEWARD AVE. • LINCOLN, NEBRASKA 68507, U.S.A. • PHONE (402) 434-8265 • CABLE: ISCOLAB LINCOLN

---

**KEEP UP TO DATE WITH PERCIVAL SRE-30**

An ideal teaching or research unit — Percival E-30 Environator stacked on an R-30 Refrigerator. Refrigerator maintains temperature of 40° F. Environator’s temperature ranges from 40° F. to 110° F. ± 2° F. with light intensities from 200 to 2000 F.C. — temperature and light cycled by separate time clocks. Over-all size 30” x 26” x 72”. Also available with freezer base.

Write for details on Percival’s complete line.

**PERCIVAL REFRIGERATION & MFG. CO.**

1442 WALNUT ST., DES MOINES, IOWA 50307

---

**Arterenone**

**HCl**

**Diethyl**

**Oxalpropionate**

**Michler’s Hydrol**

**Michler’s Ketone**

*Now Available From*

**Winthrop**

Special Chemicals Department

90 Park Ave., New York, N.Y. 10016

Phone: 212 972 2632

---

**CONTINUOUS PROFILING OF DENSITY GRADIENT ZONES**

*INO**
Lambertsen:
UNDERWATER PHYSIOLOGY

"The recent manned operations in the open sea, highly important in their own right, are exploiting the basic physiological findings of the past fifty years. However, the lack of basic information concerning a means for improving decompression from great depths, the effects of gases at extreme pressures, and the effects of interactions of multiple environmental conditions differing radically from those on the surface of the earth, will present serious limitations to the great opportunity for further practical application of human engineering skills. The Symposium was designed to encourage the reporting of progress in critical areas of underwater physiology. These proceedings are a documentation of the papers presented as well as the discussion resulting from these papers. It consists of detailed and searching studies of man, animals, tissues and cells, with emphasis upon research required to enable further extension of the maximum diving depth and its duration."—From the Foreword

Proceedings of the Third Symposium on Underwater Physiology, Sponsored by the Committee on Undersea Warfare of the National Academy of Sciences—National Research Council.

Edited by C. J. Lambertsen, M.D., Professor of Pharmacology, Department of Pharmacology, School of Medicine, University of Pennsylvania.

1967 approx. 350 pp. 185 figs. $17.00

THE WILLIAMS & WILKINS CO.
428 EAST PRESTON STREET, BALTIMORE, MD. 21202

Hardy, Mineral Resources Section, State Geological Survey, Lawrence

6-7. Society for Biological Rhythm, 9th intern. conf., Wiesbaden, West Germany. (W. Menzel, Amalie-Sieverking-Krankenhaus, Farmesener Landstrasse 73, Hamburg-Volkdsdorf, West Germany)

6-9. Germfree Life Research, intern. conf., Nagoya, Japan. (M. Miyakawa, Dept. of Pathology, Nagoya Univ. School of Medicine, Showa-ku, Nagoya)


7-9. American Soc. of Internal Medicine, annual, San Francisco, Calif. (A. V. Whitehall, 3410 Geary Blvd., San Francisco 94118)

8. New Mexico Acad. of Science, Socorro. (E. L. Cleveland, New Mexico State Univ., Las Cruces 88001)

8-9. Arizona Chest Disease Symp., Tucson. (L. D. Hudson, Arizona Chest Disease Symp., P.O. Box 6067, Tucson 85716)


9-15. Cryogenic Engineering, intern. conf., Kyoto, Japan. (K. Oshima, Dept. of Nuclear Engineering, Univ. of Tokyo, Bunkyo-Ku, Tokyo, Japan)

9-16. Inter-American Inst. of Agricultural Sciences, mtg., Rio de Janeiro, Brazil. (The Institute, Apt. 4359, San Jose, Costa Rica)


10-12. Methods and Techniques for Hospital Volunteers, American Hospital Assoc., Pittsburgh, Pa. (E. J. Lanigan, 840 N. Lake Shore Dr., Chicago, Ill. 60611)


