



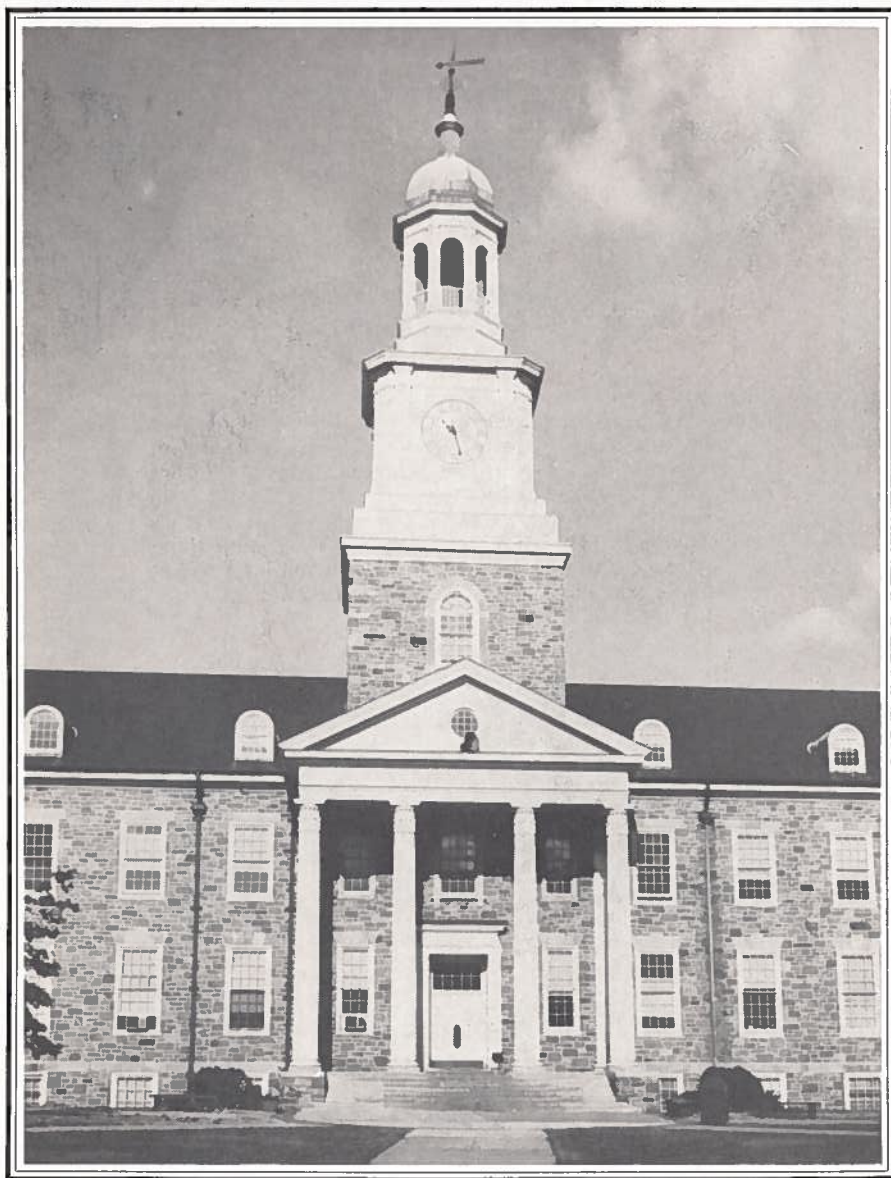
THE CHESAPEAKE CHEMIST

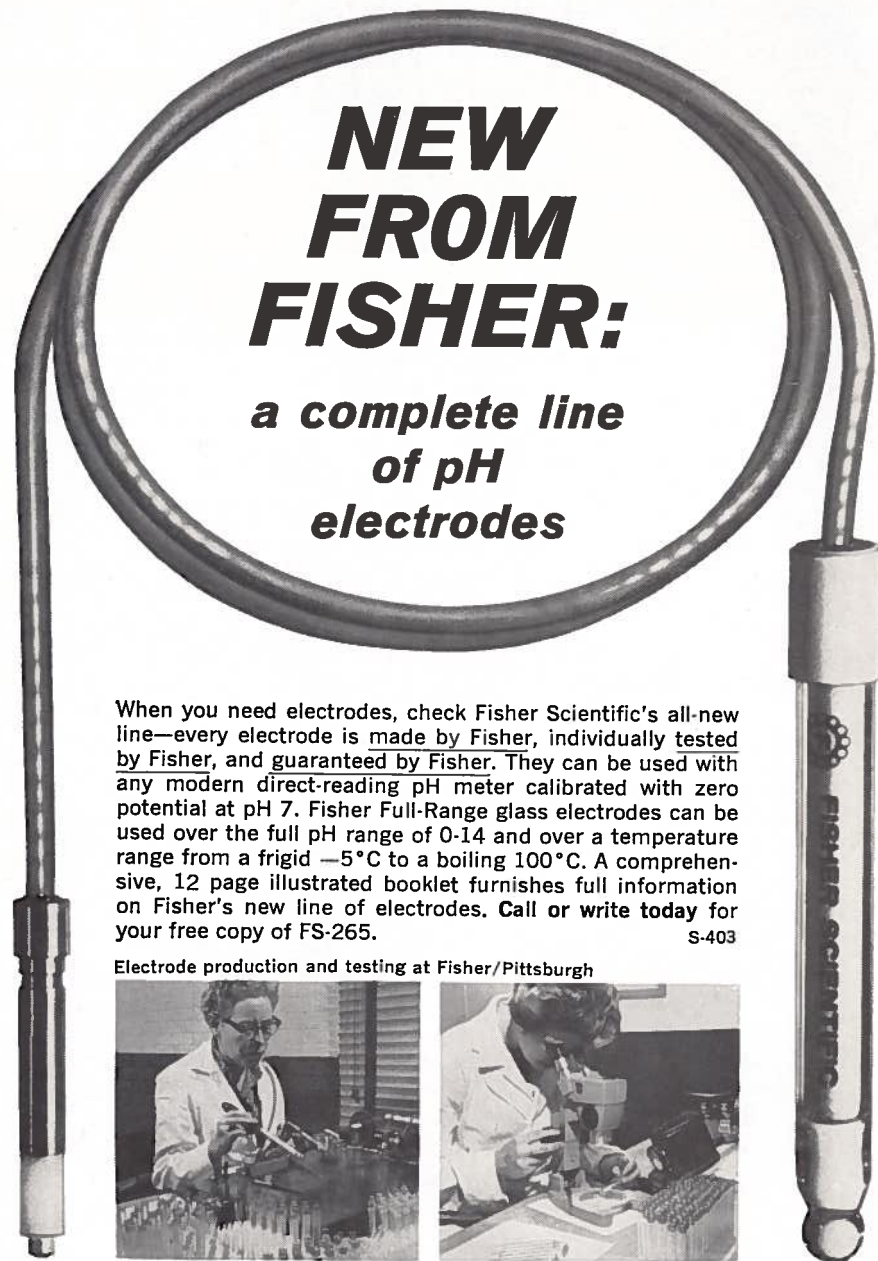
MARYLAND SECTION
AMERICAN CHEMICAL SOCIETY

VOL. XXI

MARCH, 1965

NUMBER 3





**NEW
FROM
FISHER:
a complete line
of pH
electrodes**

When you need electrodes, check Fisher Scientific's all-new line—every electrode is made by Fisher, individually tested by Fisher, and guaranteed by Fisher. They can be used with any modern direct-reading pH meter calibrated with zero potential at pH 7. Fisher Full-Range glass electrodes can be used over the full pH range of 0-14 and over a temperature range from a frigid -5°C to a boiling 100°C . A comprehensive, 12 page illustrated booklet furnishes full information on Fisher's new line of electrodes. Call or write today for your free copy of FS-265. S-403

Electrode production and testing at Fisher/Pittsburgh



FISHER SCIENTIFIC

World's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals
7722 Fenton Street, Silver Spring, Md. 20910 • Phone: 587-7000



**THE
CHESAPEAKE CHEMIST**

VOL. XXI

MARCH, 1965

NUMBER 3

EDITORIAL STAFF

Kenneth S. White Editor
University of Maryland
636 W. Lombard St.
Baltimore, Md. 21201

R. J. Allgeier Asst. Editor
U.S. Army Biological Laboratories
Fort Detrick, Frederick, Md. 21701

Alvin Bober Asst. Editor
U.S. Customs Laboratory
103 S. Gay St.
Baltimore, Md. 21202

BUSINESS STAFF

John A. Kerchner Business Mgr.
Borden Chemical Co., Ink Div.

