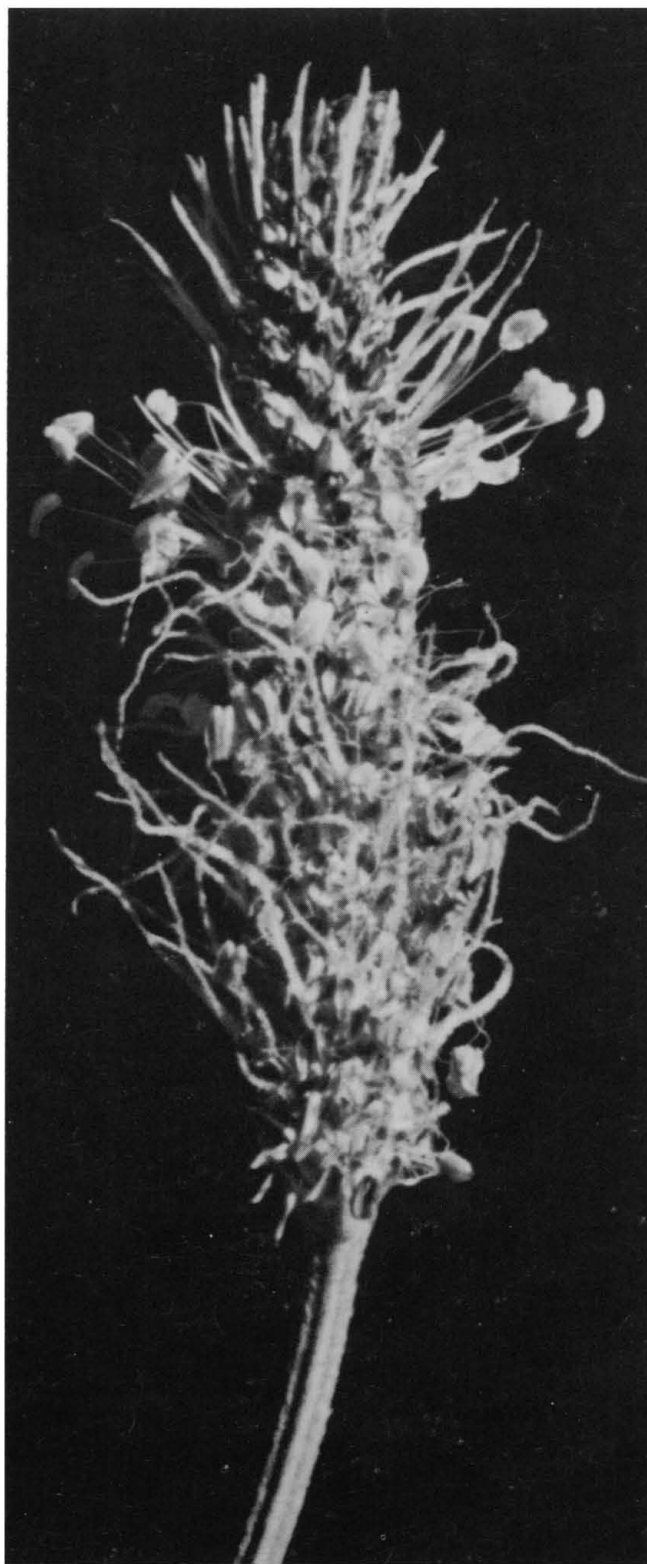
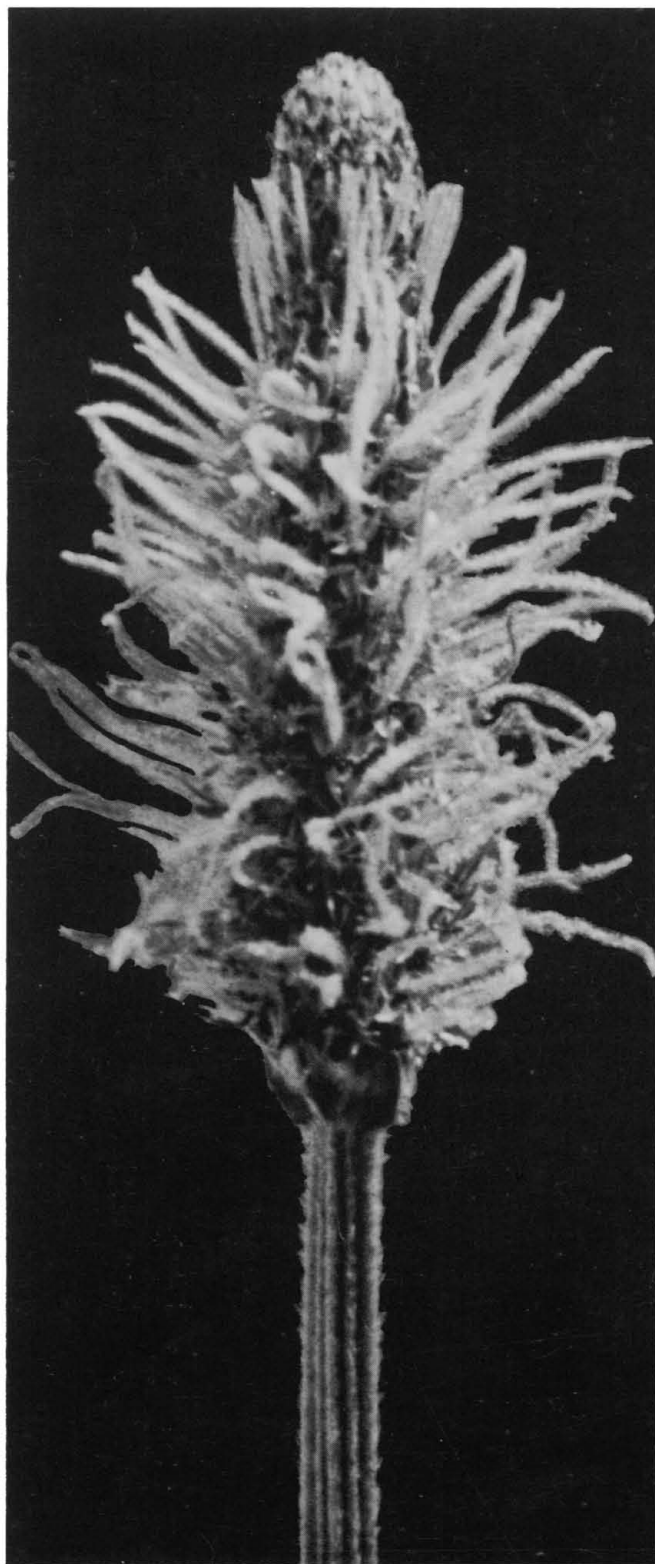


# SCIENCE

8 March 1963

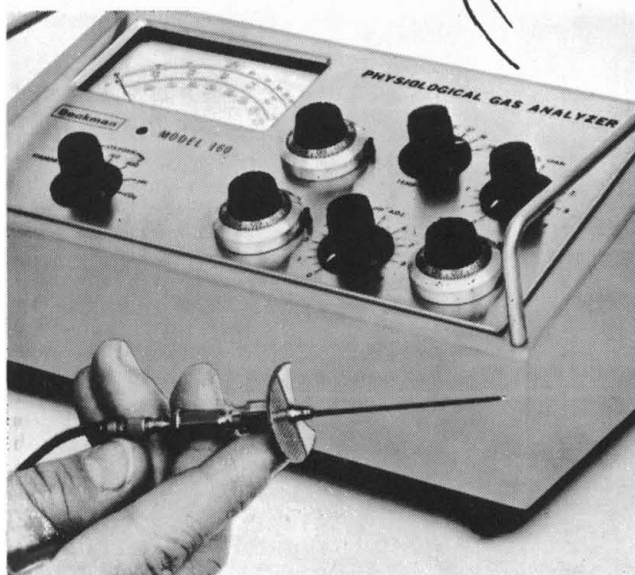
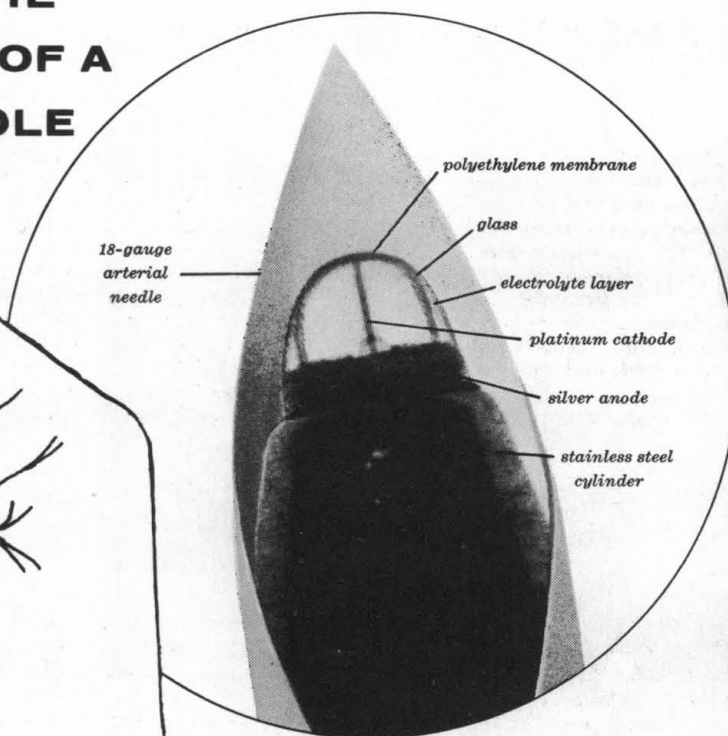
Vol. 139, No. 3558

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



ONE SPECIES, TWO TYPES OF FLOWERS

# AN OXYGEN ELECTRODE IN THE POINT OF A NEEDLE



With the Beckman Oxygen Microelectrode, you can measure oxygen tension *in vivo* directly in arteries, veins, in the brain itself. The sturdy, miniaturized electrode fits inside an 18-gauge arterial needle for direct insertion into circulating blood, live tissue, body fluids in their natural environment...and transmits a continuous, accurate measurement of  $pO_2$ . You observe changes as they happen. You eliminate gaps in information. Since  $pO_2$  is read directly, you do away with calculations.

More than three hundred Beckman Oxygen Microelectrodes are in use in a variety of physiological research investigations. If your requirements call for *in vivo*  $pO_2$  measurement, write Beckman Instruments, Inc., Spinco Division, Palo Alto, California, for Data File 160-5.

**Beckman**

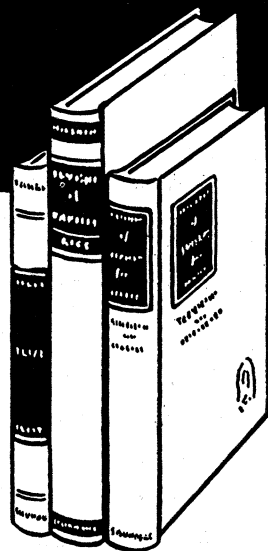
INSTRUMENTS, INC.

**SPINCO DIVISION**

Palo Alto, California

INTERNATIONAL SUBSIDIARIES: GENEVA, SWITZERLAND;  
MUNICH, GERMANY; GLENROTHES, SCOTLAND.

# SAUNDERS BOOKS



**New!—A Brilliant Summary of Present Knowledge . . . .**

## McLennan—SYNAPTIC TRANSMISSION

This *New Book* offers a clear picture of the morphology, the electrical and chemical aspects of the synapse and its function. Although mainly concerned with the mammalian central nervous system, Dr. McLennan discusses synapses in other organisms and sites to show flexibility of synaptic interaction. Possible chemical transmitters discussed include acetylcholine, gamma-aminobutyric acid, and catecholamines. Elec-

trical factors such as resting potential, pre-synaptic inhibition, and excitatory postsynaptic potential are examined. Features common to all synapses, and those common to electrical or chemical synapses are summarized. In reviewing the literature, and in reporting his own findings, the author makes liberal use of schematic drawings and electron micrographs.

By HUGH D. MCLENNAN, Ph.D., Associate Professor of Physiology, Faculty of Medicine, the University of British Columbia, Vancouver, Canada. About 140 pages, 7 1/4" x 10 1/4", illustrated. About \$7.00.

*New!—Ready April, 1963!*

**New (18th) Edition!—A Standard for Over 50 Years**

## Burrows—TEXTBOOK OF MICROBIOLOGY

This classic text has been a leader in its field for over 50 years. Written for the medical and advanced undergraduate student, it covers structure, size, physiology, variations, etc. of fungi, bacteria, and parasites. Topics range from the history of microbiology to human infection by encephalomyocarditis virus. This *New (18th) Edition* incorporates all the advances of

the past four years, including new sections on: Tissue Culture—Immunodiffusion—Permeases—Infectious nucleic acids and interferon—Anonymous mucobacteria. Many discussions are completely rewritten, including those on: anthrax immunization, antifungal antibiotics—polio-virus immunization—antibiotic formation—staphylococci—listeriosis.

By WILLIAM BURROWS, Ph.D., Professor of Microbiology, The University of Chicago. About 1056 pages, 6 5/8" x 10", with about 302 illustrations. About \$16.50.

*New (18th) Edition—Ready April, 1963!*

**New (2nd) Edition!—Keyed to Modern Teaching Methods**

## Gardner, Gray and O'Rahilly—ANATOMY

The unique regional approach of this extensively revised *basic text* can help you teach more effectively in today's shortened course in anatomy. Following an initial section on important systemic considerations, the body is examined according to the major natural subdivisions—*thorax, upper limb, head and neck*—paralleling the laboratory dissection. Special attention is

given to living anatomy, rather than the anatomy of the cadaver. The relationship of structure to function is emphasized. Surface and radiological anatomy are beautifully described in word and picture. More than 200 photos and drawings have been replaced or redrawn for this *New (2nd) Edition*, and over 175 illustrations have been added.

By ERNEST GARDNER, M.D., Chairman and Professor of Anatomy, Wayne State University; DONALD J. GRAY, Ph.D., Professor of Anatomy, Stanford University; and RONAN O'RAHILLY, M.Sc., M.D., Professor of Anatomy and Director of the Department of Anatomy, St. Louis University. About 1072 pages, 7" x 10", with about 762 illustrations. About \$20.00.

*New (2nd) Edition—Ready April, 1963!*

**New!—60 Experiments  
for the Basic Course**

## Bradshaw— LABORATORY MICROBIOLOGY

Here is a completely *new laboratory manual* that ideally augments any elementary microbiology text. The sixty experiments cover apparatus and techniques, cytology, nutrition, identification, ecology, metabolism, destruction and inhibition, and selected medical microbiology procedures. Valuable time in the laboratory is saved by the author's full discussion of the microbiological principle or phenomenon involved (*included as a preface to each experiment*). Other valuable features in this manual include: Lists of equipment, microbiological media and organisms needed for each experiment and for the entire course—A schedule of time required for each experiment—Perforated tear-out report sheets punched for a 3-ring binder.

By L. JACK BRADSHAW, Ph.D., Associate Professor and Chairman, Department of Microbiology, San Bernardino Valley College, California. About 240 pages, 7 1/4" x 10 1/4", illustrated. About \$3.50.