10-12. European Federation of International College of Surgeons, congr., Barcelona, Spain. (Secretary, Intern. Congr., 1516 Lake Shore Dr., Chicago, Ill. 60610)

10-12. Great Lakes Research, 10th conf., and Intern. Assoc. for Great Lakes Research, 1st mtg., Toronto, Ont., Canada. (Mrs. J. S. Seddon, Great Lakes Inst. of Univ. of Toronto, Toronto 5)


10-14. American College of Physicians,
SCHOTT Absorption Type
Colored Optical Filter Glass

UV Visible IR
250nm-3000nm
100 types available in any size, shape and thickness.
Processed in our New Rochelle Optical Shop.
Standard stock types: Price $6.50 ea. 2 x 2” x 1” to 3mm.
Ask for Bulletin CF-417

SCHOTT Narrow-Band Transmitting
Interference Filters

For spectral region from 310 to 2000nm with transmission up to
60%. Half-band width down to 10nm, depending on filter type. Available as: line, line double, band, band double, wedge (VERIL), broad band and spectral band filters. Ask for Bulletin 3701-E.

UV-R-250 REFLECTING-TYPE FILTER
in the ultraviolet region peaked at 250, 280, and 310 nm, transmitted as high as 92%. While this filter works on a reflecting principle, by dual reflection, it results in an in-line transmitter in the ultraviolet, completely free from radiation of longer wavelengths.
Ask for Bulletin 3700-E

U.S. Importers and Distributors of Schott Glass for over 40 years.
FISH-SCHURMAN CORPORATION
74 Portman Road, New Rochelle, N. Y. 10802

Fish-Schurman

Face to face with excellence.

Bell-stir puts an end to magnetic stirrer problems. Precise r.p.m. control. Cool running hour after hour, day after day. Where the slightest variable can affect the results of an investigation, only Bell-stir will do. In six models. May we give you a face-to-face demonstration? Just call or write today.

Bellco GLASS INC.
Dept. SM3, VINELAND, NEW JERSEY 08360 • AREA CODE 609, 691-1075
The extraordinary Summatic Integrator provides automatic digital print-out of gas chromatographic peak areas. Through the use of fresh electronic concepts, the 1501 Summatic offers more convenience features, computing accuracy and lowest possible cost* for automatic data processing of analytical information.

The Summatic is not a "me too" instrument, but is first with the following state-of-the-art design innovations:

- Very wide dynamic range (full 0-1000 mv) through first use of "auto-ranging".** Allows unattenuated input from flame ionization detector for superior counting statistics.
- Unique slope threshold control permits baseline noise immunity without decreasing slope sensitivity or integrator response time.
- First to isolate recorder output from the G.C. detector, and provide selectable automatic attenuation of recorder signal.
- Threshold level detector provides a second peak detection system completely independent of slope to automatically detect shoulders and very broad, slowly eluting, peaks.
- Built in printer for convenience and space saving. Peak integrals are accumulated directly in the counter-printer eliminating the cost and maintenance of a separate memory system.
- Simplest possible installation.
- Substantially lower cost than any other electronic digital integrator.

*Make us prove it. Write for Summatic Integrator brochure
**Patent pending

Nester/Faust Instruments Products Division, 2401 Ogelton Road, Newark, Delaware.
THE SEE-THROUGH LOOK

IN PLASTIC LABORATORY BOTTLES

New Nalgene® Laboratory Bottles molded of transparent polyvinyl chloride! Unaffected by salts, vegetable or mineral oils, excellent for shipping liquids. PVC bottles are the latest addition to our extensive bottle line. Available in stock from 4-32 oz.

The Nalgene name is molded right in—your assurance of highest quality. More labs specify Nalgene Labware than all other brands of plastic labware combined. How about you? Specify Nalgene Labware from your lab supply dealer. Ask for our 1967 catalog, or write Dept. 2703, Nalgene Labware Division, Rochester, N.Y. 14603.