J. M. Maselli Advertising Mgr.
W. R. Grace & Co.
Clarksville, Maryland, 21029

MEMBERSHIP CHAIRMAN

Joseph Cogliano
W. R. Grace & Co.
Clarksville, Maryland, 21029

CONTRIBUTORS TO THIS ISSUE

R. J. Allgeier
Fort Detrick, Md.

Ernest Levens
Aerojet-General Corp.
Azusa, California

Edward J. Poziomek
U.S. Army C.R.D.L.
Edgewood Arsenal, Md. 21040

IN THIS ISSUE

March Meeting 5

Exhibitors 6

Maryland Section News 7

Membership Changes 8

Chemical Safety Letter 9

The Listening Post 13

N.M.R. Workshop 14

SECTION OFFICERS

George M. Steinberg, *Chairman*
Physiology Div., U.S. Army C.R.D.L.
Edgewood Arsenal, Md. 21040

F. Marion Miller, *Chairman-elect*
School of Pharmacy
University of Maryland
Baltimore, Maryland 21201

F. Timothy Parr, *Secretary*
Westinghouse Air Space Div.,
Materials Engineering
Mail Stop 496
P. O. Box 746, Baltimore, Md. 21203

Edwin M. Glocker, *Treasurer*
W. R. Grace & Co.
Washington Research Center
Clarksville, Maryland 21029

The Chesapeake Chemist is published monthly September through May by the Maryland Section of the American Chemical Society. Address editorial comments to Lt. Col. Kenneth S. White, University of Maryland, 636 W. Lombard St., Baltimore, Md. 21201. Address advertising inquiries and plates to J. M. Maselli, W. R. Grace & Co., Washington Research Center, Clarksville, Maryland 21029.

MARCH MEETING

EXHIBITS AND LECTURES ON APPLICATIONS OF LABORATORY AND RESEARCH EQUIPMENT

DATE AND TIME:

WEDNESDAY, MARCH 17, 1965
4:00 P.M. TO 10:00 P.M.

PLACE:

Calloway and Key Halls
Morgan State College
Coldspring Lane and Hillen Road

COCKTAILS AND DINNER:

Eudowood Gardens Dining Room
Price — \$2.25 per person for cocktails and hot buffet dinner (5:45 to 7:30). Free parking. Reservations must be received no later than March 12. Use reservation form on page 11.

PARKING:

Prior to 5:00 P.M. visitors are required to have temporary stickers for on-campus parking. After 5:00 P.M. parking is unrestricted. Several parking lots are available. Enter driveway from Hillen Road, north of Coldspring Lane. Personnel will be present to direct visitors.

SOCIAL HOUR:

There will be a social hour after the final lecture. Refreshments will be served.

LECTURES:

"High-Capacity Preparative Gas Chromatography"

Mr. James Schlater,
Field Sales Manager,
F & M Scientific Corporation
4:30 P.M.

"Atomic Absorption"

Mr. Leon Lake,
Sales Engineer,
Perkin-Elmer Corporation
7:45 P.M.

"Nuclear Magnetic Resonance Spectroscopy"

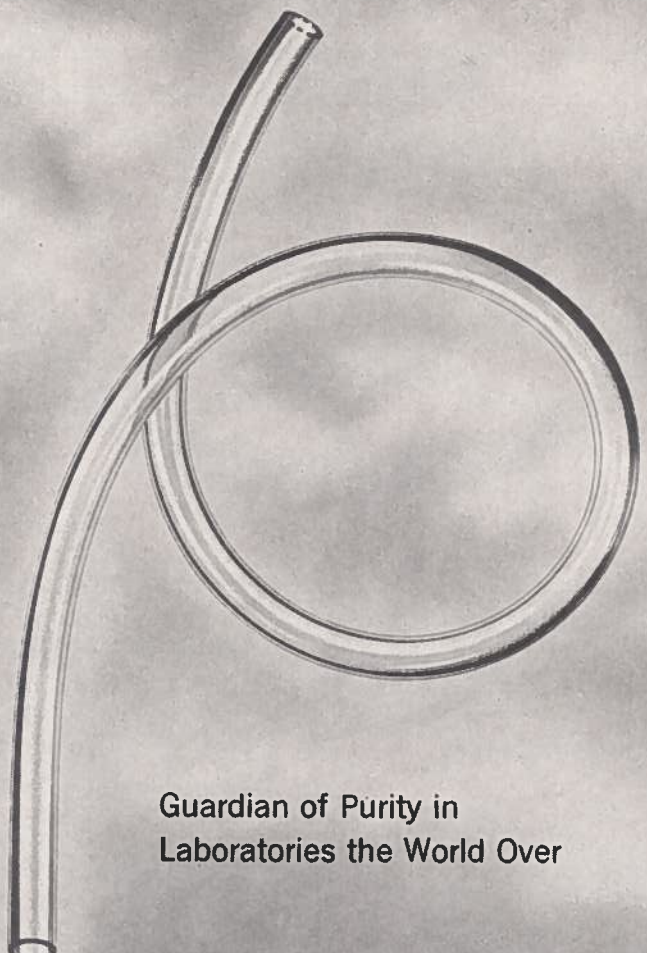
Mr. Ross Pitcher,
Varian Associates
8:30 P.M.