*New!—Ready April, 1963!*

*Gladly Sent to Teachers on Approval*

# W. B. SAUNDERS COMPANY

West Washington Square

Philadelphia 5

8 MARCH 1963

863



8 March 1963

Vol. 139, No. 3558

# SCIENCE

<b>EDITORIAL</b>	A Favorable Environment for Research .....	875
<b>ARTICLES</b>	Evolutionary Mechanisms in Pollination Biology: <i>H. G. Baker</i> .....	877
	Origins and functions of floral systems are being elucidated by genetical and ecological studies.	
	Are We Retrogressing in Science?: <i>M. K. Hubbert</i> .....	884
	Despite superficial evidence to the contrary, science in the United States is in a state of confusion.	
<b>NEWS AND COMMENT</b>	Space Budget—Russians to the Rescue?; Fish Flour—Research Funds Delayed; Electron Microscopes—Tariff Proposed Again; Scientist Hunters—British Aroused .....	890
<b>BOOK REVIEWS</b>	J. H. Willis's <i>A Handbook to Plants in Victoria</i> , reviewed by <i>R. F. Thorne</i> ; other reviews .....	897
<b>REPORTS</b>	Mariner II: Preliminary Reports on Measurements of Venus	
	Charged Particles: <i>L. A. Frank, J. A. Van Allen, H. K. Hills</i> .....	905
	Infrared Radiometer: <i>S. C. Chase, L. D. Kaplan, G. Neugebauer</i> .....	907
	Microwave Radiometers: <i>F. T. Barath et al.</i> .....	908
	Magnetic Field: <i>E. J. Smith et al.</i> .....	909
	Rotation of Venus: Period Estimated from Radar Measurements: <i>R. M. Goldstein and R. L. Carpenter</i> .....	910

## EDITORIAL BOARD

DAVID M. BONNER  
MELVIN CALVIN  
ERNEST COURANT  
FARRINGTON DANIELS  
JOHN T. EDSALL

DAVID R. GODDARD  
ALEXANDER HOLLAENDER  
ROBERT JASTROW  
KONRAD B. KRAUSKOPF

EDWIN M. LERNER II  
WILLARD F. LIBBY  
NEAL E. MILLER  
PHILIP M. MORSE

## EDITORIAL STAFF

Editor  
PHILIP H. ABELSON

Publisher  
DAEL WOLFLE

Business Manager  
HANS NUSSBAUM

Managing Editor  
ROBERT V. ORMES

Assistant Editor  
ELLEN E. MURPHY

Assistant to the Editor  
NANCY TEIMOURIAN

News and Comment  
DANIEL S. GREENBERG  
JOHN R. WALSH  
MARION Y. KLINE

Book Reviews  
SARAH S. DEES

## ADVERTISING STAFF

Director: EARL J. SCHERAGO

Sales: New York, N.Y., 11 W. 42 St. RICHARD L. CHARLES, RUBERT S. BUGBEE (212-PE-6-1858)  
Old Bridge, N. J.: C. RICHARD CALLIS (201-CL4-3680)

Production Manager: HAZEL SANDS

SCIENCE is published weekly by the American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D.C. Now combined with *The Scientific Monthly* ®. Second-class postage paid at Washington, D.C. Copyright © 1963 by the American Association for the Advancement of Science. Annual subscriptions \$8.50\* foreign postage, \$1.50; Canadian postage, 75¢; single copies, 35¢. School year subscriptions: 9 months, \$7; 10 months, \$7.50. Provide 4 weeks' notice for change of address, giving new and old address and zone numbers. Send a recent address label. Opinions expressed by authors are their own and do not necessarily reflect the opinions of the AAAS or the institutions with which the authors are affiliated. Indexed in the *Reader's Guide to Periodical Literature*.

# AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Nuclear Explosions: Some Geologic Effects of the Gnome Shot: <i>L. M. Gard</i> .....	911
Plasma Protein Synthesis in the Liver: Method for Measurement of Albumin Formation in vivo: <i>E. B. Reeve, J. R. Pearson, D. C. Martz</i> .....	914
Gamma Emitters in Marine Sediments near the Columbia River: <i>C. Osterberg, L. D. Kulm, J. V. Byrne</i> .....	916
Hemoglobin: Molecular Changes during Anuran Metamorphosis: <i>C. D. Trader, J. S. Wortham, E. Frieden</i> .....	918
Geothermal Brine Well: Mile-Deep Drill Hole May Tap Ore-Bearing Magmatic Water and Rocks Undergoing Metamorphism: <i>D. E. White, E. T. Anderson, D. K. Grubbs</i> .....	919
Low Malignancy of Rous Sarcoma Cells as Evidenced by Poor Transplantability in Turkeys: <i>V. V. Bergs and V. Groupé</i> .....	922
Generalized Shwartzman Reaction in the Pregnant Golden Hamster: <i>M. Galton</i> ....	923
Deoxyribonuclease Sensitivity of Ribonucleic Acid Synthesizing System from Tobacco Leaves: <i>J. G. Shaw</i> .....	924
<b>MEETINGS</b> Biological Control Mechanisms; Endocrine Control of Growth; Structural Chemistry: Techniques; Tongues of Science .....	926
<b>LETTERS</b> <i>M. B. Visscher; B. L. Horecker; G. Mamikunian and M. H. Briggs</i> .....	871

COLIN S. PITTENDRIGH  
KENNETH S. PITZER  
H. BURR STEINBACH  
DeWITT STETTEN, JR.

WILLIAM L. STRAUS, JR.  
EDWARD L. TATUM  
JOHN R. WINCKLER  
CLARENCE M. ZENER

Editorial Assistants  
ELEANORE J. BUTZ  
GRAYCE A. FINGER  
GARY O. GOLDSMITH  
NANCY S. HAMILTON  
OLIVER W. HEATWOLE  
SHELLEY MANN  
EDGAR C. RICH

JOHN E. RINGLE  
EVA WOO  
Staff Assistants  
LILLIAN HSU  
KAY E. KROZELY  
BARBARA J. SHEFFER

Chicago, Ill., 6 W. Ontario St.: HERBERT BURKLUND (312-DE7-4973)  
Monterey Park, Calif., 664 Monterey Park Rd.: ED. BIG (213-CU3-8600)

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., N.W., Washington 5, D.C. Phone: 202-DU 7-7171. Cable: Advancesci, Washington. Manuscripts should be submitted in triplicate, doublespaced throughout. The AAAS assumes no responsibility for the safety of manuscripts. Copies of "Instructions for Contributors" can be obtained from the editorial office.

ADVERTISING CORRESPONDENCE: Room 1740, 11 West 42 St., New York 36, N.Y. Phone 212-PE 6-1858.

## COVER

Some species of flowering plants produce both male-sterile and hermaphrodite flowers on separate plants (gynodioecism). *Plantago lanceolata* is well established around the world as a weedy follower of man and is generally pollinated by wind. The male-sterile head is on the left, the hermaphrodite is on the right. Flowering proceeds from the base to the apex of the spike and perfect flowers pass through pistillate, staminate, and fruiting phases in that order. See page 877.

### BIOPOLYMERS

A new bi-monthly publication devoted to original research on the structure, synthesis, and behavior of biopolymers. It provides accurate, timely coverage of progress in the study of proteins, nucleic acids, polysaccharides, genetic investigations, details of biological organization, biosynthetic pathways of polymer formation and many other areas of the field. BIOPOLYMERS started publication with the February, 1963 issue. An Interscience Journal.

*Subscription price: 1963. \$18.00.*

### CYANINE DYES AND RELATED COMPOUNDS THE CHEMISTRY OF HETEROCYCLIC COMPOUNDS SERIES—Volume 18

By F. M. HAMER. A complete and systematic treatment of the chemistry of the cyanine dyes, this book continues a series of monographs that gives up-to-date, detailed, and comprehensive presentations of the various branches of heterocyclic chemistry. An Interscience Book.

*1963. Approx. 808 pages. Prob. \$25.00.*

### THE SEA: IDEAS AND OBSERVATIONS

**A Comprehensive Treatise on Progress in the Study of the Seas—in three volumes**

*Edited by* M. N. HILL, *Cambridge University*; E. D. GOLDBERG, *University of California, La Jolla*; C. O'D. ISELIN, *Woods Hole Oceanographic Institution*; and W. H. MUNK, *University of California, La Jolla*. Divided into six major sections, this work covers physical oceanography (Vol. 1); composition of sea water, comparative and descriptive oceanography and oceanographic methods (Vol. 2); the earth beneath the sea, and an historical survey of its evolution through geological time (Vol. 3). Interscience Books. Vol. 1: 1962. 864 pages. \$25.00. Vol. 2: 1963. Approx. 554 pages. \$20.00. Vol. 3: 1963. Approx. 850 pages. *In press*.

### MOLECULAR REARRANGEMENTS In two parts

*Edited by* PAUL DE MAYO, *University of Western Ontario, Canada*. Announcing the only book available in English entirely devoted to the rearrangements of organic molecules. Most of the well-known rearrangements are discussed. Part I: 1963. Approx. 600 pages. Prob. \$18.00. Part II: 1963. Approx. 550 pages. Prob. \$17.00.

### OUTLINES OF BIOCHEMISTRY

By ERIC E. CONN and P. K. STUMPF, *both of the University of California, Davis*. A modern, over-all introduction to the rapidly expanding science of biochemistry. 1963. 387 pages. \$8.75.

### PENTOSE METABOLISM IN BACTERIA

By B. L. HORECKER, *New York University School of Medicine*. A comprehensive review of the current status of the 5-carbon sugars in metabolism, including both respiration and fermentation mechanisms. This includes new developments in the mechanism of action of selected enzymes

in these pathways. One of the CIBA Lectures in Microbial Biochemistry. 1963. 100 pages. \$4.00.

### MAGNETISM AND THE CHEMICAL BOND

By JOHN B. GOODENOUGH, *Massachusetts Institute of Technology*. A comprehensive survey of the current position of research into the magnetic interactions of transition metal ions in their solid compounds. The first volume in the Interscience Monographs on Chemistry series—Inorganic Chemistry Section. 1963. 393 pages. \$12.50.

### PROCEEDINGS OF THE SYMPOSIUM ON TIME SERIES ANALYSIS

*Edited by* MURRAY ROSENBLATT, *Brown University*. The proceedings of a symposium held at Brown University, June 11–14, 1962, sponsored jointly by Brown University and the Office of Naval Research. One of the SIAM Series in Applied Mathematics. 1963. 497 pages. \$16.50.

### SCIENTIFIC CREATIVITY: ITS RECOGNITION AND DEVELOPMENT

*Edited by* CALVIN W. TAYLOR, *The University of Utah*; and FRANK BARRON, *The University of California, Berkeley*. Selected papers from the proceedings of the First, Second, and Third University of Utah Conferences: "The Identification of Creative Scientific Talent," supported by the National Science Foundation.

*1963. 419 pages. \$7.95.*

### METHODS OF BIOCHEMICAL ANALYSIS Volume XI

*Edited by* DAVID GLICK, *Stanford University Medical School*. The eleventh volume in this series designed to review techniques and methods in biochemical analysis. 1963. 442 pages. \$14.50.

### THE OPTICAL MODEL IN NUCLEAR AND PARTICLE PHYSICS

By P. B. JONES, *University of Oxford, England*. An introduction to the principles of the optical model of the nucleus. Interscience Tracts on Physics and Astronomy, #14.

*1963. Approx. 140 pages. Prob. \$4.50.*

### ANALOGUE COMPUTING AT ULTRA-HIGH SPEED

**An Experimental and Theoretical Study**

By DONALD M. MACKAY, *University of North Staffordshire, Keele*; and MICHAEL E. FISHER, *King's College, London*. Combining experimental and theoretical approaches, this book emphasizes principles, with circuits offered only as illustrations. 1962. 410 pages. \$11.50.

### PROCESSES OF CREEP AND FATIGUE IN METALS

By A. J. KENNEDY, *The College of Aeronautics, Cranfield, England*. This book unifies the engineering and scientific approaches to creep and fatigue. It sets forth the present state of knowledge of fundamentals.

*1963. In press.*

*Send for examination copies.*

**JOHN WILEY & SONS, Inc.**

# WILEY BOOKS Including INTERSCIENCE

## RUSSIAN-ENGLISH PHYSICS DICTIONARY

By IRVING EMIN, *Consultants Bureau Enterprises, Inc.* This dictionary supplies authentic equivalents not only for all important branches of physics—theoretical, experimental, mathematical, and applied—and such allied fields as astronomy, meteorology, and geophysics—but basic chemical terminology and a general nontechnical vocabulary.

1963. Approx. 560 pages. Prob. \$14.00.

## VISCOSITY AND FLOW MEASUREMENT

### A Laboratory Handbook of Rheology

By J. R. VAN WAZER, J. W. LYONS, K. Y. KIM, and R. E. COLWELL, *all of Monsanto Chemical Company.* Presents modern rheological theory in an easy-to-assimilate form that can be immediately applied to experimental data. An Interscience Book.

1963. Approx. 440 pages. Prob. \$14.00.

## ADVANCES IN ELECTROCHEMISTRY AND ELECTROCHEMICAL ENGINEERING

### Volume 3: Electrochemistry

Edited by PAUL DELAHAY, *Louisiana State University.* This is the third volume in a series which provides authoritative reviews in the area of electrochemical phenomena and bridges the gap between electrochemistry as a part of physical chemistry, and electrochemical engineering. An Interscience Book.

1963. Approx. 550 pages. Prob. \$17.50.

## SPACE SCIENCE

Edited by DONALD P. LEGALLEY, *Space Technology Laboratories, Inc.* Records and evaluates both the theoretical and experimental findings of the first five years of the "Space Age." One of the University of California Engineering and Physical Sciences Extension Series.

1963. 668 pages. \$17.50.

## NUMERICAL ANALYSIS

By NATHANIEL MACON, *Auburn University.* An introduction to numerical analysis that places strong emphasis on applicability to high-speed computing.

1963. 161 pages. \$5.50.

## TREATISE ON ANALYTICAL CHEMISTRY

### Part II: Analytical Chemistry of the Elements, Volume 8

Edited by I. M. KOLTHOFF, *University of Minnesota;* and P. J. ELVING, *University of Michigan;* with the assistance of E. B. SANDELL, *University of Minnesota.* This part of the *Treatise* deals with rare earths, bismuth, vanadium, chromium, and the platinum metals. An Interscience Book.

1963. 556 pages. \$20.00.

## INTRODUCTORY STATISTICAL MECHANICS FOR PHYSICISTS

By D. K. C. MACDONALD, *National Research Council, Canada.* An introduction to statistical mechanics that presents basic principles clearly and simply and highlights questions of interest to physicists.

1963. Approx. 200 pages. Prob. \$6.50.

## THE MENTAL PATIENT COMES HOME

By HOWARD E. FREEMAN, *Brandeis University;* and OZZIE G. SIMMONS, *University of Colorado.* A report on a study of 649 former mental patients during the year after hospitalization. It examines the factors affecting the behavior and performance of psychiatric patients after they return to their community.