NALGE
NUTRIENT FLASK CORPORATION
Now have unmatched convenience and economy with four heavy duty magnetic stirrers in one by Henry TROEMNER! Four separate stirrers, driven by individual motors, are controlled by individual rheostats and on-off switches. Each stirrer is capable of uniform mixing up to four liters at 1000 rpm's! With Model 601 you get more versatility, more time-saving operation, more convenience than ever before! The sturdy, lightweight case design includes air cooling, sound-proofing and mounting rods at each stirrer location. Model 601 is priced at $285.00 f.o.b. Phila., and delivered ready for plug-in and use. Order now or write for literature: Henry TROEMNER, Inc., 6823 Greenway Ave., Phila., Pa. 19142.

TROEMNER

NOW AVAILABLE...

4 Heavy Duty Magnetic Stirrers in 1!

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 attachment, 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.

NEW BOOKS (Continued from page 1217)

Martin Levey, Ed. Univ. of Pennsylvania Press, Philadelphia, 1967. 365 pp. Illus. $8.50. Fifteen papers; most of the papers are in English, others are in German or French.


SCIENCE, VOL. 155
We are pleased to announce the first products of our new $1,000,000 Enzyme Plant:

As many of you have learned, we have been unable to ship all of your requirements of the following and several other enzymes. Our suppliers have been either unable to meet our needs, or unable to consistently meet our specifications. Orders have been delayed and your work has been handicapped. Although we are badly overloaded already, we set out to break this unfortunate bottleneck. The result is our new Enzyme Plant... and an ambitious program to make Sigma more independent of unreliable outside suppliers. While it is contrary to our policy to devote our limited staff to the preparation of reagents which are already available from other laboratories, it is imperative that we undertake the production of these items which are already in default. No expense is being spared to make Sigma an even more reliable supplier of the World’s Finest Enzymes...

Made in the U.S.A!

Now IN STOCK for prompt shipment

HEXOKINASE

Ammonium Sulfate Suspension

Crystalline, From Yeast Fraction I and II

Activities: Almost 200% Higher than previously available from our former supplier.

In keeping with the Sigma policy, we are sharply reducing the price of Crystalline Hexokinase now that it is made BY Sigma—no longer "psa." We can also offer separated Fractions I and II of Kaji et al.*, as well as greatly increased purity—over 300 units/mg vs only about 100 to 130 units previously available. Activities to 700 units should be developed in the future.

Type C-130 Approx. 100-130 units/mg (This is the old grade)  Type C-300 Approx. 300 units/mg Fractions I and II of Kaji*

(Formerly)

200 units 1 mg $3.00 200 units $3.50
1,000 units 10 mg 6.75 1,000 units 8.00
2,500 units 25 mg 13.50 2,500 units 16.00
10,000 units 100 mg 53.00 10,000 units 60.00

Type C-301 Approx. 300 units/mg
This is essentially Fraction I of Kaji*

OR

200 units $3.50
1,000 units 12.00
2,500 units 26.00
10,000 units 100.00

Type C-302 Approx. 300 units/mg
This is essentially Fraction II of Kaji*

Activities of these Fractions: 1 "unit" will phosphorolysate 1 μMole of Glucose per minute at 25°C.

Crude Grades: All crude powdered grades are in stock again, and if all goes well, we will be able to ship all normal requirements promptly.


PHOSPHOGLUCOMUTASE

Crystalline, From Rabbit Muscle

Ammonium Sulfate Suspension

Activity: 80-130 units/mg

2 mg—$7.00 5 mg—$16.00 10 mg—$28.00 25 mg—$59.50

ORDER DIRECT

TELEPHONE COLLECT

from ANYWHERE in the WORLD

Day, Station to Station, Prospect 1-5750

Night, Person to Person,

Dan Broida, WYdown 3-6418

TWX (Teletype) Day or Night: COLLECT-314-556-0594

TELEGRAM: SIGMACHEM, St. Louis, Missouri

The Research Laboratories of

SIGMA CHEMICAL COMPANY

3500 DE KALB ST. • ST. LOUIS, MO. 63118 • U.S.A.

MANUFACTURERS OF THE FINEST BIOCHEMICALS AVAILABLE

Distributed in the United Kingdom through


Phone RENow 5823 (Reverse Charges)
Eight* samples on the same gel slab; compare and analyze them together.