1963. 309 pages. \$7.95.

## CHEMICAL ANALYSIS BY FLAME PHOTOMETRY

By ROLAND HERRMANN, *University of Giessen, Germany;* and C. T. J. ALKEMADE, *The University of Utrecht.* Translated by PAUL T. GILBERT, JR., *Beckman Instrument Company.* A comprehensive introduction to the technique and results obtained by this invaluable method of chemical analysis. Volume XIV in the Interscience Chemical Analysis Series.

1963. Approx. 432 pages. Prob. \$13.50.

## THE CHEMISTRY OF WOOD

Edited by B. L. BROWNING, *The Institute of Paper Chemistry.* Presents the outstanding features of the chemistry of wood and its components.

1963. Approx. 736 pages. Prob. \$24.50.

## ORGANIC ELECTRONIC SPECTRAL

### DATA—Volume IV: 1958-1959

#### A Comprehensive Catalog of Ultraviolet and Visible Spectra

Published under the auspices of the *Organic Electronic Spectral Data, Inc.* Edited by F. C. NACHOD, *Sterling Winthrop Research Institute;* and J. P. PHILLIPS, *University of Louisville.* Volume IV in a unique collection of spectral data—the result of teamwork by experts in the field of chemical spectroscopy. An Interscience Book.

1963. Approx. 1340 pages. In press.

## THE EVOLUTION OF THE BANANAS

By N. W. SIMMONDS, *John Innes Institute, Hertford.* Gives a general account of the evolution of the bananas, both wild and cultivated. Tropical Science Series.

1962. 170 pages. \$7.50.

## FORMAL STRUCTURE OF ELECTROMAGNETICS

### General Covariance and Electromagnetics

By E. J. POST, *Air Force Cambridge Research Laboratories.* An explicit treatment of the principle of general covariance as applied to electromagnetics. A North-Holland (Interscience) Book.

1962. 204 pages. \$7.50.

## RADIO ASTRONOMICAL AND SATELLITE STUDIES OF THE ATMOSPHERE

Edited by JULES AARONS. This book covers such topics as radio star scintillation, radar astronomical studies, cosmic noise absorption, and satellite studies of the atmosphere by radio techniques. A North-Holland (Interscience) Book.

1963. In press.

## PROGRESS IN ELEMENTARY PARTICLE AND COSMIC RAY PHYSICS Volume VI

Edited by J. G. WILSON, *Professor of Physics, Leeds;* and S. A. WOUTHUYSEN, *Professor of Physics, Amsterdam.* Covers cosmic ray produced isotopes and applications to problems in geophysics. A North-Holland (Interscience) Book.

1963. 344 pages. \$13.75.

*Note change of address.*

440 Park Avenue South, New York 16, N. Y.



*One of a series briefly describing GM's research in depth*

## The unsettled mobility of gases in solids

One of the more elusive phenomena of nature—the diffusion of gases into solids—may cause peculiar, even detrimental, metallurgical effects.

To explain these mysterious meanderings, physicists at the General Motors Research Laboratories are measuring the mobilities of gas atoms in metal lattices. Their goal: fundamental knowledge on which to base improvements in the properties of metals and other solids.

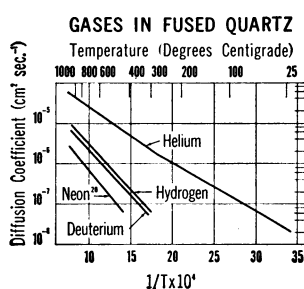
Diffusion rates for hydrogen in iron or steel have been found to drop off more than predicted as the temperature is lowered. For the theoretician, these results suggest that diffusion models will have to account for more than simple interstitial migration of hydrogen atoms. For the more practical minded, the new room temperature values can be correlated with the performance of hydrogen-embrittled steels.

In addition, the delicate nature of mobility measurements has diverted our experimentalists into investigating gases diffusing through glass lab equipment. The detour has proven fruitful. Their studies of gases in natural and synthetic fused quartz—the simplest form of glass—have furnished further clues to the basic structure of the glassy state.

It's another example of how General Motors engineers and scientists are working to find a better way—with research in depth.

## General Motors Research Laboratories

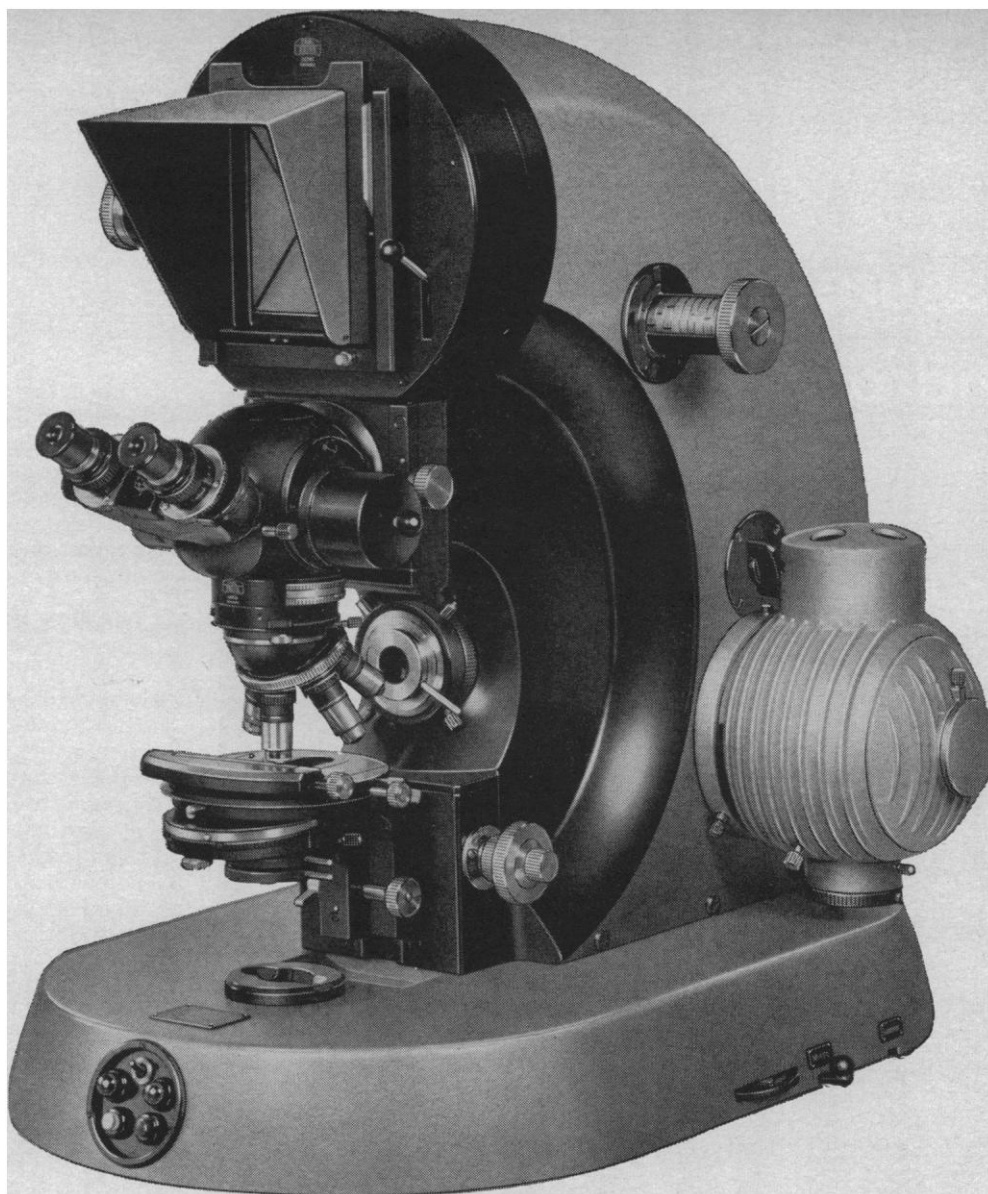
Warren, Michigan



Compiled from recent  
GM publications in  
*J. Chem. Phys.* List  
available upon request.

Screw at left loaded with hydrogen by electrolysis and suspended in a hot oil bath.





## This is the most versatile camera microscope

**It is the Carl Zeiss Ultraphot II.** If you want a microscope that will do just about everything and is easy to operate, this is the one you ought to choose.

It gives you the highest degree of performance yet attained in photomicrography. Once the image is focused, at the touch of a button, the automatic camera produces sharp and properly exposed photomicrographs. Sheet film 4 x 5", 35mm roll film, or Polaroid film can be used. The camera head can be substituted by ground glass screen for projection viewing.

The camera microscope has a unique illuminating system: you can work with reflected or transmitted light or use both simultaneously.

A choice of three light sources is available: tungsten filament bulb, high pressure mercury burner, carbon arc lamp with automatic feed.

The tube head is provided with a quintuple revolving nose-piece for the objectives and the built-in "Optovar" which increases the magnification by 1.25x, 1.6x, or 2x. Therefore no additional eyepieces are required. The binocular tube is equipped with an interpupillary distance adjustment device and can be corrected for ametropia.

A full complement of accessories makes it possible to do any kind of study in your specialty. Write for more detailed information. **Complete service facilities available.**

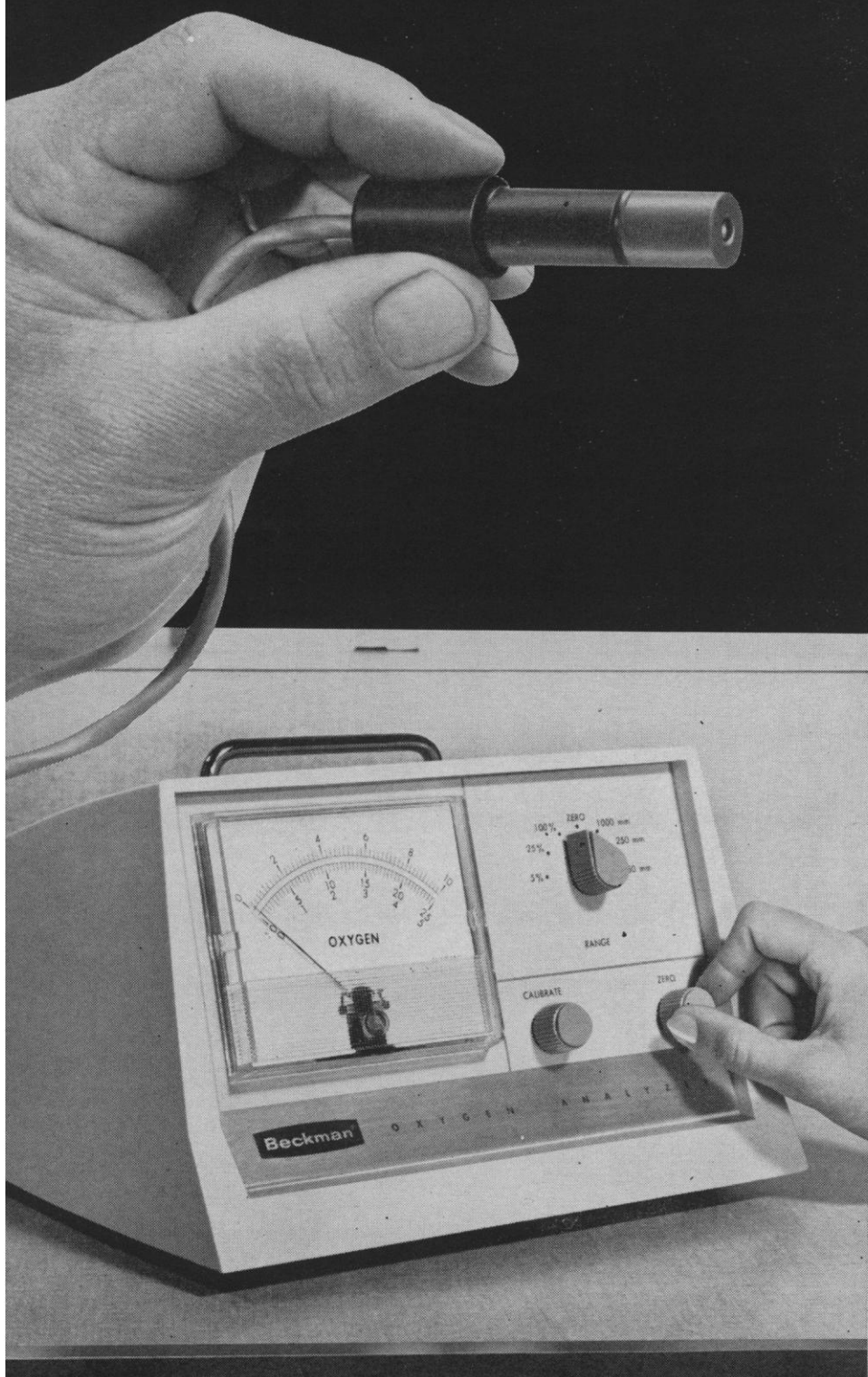


The Symbol of World Famous Optics

**Carl Zeiss, Inc., 444 Fifth Ave., New York 18, N.Y.**  
**IN CANADA: CARL ZEISS CANADA LTD., 60 OVERLEA BLVD., TORONTO 17, ONTARIO**

new Beckman system

## measures gaseous $O_2$ and dissolved oxygen



This is the concept developed by Beckman for critical oxygen analyses in the Project Mercury space capsules. Now Beckman offers a commercial version of this rugged, highly successful system for laboratory measurement of gaseous oxygen *or* of dissolved oxygen in aqueous or non-aqueous solutions.

**The New Beckman Oxygen Sensor** is the key to the system. Working on a patented polarographic principle\*, a silver anode and a gold cathode are separated from the sample by an oxygen-permeable membrane. Thus, the membrane prevents sensor contamination, yet permits oxygen to diffuse to the sensor for fast determinations—90% of response in less than ten seconds. A built-in thermistor compensates for temperature fluctuations. Readout is accomplished by one of two new Beckman devices:

**Beckman Model 777 Oxygen Analyzer** has a direct-reading meter plus recorder output, and translates sensor signal into convenient measurement units. Multiple ranges are expressed in per cent oxygen mm. partial pressure, per cent air saturation, and parts per million dissolved oxygen. Features a line-operated, solid-state A.C. amplifier for drift-free performance. Especially designed for the modern laboratory, the Model 777 is attractively housed in a light-weight, corrosion-resistant, polypropylene case.

**Beckman Oxygen Adapter** allows the Beckman Model 76 Expanded Scale pH Meter to function as an oxygen analyzer. The Model 76 can then provide the same oxygen measurement ranges as the Model 777 with the same accuracy. The laboratory is thus equipped with a multi-purpose instrument readily convertible for either pH or oxygen measurements.

Your Beckman dealer has full particulars on these exciting new laboratory oxygen measuring devices. Remember too, that Beckman has comparable process oxygen equipment. Ask him, or write for data file LO-38-163.

**Beckman®**

INSTRUMENTS, INC.

SCIENTIFIC AND PROCESS  
INSTRUMENTS DIVISION

Fullerton, California

International Subsidiaries:  
Geneva, Switzerland; Munich, Germany; Glenrothes, Scotland

\* U.S. PATENT NO. 2,913,386

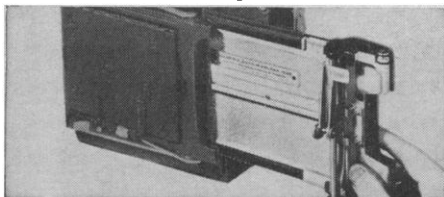




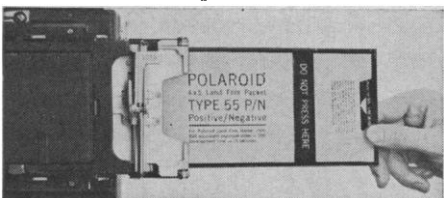
**Wes Kemp** had a fully developed negative and positive just 20 seconds after he took this picture of a sky diver at the Parachuting Center in Orange, Mass. He used a Linhof Technika loaded with **Polaroid P/N 4 x 5 Film.**

## How Polaroid Land 4x5 Film gives you both negative and positive in 20 seconds outside the darkroom.

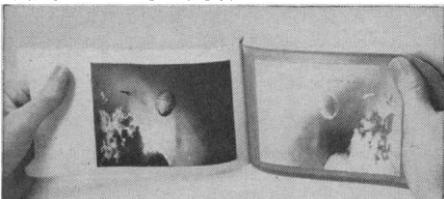
It's this simple to get both negative and positive without using the darkroom. Time required: 20 seconds.



Put a Polaroid Land 4 x 5 Film Holder in the back of any camera that uses a Graphic or similar back.



Insert a Type 55 P/N Film packet into the holder, and expose as you would with any panchromatic film rated at A.S.A. 50.



20 seconds later you have a fully developed, fine grain negative and a positive that matches the negative in every respect. Positive and negative develop in their own packet outside the camera, outside the darkroom. The negative needs only to be washed and dried to be ready to print or enlarge. Resolution is better than 150 lines per mm.

Type 55 P/N Film is one of three special Polaroid Land Films for 4 x 5 photography.

Type 52 Film produces a virtually grainless paper print in 10 seconds. It has an A.S.A. rating of 200 and is ideal for general purpose 4 x 5 photography.

Type 57 Polaroid Land Film has an A.S.A. rating of 3000 for use in extremely low light conditions. It also produces a finished print in 10 seconds.

The Polaroid Land 4 x 5 system gives your camera more versatility, opens up new opportunities for you in 4 x 5 photography.

POLAROID®

proper spirit, even by sophisticated laymen, and I feel that self-criticism of this kind should be restricted to our own journals. Furthermore, I do not share the views regarding the grant-supported workshops. In my own area of research, in the past 2 years, we have experienced two important breakthroughs as a result of such workshops. The opportunity for personal contact which is provided by these meetings is not provided by the large open meetings. Equally important is the fact that there is no publication of the proceedings, which permits one to present recent observations which may not yet be fully documented. If the editorial should serve to make such meetings more difficult, then science will have been done a great disservice.

BERNARD L. HORECKER

Department of Microbiology,  
New York University School  
of Medicine, New York

### "Organized Elements" in Carbonaceous Meteorites

In a recent article (1) Anders and Fitch reported on their failure to observe in preparations of carbonaceous chondrites the "organized elements" of Claus *et al.* (2, 3). In other papers (4), Fitch and Anders have shown in detail the difficulty of using morphological criteria to determine the nature and origin of meteorite microstructures in the 5- to 30- $\mu$  range.

However, the possible occurrence of microfossils in meteorites has attracted considerable attention, and other workers have identified structures in carbonaceous chondrites that they consider to be indigenous fossil remains. These workers are Staplin (5), Reimer (see 3), Palik (6), Chohnoky (7), Skuja (see 3), Ross (8), Engels (9), and Timofeev (see 3).

On the other hand, several persons, after examining the structures in question, have supported the view of Fitch and Anders that identification of them as microfossils is premature. Thus, Fox (10) has suggested that the objects are spheroids of nonbiological organic matter, together with droplets of sulfur and recent contaminating organisms. Deflandre (11) has similarly claimed that the objects are terrestrial contaminants and artifacts. Briggs (12), who examined preparations made under

sterile conditions to eliminate contamination during preparation, has suggested that some of the "organized elements" are mineral grains and that others are associations of sulfur with organic matter, probably of abiogenic origin. Mueller (13) has recently presented evidence that one class of "organized element," which displays a very complex morphology, is a rare limonite pseudomorph of troilite.

In view of this marked disagreement it is clear that the true nature of the "organized elements" will be established only after prolonged study by many different scientists competent in various fields. Thus, contributions from bacteriologists, palynologists, micropaleontologists, pathologists, crystallographers, histologists, and organic chemists are necessary, and it is improbable that any single person is competent to identify microscopic objects in all these fields.

Since meteorites, particularly carbonaceous chondrites, are difficult to obtain for study and are at present available to only a small group, we have prepared a catalog of photographs (14) of meteorite microstructures for wide circulation. Copies will be sent on application to any scientist. It is hoped in this manner to obtain suggestions as to the identity of the "organized elements" from as wide a group of specialists as possible. It is also hoped that new criteria for identification will be forthcoming.

GREGG MAMIKUNIAN  
MICHAEL H. BRIGGS

Chemistry Section, Space Sciences  
Division, Jet Propulsion Laboratory,  
California Institute of Technology,  
Pasadena

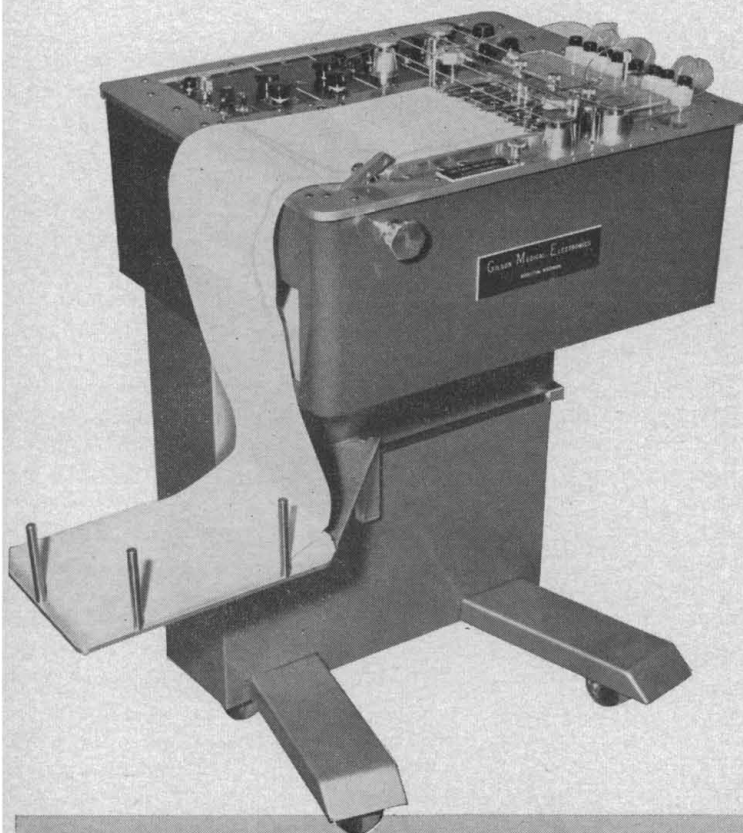
#### References

1. E. Anders and F. W. Fitch, *Science* **138**, 1392 (1962).
2. G. Claus and B. Nagy, *Nature* **192**, 594 (1961); *Phycol. Soc. Am. News Bull.* **15**, 15 (1962).
3. — and D. L. Europa, *Ann. N.Y. Acad. Sci.*, in press.
4. F. W. Fitch, H. P. Schwarcz, E. Anders, *Nature* **193**, 1123 (1962); F. W. Fitch and E. Anders, *Ann. N.Y. Acad. Sci.*, in press.
5. F. L. Staplin, *Micropaleontology* **8**, 343 (1962).
6. P. Palik, *Nature* **194**, 1065 (1962); *Micropaleontology*, in press.
7. B. J. Chohnoky, *Ann. N.Y. Acad. Sci.*, in press.
8. R. Ross, *ibid.*, in press.
9. C. Engels, cited by H. C. Urey, *Science* **137**, 623 (1962).
10. S. Fox, paper presented at the Denver meeting of the AAAS (1961).
11. G. Deflandre, *Compt. Rend.* **254**, 3405 (1962).
12. M. H. Briggs, *Nature* **195**, 1076 (1962); — and G. B. Kitto, *ibid.* **193**, 1126 (1962).
13. G. Mueller, *ibid.* **196**, 929 (1962).
14. G. Mamikunian and M. H. Briggs, Jet Propulsion Laboratory technical report, in press.



# GME

## MODEL M5P MINI-POLYGRAPH



- *Fully modular*
- *2 to 5 channels*
- *Rectilinear recording*
- *Simultaneous 8" servo and other records on one graph*
- *Compact versatility—up to 4 chopper, ECG, or EEG channels in any assortment—up to 2 servos...for a total of 5 channels*

- Each channel a complete, self-contained interchangeable unit
- One or two servos may be used, writing the full width of 8" chart. Sensitivity up to 6 millivolts full scale, traverse time approximately 1 second
- Chopper amplifiers, for pressure or force with a Statham transducer, or for temperature with a thermistor bridge. Include Zener diode regulated power supply for bridge. May also be used as stable high gain DC amplifiers
- Time and event markers included
- Rectilinear recording — simple and reliable linkage with only two moving parts
- Transducers plug in directly — no extra power supply or pre-amplifiers needed
- Ease of record analysis — the servo record is on the same chart as other records (EEG, ECG, pressure, etc.) — all on 8"-wide fan-folded paper with millimeter square marking
- Anti-clogging inking system
- Instantaneous speed change without gear shifting — 6 speeds
- Rugged and sturdy construction

MODEL M8PM FULLY MODULAR 8-CHANNEL MACRO-POLYGRAPH AVAILABLE

**GILSON MEDICAL ELECTRONICS**

MIDDLETON, WISCONSIN

*On Madison's West Beltline Highway*

## American Association for the Advancement of Science

### BOARD OF DIRECTORS

PAUL M. GROSS, Retiring President, Chairman	
ALAN T. WATERMAN, President	
LAURENCE M. GOULD, President Elect	
HENRY EYRING	MINA REES
H. BENTLEY GLASS	WALTER ORR ROBERTS
DON K. PRICE	ALFRED S. ROMER
	WILLIAM W. RUBEY
PAUL E. KLOPSTEG	DAEL WOLFLE
Treasurer	Executive Officer

### SECTION VICE PRESIDENTS AND SECRETARIES

MATHEMATICS (A)	
Magnus R. Hestenes	Wallace Givens
PHYSICS (B)	
Elmer Hutchisson	Stanley S. Ballard
CHEMISTRY (C)	
Milton Orchin	S. L. Meisel
ASTRONOMY (D)	
Paul Herget	Frank Bradshaw Wood
GEOLOGY AND GEOGRAPHY (E)	
John C. Reed	Richard H. Mahard
ZOOLOGICAL SCIENCES (F)	
Dietrich Bodenstein	David W. Bishop
BOTANICAL SCIENCES (G)	
Aaron J. Sharp	Harriet B. Creighton
ANTHROPOLOGY (H)	
David A. Baerreis	Eleanor Leacock
PSYCHOLOGY (I)	
Lloyd G. Humphreys	Frank W. Finger
SOCIAL AND ECONOMIC SCIENCES (K)	
Kingsley Davis	Ithiel de Sola Pool
HISTORY AND PHILOSOPHY OF SCIENCE (L)	
Adolph Grünbaum	N. Russell Hanson
ENGINEERING (M)	
Clarence E. Davies	Leroy K. Wheelock
MEDICAL SCIENCES (N)	
Francis D. Moore	Oscar Touster
DENTISTRY (Nd)	
Paul E. Boyle	S. J. Kreshover
PHARMACEUTICAL SCIENCES (Np)	
Don E. Francke	
AGRICULTURE (O)	
A. H. Moseman	Howard B. Sprague
INDUSTRIAL SCIENCE (P)	
Alfred T. Waidelich	Allen T. Bonnell
EDUCATION (Q)	
H. E. Wise	Herbert A. Smith
INFORMATION AND COMMUNICATION (T)	
Foster E. Mohrhardt	Phyllis V. Parkins
STATISTICS (U)	
Harold Hotelling	Morris B. Ullman

### PACIFIC DIVISION

John P. Tully	Robert C. Miller
President	Secretary

### SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Anton H. Berkman	Marlowe G. Anderson
President	Executive Secretary

### ALASKA DIVISION

Allan H. Mick	George Dahlgren
President	Executive Secretary

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

## A Favorable Environment for Research

Most scientists require a stimulating atmosphere to realize their full creative capacity. The factor of most importance in determining a favorable environment is constructive interaction among colleagues. Discussions can generate enthusiasm and a stream of sparkling ideas. In the implementation of new concepts, members of the group can be mutually helpful. One person may remember a relevant article in the literature. Another may know of an applicable technique. As research progresses, suggestions for other approaches may open new doors. As results come in, discussion of their validity and significance can lead to a more rigorous approach and ultimately to additional insight.

Interaction among members of a research group must be continuous, with minimal intrusion of distracting influences. Indeed, it is distractions that can most readily quench creative fire or prevent it from igniting in the first place. One potent destructive influence is irritation. This can stem from outside events, but it is more likely to arise within the group itself. Jealousy and gossip can be effective poisons, and one trouble maker can ruin the spirit of a laboratory.

Recently, academic scientists have fostered a new form of distraction. A man of any stature, according to the current vogue, must have at least one nonprofessional assistant and, if he is a person of real consequence, a battery of assorted flunkies. If a scientist is doing routine development work or is administrative head of a large laboratory or department, nonprofessional help is essential. However, if his major function is to perform fundamental research, nonprofessional and even professional assistance can be a drain rather than a help. These aides may render dedicated service, but the price of this service can be destruction of the creative fire. To justify their presence and to satisfy their need for achievement, the scientist must keep them busy—must plan for them and direct them. Later he must hear the details of why things can't be done or admire the flourish with which they were done. Usually members of the staff occupy the space nearest that of the scientist and thus hold a first mortgage on his time. He finds that he has fostered not an intellectually stimulating environment but a sterile one, that he has robbed himself of some of the time needed for creative effort.

I was privileged to be a graduate student in Berkeley during the late 1930's when nuclear research was the big frontier in science and the Radiation Laboratory was one of the most exciting places in the world. The staff of the laboratory consisted almost entirely of pre- and postdoctoral fellows and totaled about 25. There were no secretaries to answer the telephone or make coffee. A machinist fabricated some parts for apparatus, but almost all the experimental equipment was made by the fellows. They also took care of the operation and repair of the cyclotron. In this purely professional atmosphere there was intense concentration on physics. Although the staff (including Professor Lawrence) performed what now would be regarded as menial jobs, their conversation at such times was largely about research.