The serum samples above have been separated simultaneously on a single gel slab. Electrophoretic conditions were identical for each sample.

- To prepare: pour in single gel solution (not eight) and apply samples directly into sample slots.
- After running, stain together, destain together, and evaluate together.
- Total procedure requires less working time than any other method.
- Twelve place sample slot former also available.

Circle Reader Service Card for data sheets and bibliography.

HERE'S OUR OSMOMETER LINE, TODAY...

What more can you expect from a leader?

All of these outstanding osmometers are available from Advanced Instruments, the company which first introduced a freezing point osmometer back in 1955.

We set out to become the leaders in osmetry... and, if sales are any indication, we have succeeded. A few of the contributions we have made to the science of osmometry are: the first schools of osmometry, the first modular osmometer, the first thermoelectric refrigerator, the first portable model, and the first Hot Line® service system.

Now, in addition to the improved 1967 version of our original model we also have: a new air-cooled refrigerator with the longest life guarantee in the field, a Hi-Precision Research Osmometer, and a Nanoliter Osmometer for samples less than one microliter. We are adding others to our growing line. To us LEADERSHIP means continuing programs of product improvement, outstanding service, and fast delivery. We think this is the way a leader should act. Don't you?

WRITE FOR FREE INFORMATION STATING PRODUCT INTEREST.

Advanced
Instruments, Inc.
40 Kenneth Street / 617 DEcatur 2-8200
Newton Highlands, Massachusetts, 02161


The Hypnotic Investigation of Dreams.


---

**diFiore's**

**Atlas of Human Histology**


111 Original Color Plates. 243 Pages.

- 10 new full page plates—on bone and bone marrow, nerves and nerve fibers, dorsal root ganglion, thoracic, spinal cord, the heart, the spleen, the vagina and the placenta.
- 7 new figures added to existing plates.
- Sequence of presentation rearranged to conform to major textbooks of histology.
- Terminology updated in line with major textbooks and the Nomina Anatomica.
- A color atlas of drawings, this ideal auxiliary text presents the usual histological entities encountered by the beginning student in a minimum of space and time. Legends accompany each plate on facing pages.

---

**Coming in August—**

**TEXTBOOK OF RADIATION BIOLOGY**

By Donald J. Pizzarello & Richard L. Witcofski

---

**LEA & FEBIGER**

**WASHINGTON SQUARE PHILADELPHIA, PA. 19106**

10 MARCH 1967
ORGANIC CHEMISTRY—Third Edition
Harold Hart and Robert D. Schuetz
Extensively rewritten, retaining successful features and
proven appropriateness for the first course.
353 pp./1966/$7.75
Study Guide and Solutions Book 131 pp./1966/$3.50
About 200 pp./March 1967

THE IMPORTANCE OF
ANTIBONDING ORBITALS
Hans H. Jaffe and Milton Orchin
A major contribution to teaching and understanding molecu-
lar orbital theory as related to bonding problems in both
ground and excited states. 128 pp. paper/Spring 1967

Houghton Mifflin
Boston / Atlanta / Dallas / Geneva, Ill. / New York / Palo Alto

high-speed ANALYTICAL EVAPORATOR

- Handles up to 12 samples at a time.
- Uses air or nitrogen as the evaporating agent.
- No danger of loss by bumping.
- Each sample easily accessible from the front.
- Simple to operate.
- Requires only 11" x 11" bench-space.

This Model 105 is a
time-saving and convenient ac-
cessory for column chromato-
tography and counter-current
eextractions. Handles 6 samples
in 50 ml. Erlenmeyers or 12
samples in 28 mm. max. dia.
test tubes or scintillation vials.
Water bath controllable from
35° to 70°C.