In today's academic world many tasks are performed by technicians, and supposedly the scientists are free to do higher things. It doesn't work out that way. In practice, scientists spend much of their time being the equivalent of straw bosses in a factory. These days it is easy for a promising young scientist to surround himself with pairs of hands, but he should ask, "Is it worth while?"—P.H.A.



Keyed to the needs of researchers in such diversified studies as Agricultural Chemistry, Biology, Geochemistry, Metallurgical and Historical Research, Organic Chemistry and Process Controls, the all-new TMC Activation Analysis Package offers the *first integrated system* for gamma radiation analysis.

Detection and measurement of trace amounts in samples is not only economical (a complete Ellison-TMC System for activation analysis costs less than most neutron guns

alone), it is also time saving, and accurate to definitions as fine as one part in 1,000,000.

The Ellison Activatron-110 is available immediately from TMC, and priced as stated above. Depending on your application, TMC instrumentation for analysis can be tailored to your needs at equally modest cost. A TMC REPRESENTATIVE IS AS AVAILABLE AS YOUR PHONE. Call, wire or write for further information.

\*Due to export and shipping, prices slightly higher overseas.

TMC is the original designer/producer of transistorized multi-channel analyzers. Today, TMC instrumentation is delivered to every nation in the free world for use in the most advanced laboratories known to man. For full specifications, information, consultation, please write or phone your nearest Sales Office or factory direct . . . North Haven CE 9-2501.



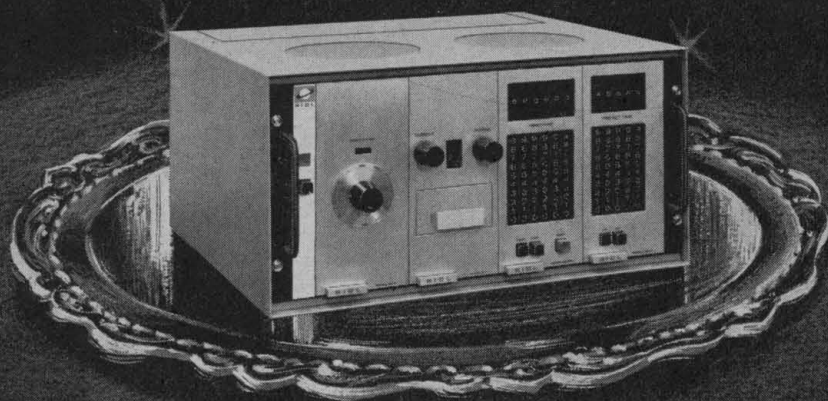
## TECHNICAL MEASUREMENT CORPORATION

441 WASHINGTON AVENUE, NORTH HAVEN, CONN., U.S.A.  
Sales Offices in all Principal Cities of the Free World

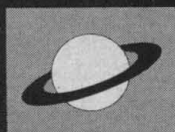
EUROPE: TECHNICAL MEASUREMENT CORPORATION, GmbH, Frankfurt/Main, Germany  
FAR EAST: NICHIMEN CO., LTD., Tokyo, Japan



*If you require the finest—specify* **RIDL**



Information on  
the world's most complete line of nuclear instruments  
is available by writing to...



**RIDL**

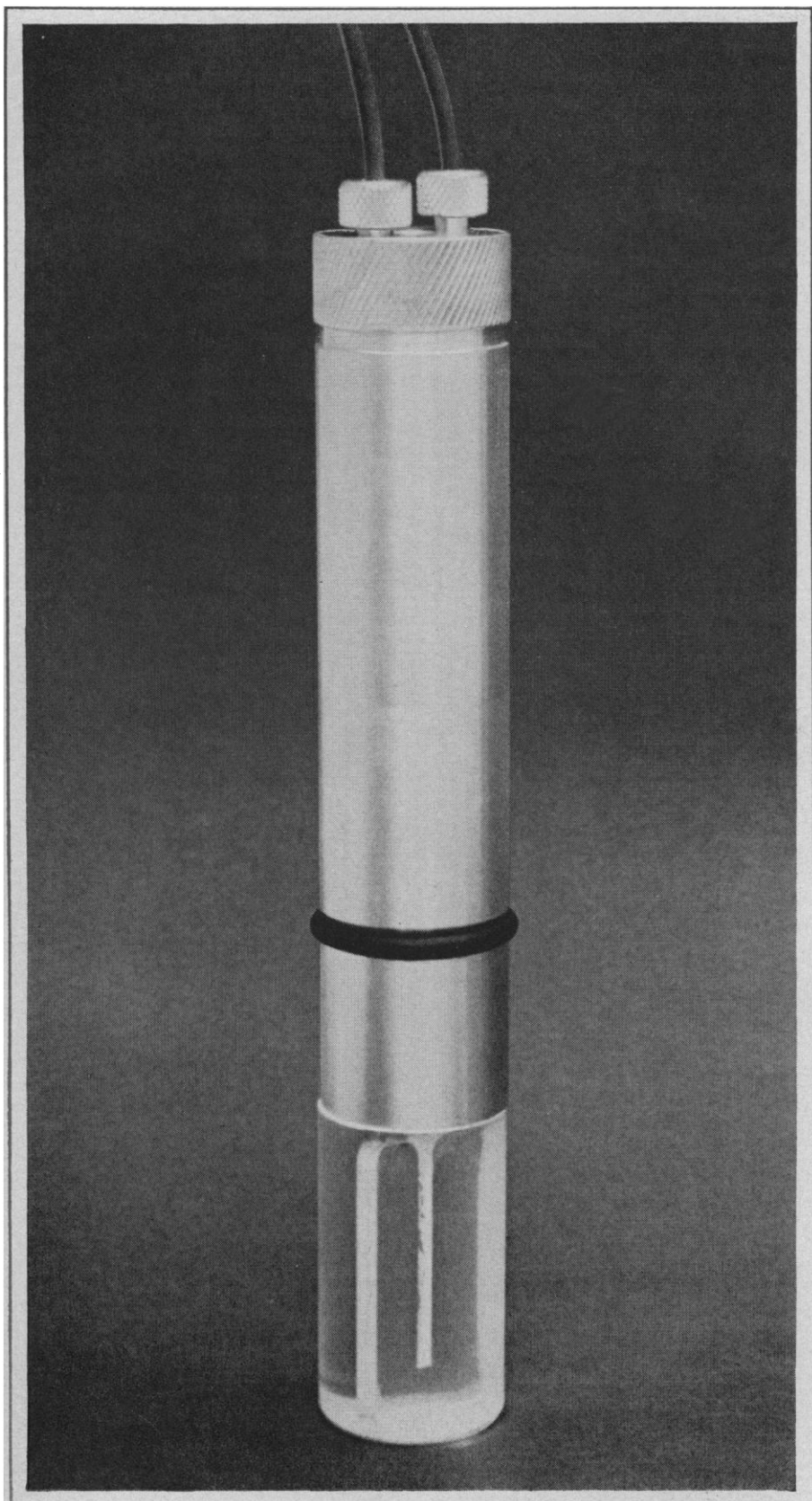
Radiation Instrument Development Laboratory

4501 WEST NORTH AVENUE • MELROSE PARK, ILLINOIS • MU 1-2323 • CABLE: RADILAB • TWX: 312-681-3448

DIVISION OF NUCLEAR-CHICAGO CORPORATION



**This is CHROMA/CELL . . .**  
**a time-saving way to measure continuously**  
**the radioactive components in a liquid stream**



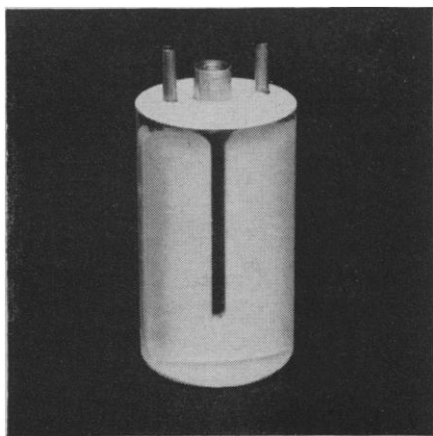
Nuclear-Chicago's new Chroma/Cell scintillation detector systems offer several important benefits. They increase the data producing capability of automatic liquid chromatographic techniques. They eliminate the need for assaying individually collected fractions of the effluent. They afford a consistently reliable method for quantitative and qualitative determinations.

In a typical analytical application a Chroma/Cell system can precisely resolve, measure, and record a radioactive peak contained in only 2.5 ml of a complex amino acid mixture. There is no interference with the normal chromatographic procedures. Recorded data can be presented in analog or digital form, or both, depending on the specific Chroma/Cell system selected.

Please request a copy of Technical Bulletin Number 15, "Continuous Scintillation Counting of Weak Beta Emitters in Flowing Aqueous Streams." It will be sent to you with a brochure describing Chroma/Cell systems.

## Good sensitivity and resolution are achieved with all beta emitters

The counting efficiency of Chroma/Cell systems is 30 to 45 per cent for carbon-14 and 1 to 2.5 per cent for tritium. Higher energy isotopes such as P-32 and S-35 are counted with correspondingly greater sensitivity. Three detector cells of 1, 2, and 4 ml volume are furnished with Chroma/Cell systems. These interchangeable cells enable the investigator to maximize either resolution or sensitivity as required by the nature of the effluent run. The Chroma/Cell's resolution characteristics insure satisfactory discrimination of each separated radioactive component in the run.

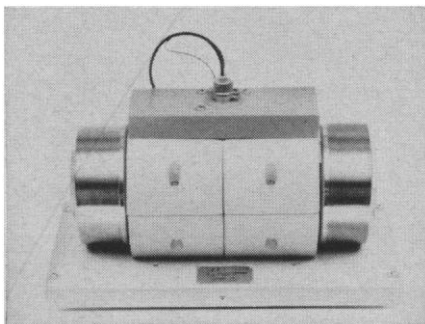


The Chroma/Cell is designed to maintain the lowest fluid pressure drop consistent with good efficiency. The anthracene-packed cell cavity has a large surface-to-volume ratio providing good collection of photons produced by beta particles. The cross-section of the cell cavity presented to the liquid stream is designed to minimize flow impedance and the possibility of turbulence. Cell background is low and almost completely independent of the cavity volume. Most of the normal background encountered is usually a result of radioactive contamination of the photomultiplier tube envelopes.

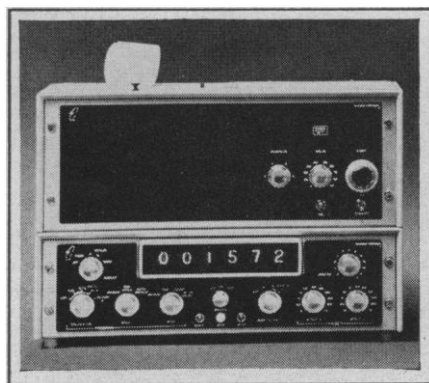
## You can select from a wide variety of advanced systems

Nuclear-Chicago offers a selection of Chroma/Cell systems for nearly all aqueous flow counting applications.

These systems feature a convenient bench-top detector assembly. They are available with automatic digital and analog readout options. Pulse-height discrimination is performed by a fast three-channel analyzer developed specifically for beta spectrometry.



Chroma/Cell systems are an excellent choice for continuous-flow scintillation counting. The bench-top detector assembly illustrated above also allows you to analyze individual liquid scintillation samples when not monitoring liquid flow.



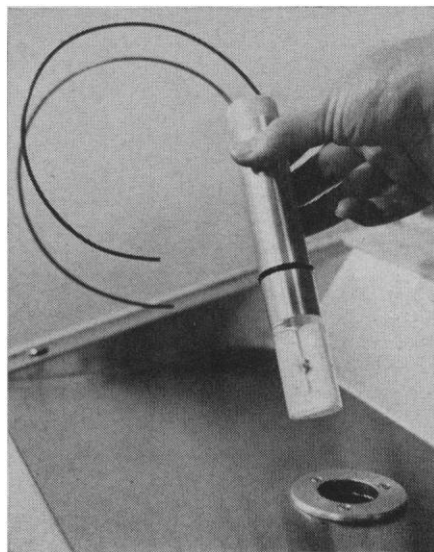
Nuclear-Chicago's flow monitoring systems offer a choice of analog and/or digital read-out instruments to fit your specific needs. The combination scaler/timer illustrated above provides fast digital print-out of data in time intervals as short as one second. Graphic recorders are available in single-channel, dual-channel, and integrating versions, and linear or log ratemeters may be selected.

## Convert your liquid scintillation spectrometer to automatic flow counting in minutes

The Chroma/Cell detector can be utilized separately to extend the usefulness of all Nuclear-Chicago liquid scintillation spectrometry systems. Just insert the Chroma/Cell in the detecting chamber of any Series 700 or 720 spectrometer for economical conversion to continuous liquid flow monitoring.

If a separate detector assembly for flow counting is desired, you can purchase the bench-top unit only and connect it to the analyzer of your present Nuclear-Chicago spectrometer.

These direct conversion features, available only with Nuclear-Chicago instruments, allow the researcher to enlarge the data-producing capabilities of his liquid scintillation spectrometer.



Conversion to continuous flow monitoring is accomplished in minutes and with no modification of existing circuitry. Simply remove the flow cell when individual sample measurement is again required.

NUC-B-3-223



349 East Howard Avenue, Des Plaines, Illinois • Telephone 312 827-4456

SALES OFFICES: New York, Boston, Washington, Philadelphia, Atlanta, Chicago, Minneapolis-St. Paul, Cleveland, Dallas, Los Angeles, San Francisco, Denver, Toronto

# Recent AAAS Symposium Volumes

## #72. Spermatozoan Motility.

1962. 322 pages. 113 illustrations.  
 Edited by: David W. Bishop.  
 For the first time the details of sperm motility are here presented in monograph form. A wealth of previously unpublished data. A valuable source of reference for the student and investigator, as well as for the practitioner of applied reproductive biology.

Retail Price: \$7.50. AAAS Member's Cash Price: \$6.50.

## #71. Great Lakes Basin.

1962. 320 pages. 92 illustrations.  
 Edited by: Howard J. Pincus.  
 The reader will find here material on pure and applied science, accounts of new research and reviews of material published elsewhere, historical and social studies, and pleas for action and planning.

Retail Price: \$7.50. AAAS Member's Cash Price: \$6.50.

## #70. Fundamentals of Keratinization.

1962. 202 pages. 136 illustrations.  
 Edited by: Earl O. Butcher and Reidar F. Sognnaes.  
 The fields of anatomy, dentistry, dermatology, medicine, pathology, and zoology are represented in this volume.

Retail Price: \$6.50. AAAS Member's Cash Price: \$5.75.

## #69. Biophysics of Physiological and Pharmacological Actions.

1961. 612 pages. 212 illustrations.  
 Edited by: Abraham M. Shanes.  
 A bird's-eye view of a number of principles now considered important. Useful for teaching, as well as for research purposes.

Retail Price: \$13.50. AAAS Member's Cash Price: \$11.75.

## #68. Sciences in Communist China.

1961. 884 pages. 23 illustrations.  
 Edited by: Sidney H. Gould.  
 "... strongly recommended to all who are in search of facts and source material on the sciences in China."—*Science*, 22 September 1961

Retail Price: \$14.00. AAAS Member's Cash Price: \$12.00.

## #67. Oceanography.

1961. 2nd printing, 1962. 665 pages. 146 illustrations.  
 Edited by: Mary Sears.  
 "I know of no other volume that so well defines oceanography, its purpose, opportunities and requirements."—*Science*, 9 June 1961

Retail Price: \$14.75. AAAS Member's Cash Price: \$12.50.

## #66. Germ Plasm Resources.

1961. 394 pages. 59 illustrations.  
 Edited by: Ralph E. Hodgson.  
 "This book will be of interest to nonplant and animal breeders, for the rather general treatment of various topics . . . allows for rapid perusal."—*Bulletin of the Entomological Society of America*, September 1961

Retail Price: \$9.75. AAAS Member's Cash Price: \$8.50.

## #65. Aging . . . Some Social and Biological Aspects.

1960. 436 pages. 65 illustrations.  
 Edited by: Nathan W. Shock.  
 "The 26 contributors include many of the most respected names in American gerontology, and the chapters cover a wealth of material."—*Journal of Gerontology*

Retail Price: \$8.50. AAAS Member's Cash Price: \$7.50.

## #64. Calcification in Biological Systems.

1960. 526 pages. 283 illustrations.  
 Edited by: R. F. Sognnaes.  
 "Those interested in current concepts of mineralization of calcified tissues will find in this text the sources of current knowledge on the subject."—*American Journal of Orthodontics*, May 1961

Retail Price: \$9.75. AAAS Member's Cash Price: \$8.50.

## #63. Congenital Heart Disease.

1960. 372 pages. 147 illustrations.  
 Edited by: Allan D. Bass and Gordon K. Moe.  
 "Should serve as a valuable and concise summation of the more important aspects of congenital heart disease."—*American Journal of Cardiology*, August 1961

Retail Price: \$7.50. AAAS Member's Cash Price: \$6.50.

British Agents: Bailey Bros. & Swinfen, Ltd., Hyde House, West Central St., London, W.C.1

Clip out this Form. Fill in and Mail Today

Circle Volumes  
 You Wish To  
 Order . . .

72      71      70  
 69      68      67  
 66      65      64  
 63

\$ . . . . .

Payment  
 Enclosed

American Association for the Advancement of Science  
 1515 Massachusetts Avenue, NW  
 Washington 5, D.C.

Please send the symposium volumes circled on this form, to:

Name: . . . . .

Address: . . . . .

City: . . . . . Zone: . . . . . State: . . . . .

Please check:

( ) I am a member of AAAS, and enclose payment for the volumes indicated at member prices. ( ) \$ . . . . . enclosed.

( ) I am not a member of AAAS. ( ) Please bill me.

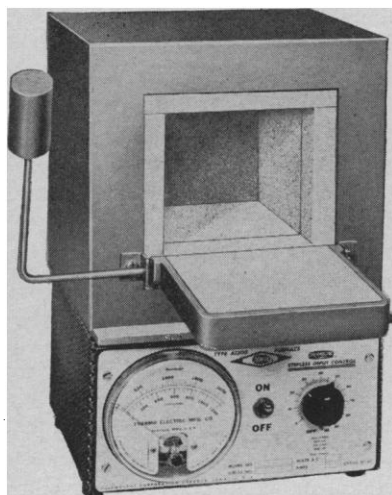
( ) Please send Membership Application Form.



## LABORATORY APPARATUS

"Lab accepted standard of quality"

**SCIENTIFICALLY ENGINEERED  
CAREFULLY MANUFACTURED  
PROPERLY PRICED**



### HANDY UTILITY SIZE ELECTRIC LABORATORY FURNACES

#### TYPE 1300

Stepless input control allows infinitely variable choice of operating temperatures from 350° F to maximum.

Maximum operating temperatures  
1650° F continuous, 1900° F  
intermittent.

Automatic compensation for line  
voltages gives uniform operating  
temperatures.

Chamber size: 4" x 3 3/4" x 4 1/4"

**PRICE \$80.00**

#### TYPE 1400

Same features as above

Chamber size: 4 7/8" x 4 1/4" x 6"

**PRICE \$98.50**

#### OTHER SIZES and types to meet most needs.

Write, wire, or phone for complete  
information and name of nearest  
dealer.

PHONE: Area code 319-583/3501

**THERMOLYNE CORPORATION**

Dept. 568 2555 Kerper Blvd. Dubuque, Iowa

930

## Structural Chemistry: Techniques

A symposium on the determination of molecular structure, ranging from discussions of classical diffraction techniques to reports on magneto-optical rotation spectra and the Mössbauer effect, was part of the program of the chemistry section of the AAAS at the Philadelphia meeting in December. Eight papers were presented.

A technique which will see wide application in the future is magneto-optical rotation spectroscopy (MOR), described by Victor Shashoua (du Pont Company). This is an extension of the method of optical rotatory dispersion in which the rotation of polarized light by the sample is measured as a function of frequency in the visible and ultraviolet regions of the spectrum. While the optical rotatory dispersion method (ORD) is limited to substances which are naturally optically active, the new method has no such limitation. All substances in a magnetic field rotate the plane of polarized light. Because of this, there are no inert solvents for this technique and considerable care has to be exercised in the interpretation of the results. Working with a magnetic field of 10,000 gauss and temperature control of  $\pm 0.1^\circ$ , Shashoua was able to report a precision of  $\pm 0.003^\circ$  in measuring the rotation.

The spectra obtained are similar in general character to the ORD spectra but often show considerably more detail than ORD shows in compounds which are naturally optically active. Results were shown for a wide variety of substances ranging from inorganic complexes to polypeptides. Among other effects this technique can detect triplet states as well as changes such as those due to complexing and change of pH on hemoglobin. More will be heard in the future about this generally applicable technique.

S. S. Hanna reviewed recent work with the Mössbauer effect. Because of the extreme sharpness of the gamma-ray lines, differences in absorption can be achieved by use of the Doppler effect produced by very low relative velocities of source to absorber. Thus, line widths of  $10^{-8}$  electron volts can be measured by use of the drive mechanism on an ordinary lathe bed. The position of the nuclear energy levels is affected by the d-c magnetic field produced at the nucleus by the orbital electrons. Although only electrons in s orbitals contribute to the magnetic field at the nucleus, these electrons can be

polarized by unpaired electrons in other orbitals. The Mössbauer effect thus is very sensitive to the electronic environment of the absorbing nucleus. Considerable data were presented for absorption by iron atoms in various chemical environments, but no clear relationship with molecular structure has been developed as yet. It appears that the Mössbauer effect is the best test available for the correctness of calculated electron density functions near the nucleus.

Walter C. Hamilton (Brookhaven National Laboratory) considered some of the more recent structural studies in which neutron diffraction techniques are used. Among the works cited was that of the square planar structure of  $\text{XeF}_4$  and the linear structure of  $\text{XeF}_2$ .

M. KENT WILSON

*Department of Chemistry, Tufts  
University, Medford, Massachusetts*

## Tongues of Science

The complex of problems which confronts the scientist in his attempt to take advantage of knowledge contributed by his colleagues in tongues other than his own was the subject of the symposium presented by the Information and Communication Section (T) on 26 and 27 December at the AAAS meeting in Philadelphia. The symposium, entitled Other Tongues of Science: Assimilating the Literature of Other Nations, was cosponsored by the National Science Foundation.

The symposium's 26 participants represented government and private agencies, organizations, societies, industries, and institutions actively supporting and carrying on programs to insure the inflow of scientific information into the United States and to make it available to the scientist in usable forms. While estimates vary somewhat, only about 35 percent of the scientific literature, even when it is made available, can be understood in the original by individuals competent to read English alone. Scientists who read Russian in addition to English have access to about 50 percent, or half of the world's scientific literature.

The currently extensive acquisition, translation, and publication activities in all areas and fields of science, costly both in terms of scientific manpower and in funds consumed, must be evaluated. How effective are the present translation programs? How necessary

SCIENCE, VOL. 139



## Kodak reports on:

movies without entertainment . . . the value of a dollar . . . a big one with a low threshold

### Brig. Gen. Webb's assignment

You sway in the Sea Beach Express under Manhattan and note how deeply engrossed is the young woman across the aisle in reading about movie stars. You walk down a side street in a Kansas town in the evening and note how every family in every house sits transfixed before the blue bottle. The motion picture camera has held the people in thrall for a long time now. You have your opinions and impressions of how most professional motion picture cameras are employed. You could be wrong.

Not long ago we announced a new 16mm professional motion picture camera, the KODAK Reflex Special. Embodies 10 years' research and design, we told the movie-makers. They bought. Then we took a look at exactly who they might be. Not entirely the crowd that the careless observer might have guessed—

Cineangioradiographers who make clinical x-ray movies of the great vessels and valves of the heart.

Psychiatrists.

Petroleum engineers.

Sociologists, professional ones.

Surgeons.

Aerospace medical people.

A biologist who shoots 5,000 feet per month of time-lapse motion pictures of tissue cultures, mostly through the oil-immersion microscope objective, and who has opened up dynamic morphology by photographing the mechanism of neoplasia, the functioning of organoids within the living cell, and the structural changes by which it answers physical and chemical changes in its environment.

A physicist, a mathematician, and a few others talked one night at Woods Hole till dawn about the motion picture as a research tool and means of communication between scientists, quite apart from science teaching. They moved the National Academy of Sciences, the National Research Council, and the National Science Foundation. These imposing bodies have correlated their complex functions to seek out the scholar bending a movie camera to his will in some ignored nook of the campus. Their survey has turned up two or three hundred of him.

NSF has granted funds to the National Academy of Sciences to start the American Science Film Association. Brig. Gen. Willard Webb has left the Library of Congress to become ad-

ministrative director of ASFA. The isolated researcher with a movie camera and the scientifically dead-serious businessman with priceless studies of whales copulating can look to ASFA. It will be able to tell one how others have solved problems he is still struggling with and to help him make contact with colleagues in various parts of the world who want to see *his* footage. He ought to make sure that his name and his interests are on file with American Science Film Association, 704 Seventeenth St. N. W., Washington 6, D. C.

*Neither ASFA, NSF, NRC, nor NAS endorses any particular brand name, but we do. In doing so we can answer many pertinent questions about cameras, projectors, film, processing services, and auxiliary equipment for anybody who asks them of Eastman Kodak Company, Motion Picture Film Department, Rochester 4, N. Y.*

### An interest in silver

To avoid crippling confusion in motivation, one stoutly reaffirms the belief of ages past that one is in business for the money. Today, however, other motivators exhibit their power, and though we still pursue the almighty dollar fiercely, once we have caught it we give little thought to the promise printed on it under President Washington's portrait. It promises silver.

Our house is founded on this truly unique gem of the periodic table. The marvelous behavior of the crystal lattice that it forms with bromine, when properly studded with impurities, makes photography possible; the importance of photography in both the serious and the gay is a major component of the force that attracted over  $10^9$  almighty dollars into the till last year. (Figuratively. Physically they are only a configuration of magnetized domains on a strip of iron oxide in some vault. Wonderful is the mind of man.)

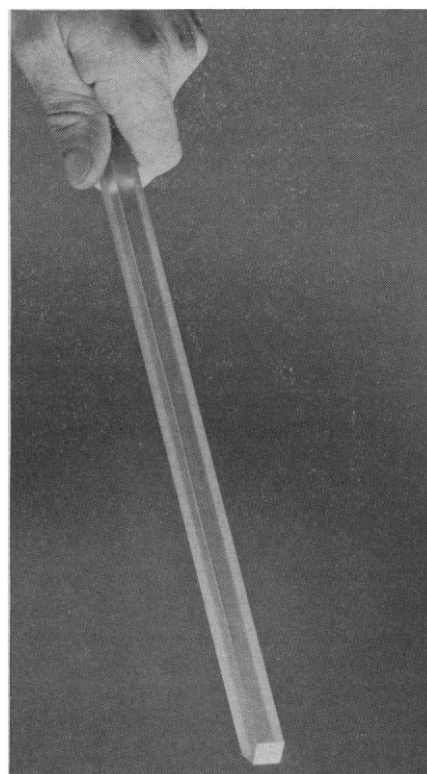
Silver is drawn from the vault (a different vault) and made into pure  $\text{AgNO}_3$ . The vast bulk of this gets converted to silver halides and moves out on photographic goods. A very few parts per million find their way into bottles carrying the EASTMAN Organic Chemicals label.

*Silver Nitrate* itself, a fixture of the chemical laboratory since long before the invention of the test tube, still makes news. Only last spring it was revealed that silica impregnated with  $\text{AgNO}_3$  displays highly selective adsorption with respect to the geometry and number of  $\text{C}=\text{C}$ 's in related unsaturated lipids, as detailed for chromatographic practice in

*Chemistry and Industry*, June 16 and July 7, 1962. Last year also  $\text{AgNO}_3$ -Dichromate spray reagent was proposed for mercapturic acids and S-phenylcysteines (*J.C.S.*, 1962, 608).  $\text{AgNO}_3$  paper detects and fixes volatile As and Sb hydrides (*Chim. Anal.*, 43, 441).  $\text{AgNO}_3$  is needed in the complexometric titration of K, Li, and Rb (*Mikrochim. Acta*, 1961, 644, 729, 732).

*We also offer Silver Nitrite, Silver Arsenate, Silver Carbonate, Acetic Acid Silver Salt (aren't we silly in our nomenclature!), Silver Cyanate, p-Toluenesulfonic Acid Silver Salt, numerous reagents for silver, and an invitation to all chemists interested in silver to keep in touch with EASTMAN Organic Chemicals Department, Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).*

### Lase, friend!



We can make laser rods big because we make them out of glass. A big piece of homogeneous glass is far more likely than a big homogeneous crystal. Homogeneity and long experience in precision prism-polishing help keep beam divergence small. The problem with glass has been threshold. Fortunately, with non-silicate glass it's no problem. Low, low, low. Inquiries about KODAK Neodymium Glass Laser Rods welcomed by Eastman Kodak Company, Apparatus and Optical Division, Rochester 4, N. Y. (Phone 716-562-6000, Ext. 5166).