Write today for Bulletin 603

Organamation Associates
P.O. Box 5, Turnpike Station, Shrewsbury, Massachusetts

WANG LABORATORIES, INC.
Dept. DD-3, 836 North St., Tewksbury,
Mass. 01876 Tel. (617) 851-7311

NOW 4 WANG electronic
calculators cost less than
3 ordinary units
New design permits simultaneous, independent operation
of 4 keyboard/display con-
soles from a single, compact
electronics package.
- Individual consoles
as low as $780
- Performs +, -, x, x², y, e^x, log x at a
single keystroke
- Available with 4 additional storage registers
- 80-step plug-in programmer available
- Occupies only 8" x 10" desk space

Write today for complete information
New from Bio-Rad!

Bio-Gel A, spherical agarose for gel filtration

Extends the range of aqueous gel filtration to 150,000,000 molecular weight.

Bio-Gel A is agarose in spherical bead form, produced by Bio-Rad's own unique process. There are six gels in the series which give an overall operating range from 10,000 to 150,000,000 molecular weight. This range means that Bio-Gel A is applicable for use with viruses, large proteins and other macromolecules that have not been separable up to now by gel filtration techniques.

Techniques and Applications  Bio-Gel A is used in columns for the separation of materials by differences in their molecular weights. It operates essentially the same as other aqueous gel filtration media, including Bio-Gel P, Bio-Rad's polycrylamide gel series.

A typical application is illustrated in the curve below, which shows the separation of a mixture that ranges in molecular weight from Tobacco Mosaic Virus at approximately 30,000,000 down to Cytochrome C at 13,000.

Availability  Bio-Gel A is supplied fully hydrated in buffer, in 500 ml and liter quantities. Each gel is available in two particle sizes: 50-100 mesh beads for maximum flow rate and 100-200 mesh beads for maximum resolution.

Full technical information and details of the reasonable pricing are given in a new bulletin, BG-5, now ready for distribution. For your free copy please fill out the coupon below and return it to Bio-Rad.

[Image of Bio-Gel A separation curve]

Full Technical Information

Bio-Rad Laboratories, 32 & Griffin Avenues, Richmond, California

Gentlemen: Please send my free copy of your new Bulletin BG-5, which describes Bio-Gel A for aqueous gel filtration of macromolecules.

NAME

TITLE

ORGANIZATION

ADDRESS

CITY  STATE  ZIP

1337
guide to the NMR empirical method: a workbook

by Roy H. Bible, G. D. Searle & Co.

CONTENTS: General considerations, appearance of a good spectrum, concept of the chemical shift, use of the integration curve, and D2O exchange • First-order spin systems, presence of impurities, and an unknown • General problems involving chemical shifts, first-order spin systems, exchange rates, and use of the integration curve • First-order couplings to H2, C13, F19, and P31; spinning side bands • Simple unexpected non-equivalence of protons • Higher-order spin systems; AB, AB2, A'B', ABX, and ABC; calculations for AB, AB2 and ABX; "virtual" coupling • General problems involving higher-order patterns • Unexpected non-equivalence of protons involving higher-order spin systems • General problems.

305 PAGES FEBRUARY 1967 $9.50

also available:

interpretation of NMR spectra: an empirical approach

by Roy H. Bible, G. D. Searle & Co.

150 PAGES 1965 $12.50

modern aspects of electrochemistry, no. 4

by J. O'M. Bockris, Electrochemistry Laboratory, John Harrison Laboratory of Chemistry, University of Pennsylvania Philadelphia, Pa.

CONTENTS: Some aspects of the thermodynamic structure of electrochemistry, P. Van Rysselberghe • The mechanism of oxidation of organic fuels, E. Gileadi and B. Peirsma • Anodic and electronic currents at high fields in oxide films, L. Young, W. S. Goruk, and F. G. R. Zobel • An economic study of electrochemical industry in the United States, G. Wengrowski.

316 PAGES DECEMBER 1966 $12.00