**This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science**

# AP Quality

in Scientific Publishing

## NEW BOOKS

### Experimental Chemotherapy

Edited by Robert J. Schnitzer and  
F. Hawking

Volume 1, 1,008 pp. Special price  
until May 31, 1963: \$32.00  
Thereafter: \$38.00

### Enzyme Histochemistry and Its Application in the Study of Neoplasms

By M. S. Burstone  
627 pp., \$22.50

### Introduction to Dynamic Morphology

By E. Mayer  
545 pp., \$16.00

### Radiation Effects on Organic Materials

Edited by Robert O. Bolt and  
James G. Carroll  
576 pp., \$13.50

### Synthesis of Feedback Systems

By I. M. Horowitz  
726 pp., \$16.50

### Differential-Difference Equations

By Richard Bellman and  
Kenneth L. Cooke  
465 pp., \$13.75

### Nuclear Shell Theory

By Amos de-Shalit and Igal Talmi  
573 pp., \$14.50

### Real Gases

By Ali Bulent Cambel,  
Donald P. Duclos and  
P. Anderson  
166 pp., \$6.50

### Thermomagnetic Effects in Semiconductors

By I. M. Tsidil'kovskii  
333 pp., \$12.50

## SERIAL PUBLICATIONS

### Modern Materials

Advances in Development  
and Applications

Edited by Henry H. Hausner  
Volume 3, 475 pp., \$15.00

### Symposia of the International Society for Cell Biology

Volume 1, The Interpretation  
of Ultrastructure  
Edited by R. J. C. Harris  
438 pp., \$14.00

YOUR TECHNICAL BOOKSELLER  
can furnish up-to-date information  
on any of our titles.

## ACADEMIC PRESS

NEW YORK AND LONDON

111 Fifth Avenue, New York 3  
Berkeley Square House, London, W. 1

are they? Are U.S. scientists being trained to handle foreign literature competently without translations? Should entire journals be translated or should translated titles or abstracts first be circulated to scientists as bases for the selection of certain full papers to be translated? Can answers to these questions be the same for all scientific disciplines? Or does the literature of one branch of science differ significantly from that of another?

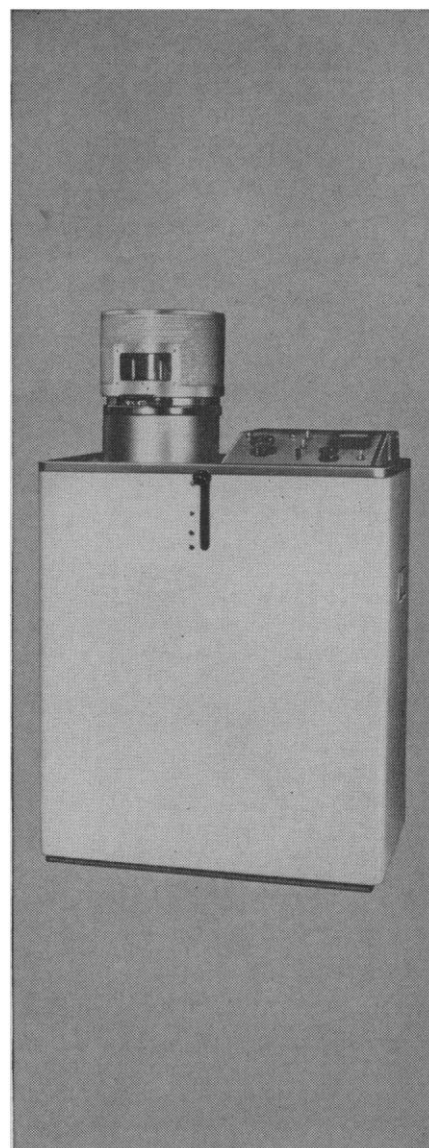
One session of the symposium was devoted to accounts of how foreign scientific information is handled in other countries. Representatives of information agencies in Great Britain, Canada, Japan, and Scandinavia presented details of current programs in their respective areas. Cooperation, coordination, and integration of the work of various information groups and interests within the country contributed significantly. Traditional early introduction of foreign languages into school curricula provides those who enter science with a good working knowledge of those languages.

As to the nature of translations, whole journal (cover-to-cover) translations apparently are desirable in certain disciplines such as physics. Most of the significant Russian research reports in physics, for example, are concentrated in relatively few journals. By translating these completely one can cover the field remarkably well. In other fields of Russian science, such as astronautics, research information is diffuse; reports are scattered throughout many publications. To cover Russian astronautics, then, a selection of articles to be translated becomes a necessity.

It was acknowledged that the broadening of language training programs for U.S. scientists is needed. Merely satisfying language requirements for advanced degrees provides the young scientist with only limited ability to read the scientific literature in these tongues. Furthermore, he is apt to select languages he feels are easier to master, rather than those he is most likely to require to cover the literature of his field. Even at best, the linguistically-gifted and well-trained scientist seldom comprehends the subtleties of more than two foreign languages. He too must depend on translations for much of the literature in other tongues.

As the literature increases in volume in countries as yet scientifically immature, the language problems will increase proportionately.

It seems clear that for the continued



## Vac-Evap®

(A high speed vacuum  
evaporator from Bendix)

- 3½ minutes to  $1 \times 10^{-4}$  mm Hg.
- 10 minutes to  $5 \times 10^{-5}$  mm Hg.
- Single lever vacuum control.
- Hinged bell jar (8½" diameter) with protective cover.
- 2 extra feed-through ports for external vacuum connections.
- Specimen protecting shutters controlled from outside vacuum.
- Compact design—takes less than 3½ square feet of floor space. 36 inches high.
- All materials, tools, and accessories supplied, including carbon evaporation unit.

For information, write us at 3625 Hauck Road, Cincinnati 8, Ohio.

## Cincinnati Division



health and growth of science in the United States substantial foreign translation programs must be continued for the foreseeable future.

Derek J. deSolla Price was the speaker at a Section T luncheon. His subject, "A calculus of scientific information and manpower," dealt with such propositions as these: the number of scientists in a field increases as the squares of the number of good scientists and amount of good work; the dollar cost of research increases as the square of the total number of scientists employed; the more scientifically mature a country becomes, the less will be its share of the world-total of scientific work. As a final corollary of his theory he suggested that the scientific paper as a means of communication is fast dying and will be replaced in part by person-to-person communication and in part by machine-handled data and perhaps also some such device as a scientific daily newspaper analogous to the *Wall Street Journal* or the *Financial Times*.

PHYLLIS V. PARKINS

Biological Abstracts,  
Philadelphia, Pennsylvania

#### Forthcoming Events

##### April

1-2. **Process Automation**, 5th symp., Santa Monica, Calif. (D. Kader, P.O. Box 1065, Canoga Park, Calif.)

1-3. **Oak Ridge Radioisotope Conf.**—Applications to Physical Science and Engineering, Gatlinburg, Tenn. (Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

1-4. **American Radium Soc.**, annual, White Sulphur Springs, W. Va. (C. G. Stetson, ARS, Dept. of Radiology, Englewood Hospital, Englewood, N.J.)

1-5. **American College of Physicians**, Denver, Colo. (E. C. Rosenow, Jr., 4200 Pine St., Philadelphia 4, Pa.)

1-27. **World Meteorological Organization**, 4th congr., Geneva, Switzerland. (Secretariat, WMO, 41 Avenue Guiseppe Motta, Geneva)

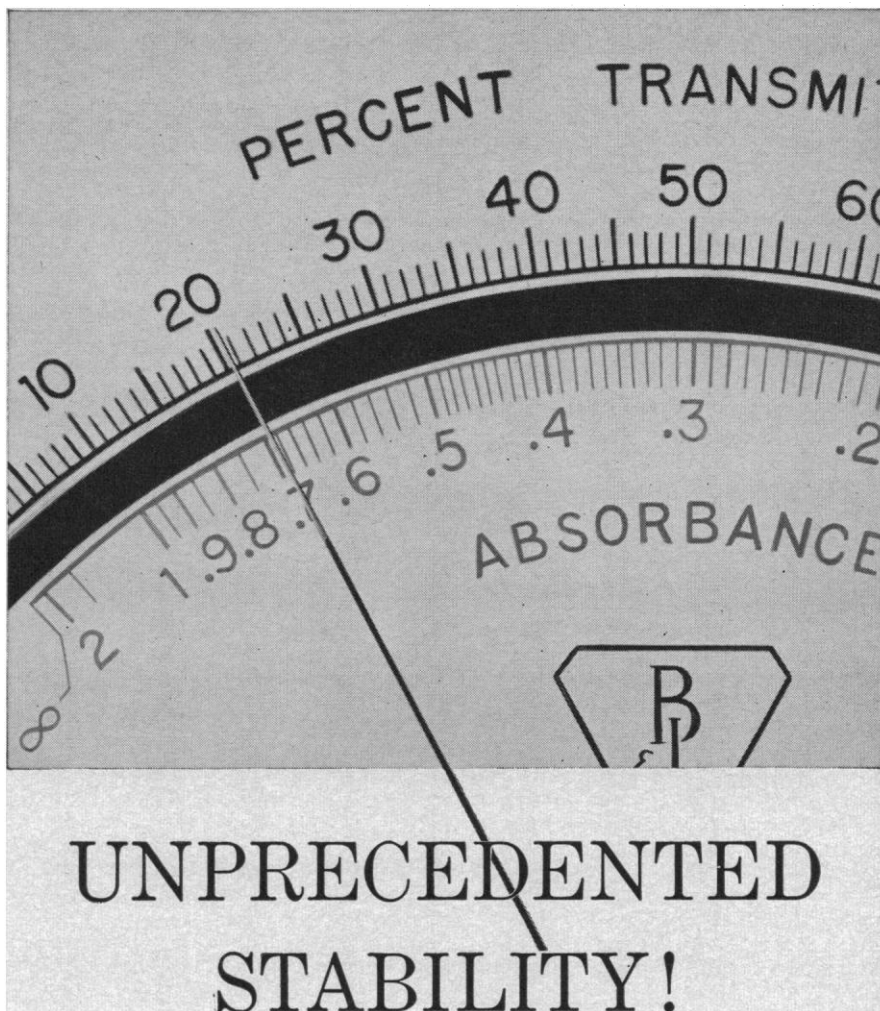
2-6. **Psychology**, 8th Inter-American congr., Mar La Plata, Argentina. (G. M. Gilbert, Psychology Dept., Long Island Univ., Brooklyn 1, N.Y.)

3-5. **American Soc. of Internal Medicine**, annual, Atlantic City, N.J. (ASIM, 3410 Geary Blvd., San Francisco 18, Calif.)

3-5. **Streamflow Regulation for Quality Control**, symp., Cincinnati, Ohio. (J. E. McLean, Field Operations Section, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Pkwy., Cincinnati 26)

3-6. **National Council of Teachers of Mathematics**, Pittsburgh, Pa. (M. H. Ahrendt, 1201 16th St., NW, Washington 6)

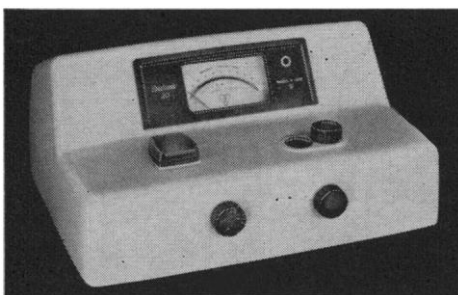
8 MARCH 1963



For analyses requiring highest possible accuracy, the voltage-and-frequency-regulated model of the NEW Spectronic 20 Colorimeter provides rock-steady scale readings, despite the most extreme power fluctuations—at either 50 or 60 cycles! *And without any sacrifice in sensitivity!* For more routine applications, you can

choose from the standard or battery-operated models at lower cost.

All better-than-ever models of the best-selling colorimeter of all time offer many other additional new and exclusive benefits. Mail the coupon, and get the whole story.



**Spectronic 20 Colorimeter** ®

**BAUSCH & LOMB**



**BAUSCH & LOMB  
INCORPORATED**

64239 Bausch Street  
Rochester 2, N. Y.

- ☐ Please schedule a Spectronic 20 Colorimeter demonstration in my lab at my convenience.
- ☐ Please send Spectronic 20 Catalog D-266.

Name.....

Company.....

Address.....

City..... Zone..... State.....

4-5. Agricultural **Meteorology**, 5th natl. conf., Lakeland, Fla. (American Meteorological Soc., 45 Beacon St., Boston 8, Mass.)

4-5. **Systems**, 2nd symp., Cleveland, Ohio. (M. Mesarovic, Case Inst. of Technology, University Circle, Cleveland 6)

4-6. International Assoc. for **Dental Research**, British section, 11th annual, London, England. (C. Tonge, Dept. of Anatomy, King's College Medical School, Newcastle upon Tyne 1, England)

4-6. Latin **Medical Conf.**, Rome, Italy. (Prof. Urso, Policlinico Umberto 1, Viale Policlinico, Rome)

5-6. Alabama **Acad. of Science**, Tuscaloosa. (W. B. DeVall, Forestry Dept., Auburn Univ., Auburn, Ala.)

6. **Paleontological Research Inst.**, Ithaca, N.Y. (R. Harris, PRI, 109 Dearborn Pl., Ithaca)

7-9. Royal **Microscopical Soc.**, Bethesda, Md. (M. C. Brown, 4409 Glenridge St., Kensington, Md.)

7-13. Panamerican **Diabetic Congr.**, 2nd, Chicago, Ill. (Diabetic Inst. of America, Inc., Suite 1646, Chicago 2, Ill.)

8-10. American Assoc. for **Thoracic Surgery**, 43rd, Houston, Tex. (AATS, 7730 Carondelet Ave., St. Louis, Mo.)

8-10. **Feedback Mechanisms in the Nervous System**, Villahermosa, Mexico. (E. Eidelberg, Div. of Neurobiology, St. Joseph's Hospital, 350 W. Thomas Rd., Phoenix, Ariz.)

8-10. **Seismological Soc. of America**, Berkeley, Calif. (K. V. Steinbrugge, 465 California St., San Francisco 4, Calif.)

8-11. American **College Personnel**

Assoc., Boston, Mass. (B. A. Kirk, Counseling Center, Univ. of California, Berkeley 4)

9-11, American Assoc. of **Anatomists**, Washington, D.C. (L. B. Flexner, Dept. of Anatomy, School of Medicine, Univ. of Pennsylvania, Philadelphia)

10-11. Engineering Aspects of **Magneto-hydrodynamics**, 4th symp., Berkeley, Calif. (G. S. Janes, Avco-Everett Research Laboratory, Everett 49, Mass.)

11-13. Natural **Radiation Environment**, intern. symp., Houston, Tex. (J. A. S. Adams, Dept. of Geology, Rice Univ., P.O. Box 1892, Houston 1)

11-13. Eastern **Psychological Assoc.**, 34th annual, New York, N.Y. (M. A. Iverson, Dept. of Psychology, Queens College of the City University of New York, Flushing 67)

11-13. **Pulsatile Blood Flow**, intern. symp., Philadelphia, Pa. (E. O. Attinger, Presbyterian Hospital in Philadelphia, 51 N. 39 St., Philadelphia 4)

11-13. Southern Soc. for **Philosophy and Psychology**, Miami Beach, Fla. (E. A. Alluisi, Human Factors Research Lab., Lockheed Georgia Co., Marietta, Ga.)

12-13. Pennsylvania **Acad. of Science**, East Stroudsburg, (K. B. Hoover, Messiah College, Grantham, Pa.)

14-18. **Electrochemical Soc.**, Pittsburgh, Pa. (ES, 30 E. 42 St., New York 17)

15-16. American Soc. for **Artificial Internal Organs**, annual, Atlantic City, N.J. (B. K. Kusserow, Medical College of Vermont, Burlington)

15-20. Association for Research into **Periodontal Diseases**, 17th intern., Athens,

Greece. (O. Louridis, ARPA, 8 rue Hippocratous, Athens)

16-18. **Optical Masers**, intern. symp., New York, N.Y. (L. Bergstein, Symp. Committee, Polytechnic Inst. of Brooklyn, 55 Johnson St., Brooklyn 1, N.Y.)

16-19. **USAF Aerospace Fluids and Lubricants Conf.** (unclassified), San Antonio, Tex. (J. Harmon, Southwest Research Inst., 8500 Culebra Rd., San Antonio)

16-20. American **Physiological Soc.**, Atlantic City, N.J. (H. Rahn, Dept. of Physiology, Univ. of Buffalo, Buffalo 14, N.Y.)

16-20. British Inst. of **Radio Engineers**, Southampton, England. (BIRE, 9 Bedford Sq., London, W.C.1, England)

16-20. Federation of American Societies for **Experimental Biology**, annual, Atlantic City, N.J. (M. O. Lee, 9650 Wisconsin Ave., NW, Washington 14)

16-21. American Soc. for **Experimental Pathology**, Atlantic City, N.J. (K. M. Brinkhous, Dept. of Pathology, Univ. of North Carolina, Chapel Hill)

16-21. American Inst. of **Nutrition**, Atlantic City, N.J. (A. E. Schaefer, Bldg. 16, Rm. 207, NIH, Bethesda 14, Md.)

16-24. **Forensic Immunology, Medicine, Pathology, and Toxicology**, 3rd intern. meeting, London, England. (I. Sunshine, 2121 Adelbert Rd., Cleveland, Ohio)

17-19. Institute of **Environmental Sciences**, technical meeting and equipment exposition, Los Angeles, Calif. (Natl. Office, P.O. Box 191, Mt. Prospect, Ill.)

17-19. **Institute of Physics and the Physical Society**/Joint British Committee for Vacuum Science and Technology, conf., Liverpool, England (Inst. of Physics, 47 Belgrave Sq., London, S.W.1, England)

17-19. **Nonlinear Magnetics**, intern. conf., Washington, D.C. (Inst. of Radio Engineers, 1 E. 79 St., New York 21)

17-19. **Plastics**, joint congr. of West Germany, Switzerland, and Austria, Vienna. (Wirtschaftsförderungsinstitut der Bundeskammer der gewerblichen Wirtschaft, 3 Hoher Markt, Vienna 1, Austria)

17-20. American **Astronomical Soc.**, meeting, Tucson, Ariz. (P. M. Routly, 265 Fitz Randolph Rd., Princeton, N.J.)

17-20. American **Geophysical Union**, annual, Washington, D.C. (AGU, 1515 Massachusetts Ave., NW, Washington 5)

17-20. German Soc. of **Surgery**, 80th meeting, Munich. (E. Derra, Chirurgische Klinik der Medizinischen Akademie, Moorenstr. 5, Düsseldorf, Germany)

17-21. Man, **Technology, and Medicine in Nuclear and Space Age**, 3rd intern. congr., Rome, Italy. (A. J. Schneiderov, 1945 Calvert St., NW, No. 44, Washington 9)

18. Society of **Plastics Engineers**, regional technical conf., Syracuse, N.Y. (R. R. Collis, c/o Joseph Cashier & Co., Inc., 810 E. Water St., Syracuse)

18-20. **Neurosurgery**, 2nd European congr., Rome, Italy. (B. Guidetti, Viale Università 30, Rome)

18-20. **Stereology**, 1st intern. congr., Vienna, Austria. (Vienna Medical Acad., Alserstrasse 4, Vienna 9)

18-21. Radiology in **Otolaryngology**, intern. symp., Bordeaux, France. (G. Guillen, 45, cours du Marechal Foch, Bordeaux)

# The abc's of Lab Safety TSI

(Time Sterile Indicator)  
Begin and end with T S I  
Conversion Label

**a** In all biological functions, preparation of glassware should start with a TSI Conversion Label that shows the word "CONTAMINATED" to identify its condition.

**b** When glassware is sterilized, the term "CONTAMINATED" is converted to the word "STERILE," thus eliminating human errors and articulating service product has had.

**c** All specimens are considered "CONTAMINATED" and sterilizing should be repeated before dangerous material is disposed of.

The TSI Conversion Label is the only label showing a color change at 250° F. after 15 minutes in the autoclave.

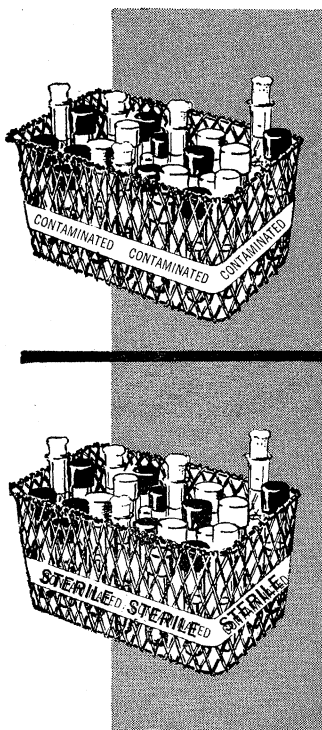


Leading laboratories now use this system to safeguard the health of their personnel.

Write today for samples and complete description.

**PROFESSIONAL TAPE CO., INC.**

365-I Burlington Ave. • Riverside, Illinois



See your nearest hospital or laboratory supplier for service.



## SCIENCE AND ENGINEERING TELEVISION JOURNAL

The "Science and Engineering Television Journal" is televised weekly at 11:10 P.M. in cooperation with New York City's educational TV station, WNDT/Channel 13. These 1-hour telecasts are designed to supplement the traditional channels of communication among scientists and engineers. Plans are being considered which will make "Television Journal" recordings available to other ETV stations about the country.

**14 March: BIOMETEOROLOGY**—American Meteorological Society. Chairman: Dr. Fred Sargent, Professor of Physiology, University of Illinois.  
Definition of biometeorology within the framework of ecology; discussion of types of environment; problems of quantification of elements within an environment; application of biometeorology studies.

**21 March: CLOSING THE MEASUREMENT GAP**—AAAS in collaboration with the National Bureau of Standards. Chairman: Dr. Robert D. Huntoon, Deputy Director of the National Bureau of Standards.  
The program will attempt to create increased awareness of the vital role that measurement plays in the physical sciences, the life sciences, and engineering.

**28 March: COMMENTARY ON CURRENT ASTRONOMY**—American Astronomical Society. Chairman: Dr. William Liller, Department of Astronomy, Harvard University.  
The program will be directed to scientists and engineers in all fields; discussion of the most significant developments in modern astronomy—the most exciting areas of current astronomical research.

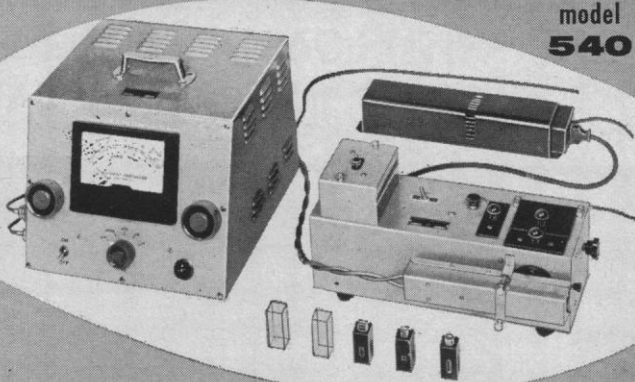
The "Television Journal" is presented under the auspices of 12 scientific and engineering societies and coordinated by the AAAS. The program is produced by John K. Mackenzie. Project Director is E. G. Sherburne, Jr., of the AAAS.

**"Science and Engineering Television Journal"**  
1697 Broadway  
New York 19, New York

# PHOTOVOLT

## LINE-OPERATED MULTIPLIER FLUORESCENCE METER

model  
**540**



- High sensitivity . . . full scale for 0.001 microgram quinine sulphate
- Micro-fluorimetry . . . liquid volumes down to 1 ml
- Low blank readings . . . linear instrument response
- High sensitivity nephelometry . . . minute turbidities
- Fluorescence evaluation of powders, pastes, and solids; also for spot-tests on filter paper without elution
- Selection of filters, interference filters, and sample holders

Write for Bulletin No. 392 to:

### PHOTOVOLT CORP.

1115 Broadway • New York 10, N. Y.

Also: pH Meters, Colorimeters, Densitometers

U.S. Patent No. 3,002,895

Grow Aerobic and Anaerobic Cultures in the

## GYROTORY® INCUBATOR SHAKER

Model G25 is a controlled temperature incubator with continuous shaking action. Agitation speed is continuously variable from 140 to 400 rpm. A heavy-duty motor drives the triple-eccentric-shaft stabilizer assembly which distributes positive, rotary motion to every flask on the 18"x30" platform. This rugged apparatus provides cool, quiet, and smooth-running operation with heavy workloads. Circulating heated air, the fully insulated unit maintains constant temperature; from ambient to 60°C.,  $\pm 1/2^\circ\text{C}$ . It is adaptable for tubes, bottles, and other glassware, and is thoroughly reliable under *continuous* operation. Alternate speed ranges and connections for gassing are also available.



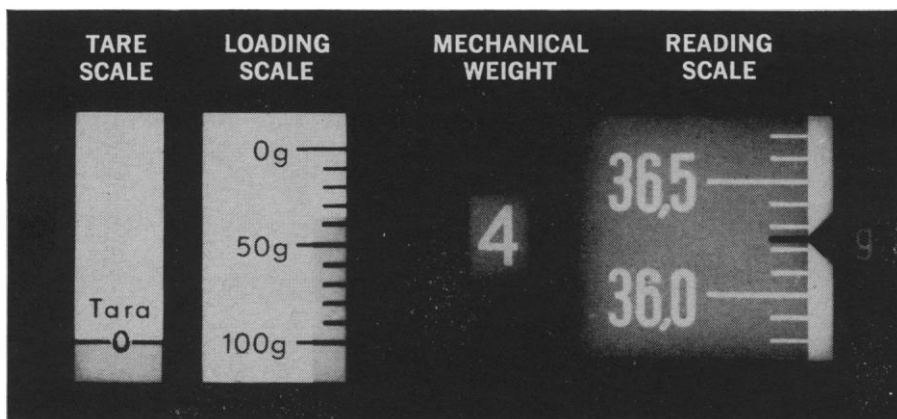
**WRITE FOR  
CATALOG  
G255/383**



**NEW BRUNSWICK SCIENTIFIC CO., INC.**  
PRECISION LABORATORY APPARATUS  
P.O. BOX 606, NEW BRUNSWICK, NEW JERSEY

# **NEW FOR THE FIRST TIME**

## **A HIGH CAPACITY PRECISION BALANCE WITH LOADING SCALE AND TARE INDICATOR SCALE**



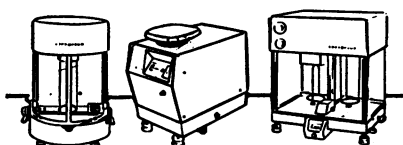
If you are contemplating the purchase of any balance for fast, convenient weighings at capacities ranging up to 3000 grams, we suggest that you examine the new SARTORIUS precision balances with loading scale and tare indicator scale. These two auxiliary scales complement the regular reading scale. They offer a number of significant and exclusive operating advantages over all similar balances—even those equipped with taring facilities. Several capacities and sensitivities are available. For example, Model 2116 has a capacity of 1000 grams; an optical range of 100 grams; an accuracy of  $\pm 0.02$  g and a readability of 0.01g. Continuous mechanical taring to 100 g is provided.

For descriptive literature contact:

# **sartorius**

**BRINKMANN INSTRUMENTS, INC.**  
115 Cutter Mill Road, Great Neck, N. Y.

PHILADELPHIA • CLEVELAND • HOUSTON • MIAMI  
MENLO PARK, CAL. • ST. LOUIS



20. New Jersey Acad. of Science, annual, Glassboro, N.J. (H. L. Silverman, 361 Highland Ave., Newark 4, N.J.)

21-24. Rare Earth, conf., Grand Bahama Island. (K. S. Vorres, Dept. of Chemistry, Purdue Univ., Lafayette, Ind.)

21-25. International College of Surgeons, North American Federation, annual, Los Angeles, Calif. (W. F. James, 1516 Lake Shore Dr., Chicago 10, Ill.)

22-24. Institute of the Aerospace Sciences, Dallas, Tex. (R. R. Dexter, 2 E. 64 St., New York 21)

22-24. American Oil Chemist Soc., Toronto, Ont., Canada. (K. F. Mattil, Swift & Co., Packers and Exchange Ave., Chicago 9, Ill.)

22-24. Biomedical Engineering, 3rd symp., San Diego, Calif. (J. H. McLeod, Program Committee, 8484 La Jolla Shores Dr., La Jolla, Calif.)

22-25. American Physical Soc., Washington, D. C. (K. K. Darrow, APS, Columbia Univ., New York 27)

22-26. Radioisotopes and Radiation in Plant and Animal Insect Control, intern. symp., Athens, Greece. (J. H. Kane, Intern. Conferences Branch, Div. of Special Projects, U.S. Atomic Energy Commission, Washington 25)

22-27. American Acad. of Neurology, Minneapolis, Minn. (C. A. Kane, 80 E. Concord St., Boston, Mass.)

23-25. Electronic Processes in Dielectric Liquids, Durham, England. (Administration Assistant, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

24-26. German Soc. of Hygiene and Microbiology, Würzburg. (W. Herrmann, Städtischen Krankenanstalten, Robert Koch-Haus, Essen, Germany)

24-26. Institute of Radio Engineers, regional conf., San Diego, Calif. (E. Herz, 4444 Mt. Castle Ave., San Diego 17)

24-28. German Roentgen Congr., 44th, Baden-Baden, Germany. (H. Lossen, GRC, Universitäts-Strahleninstitut, Langenbeckstr. 1, Mainz, Germany)

25-27. Mississippi Acad. of Sciences, University. (C. Q. Sheely, Dept. of Chemistry, Mississippi State College, State College)

25-27. Ohio Acad. of Science, Wilberforce. (G. W. Burns, 505 King Ave., Columbus 1, Ohio)

25-27. Population Assoc. of America, Philadelphia, Pa. (P. C. Glick, Bureau of the Census, Washington 25)

25-27. West Virginia Acad. of Science, Buckhannon. (J. A. Duke, S.J., Dept. of Chemistry, Wheeling College, Wheeling, W. Va.)

25-28. Association of Clinical Scientists, Louisville, Ky. (R. P. MacFate, 54 W. Hubbard St., Chicago 10, Ill.)

26-27. American Mathematical Society, University Park, N.M. (AMS, 190 Hope St., Providence 6, R.I.)

26-27. American Assoc. of University Professors, San Francisco, Calif. (W. P. Fidler, AAUP, 1785 Massachusetts Ave., NW, Washington 6)

26-27. Illinois State Acad. of Science, Carbondale. (C. L. Kanatzar, MacMurray College, Jacksonville, Ill.)

26-27. South Dakota Acad. of Science, Rapid City. (T. Van Bruggen, State Univ. of South Dakota, Vermillion)