"Applications of the Microdensitometer to Chemical Problems"

Mr. Julius Weisser,
National Instrument
Laboratories, Inc.
9:15 P.M.

THE COVER

HOLMES HALL
MORGAN STATE COLLEGE



Guardian of Purity in
Laboratories the World Over

TYGON*

AT YOUR LABORATORY SUPPLY HOUSE

*Registered Trade Mark of The U. S. Stoneware Co., Akron, Ohio 266-G

EXHIBITORS

- Ace Glass Company, Vineland, N. J.
- William Ainsworth & Sons, Inc.,
New Brunswick, N. J.
Single Pan Balances — Type 10,
Type 21 and Type 23,
Thermogravimetric Analysis
Apparatus
- Barber-Colman
Rockford, Ill.
Steroid Analyzer
- Bausch & Lomb Incorporated
Rochester, N. Y.
Spectronic 505, Abbe 3 L Refractometer,
Polarizing Microscope
- F & M Scientific Corporation
Avondale, Pa.
Model 810 Research Gas Chromatograph,
Model 700 Laboratory Gas
Chromatograph
- Harris Calorific Sales, Inc.,
Baltimore, Md.
Multi-stage, Single Stage, Metering
and Corrosive Gas Regulators
- The Hildenbrand Company, Fairfax, Va.
Product Representatives for Waters
Associates Incorporated
Model R-4 Differential Refractometer
- Instrument Corporation of America
Baltimore, Md.
Microphotometers, Potentiometric
Recorders
- Instrumentation Laboratories, Inc.
Boston, Mass.
pH Equipment, Flame Photometer
- Isomet Corporation, Palisades Park,
New Jersey
Optical Crystals, X-ray Analyzer
Crystals, Laser Crystals
- Kimble Products, Toledo, Ohio
- Kontes Glass Company, Vineland, N. J.
Chromatographic Columns, Kem Kits,
Bantam Ware, Hamilton and R.G.I.
Products
- Materials Research Corporation
Orangeburg, N. Y.
X-ray Instruments, Temperature
Measuring Instruments
- National Instrument Laboratories, Inc.
Rockville, Md.
Double-Beam Automatic Recording
Microdensitometer, N.I.L. Chromoscan
- Nikon Incorporated, Silver Spring, Md.
Stereo and Polarizing Microscopes
- Packard Instrument Company, Inc.
Downers Grove, Ill.
Gas Chromatograph, Tricarb
Scintillation Counter, Paper Strip
Chromatogram Scanner
- Packed Column Corporation,
Springfield, N. J.
Laboratory Columns, Packing Samples
- Perkin-Elmer Corporation, Norwalk,
Connecticut
I R Grating Spectrophotometer, Atomic
Absorption Spectrophotometer
- Polaroid Corporation, Springfield, Pa.
- Professional Tape Co., Inc., Riverside,
Illinois
- Scientific Kit Company, Washington, Pa.
G. C. Syringes and Accessories,
Solid State Relay, Recorder Pencil
- Texas Instruments, Inc., Houston, Texas
Quartz Tube Pressure Gage and
Solid State Recorder
- Varian Associates, Palo Alto, Calif.
NMR Materials
- Will Scientific Corporation
Baltimore, Md.

MARYLAND SECTION NEWS



GOVERNMENT

EDGEWOOD ARSENAL

Dr. Henry J. Wills has been elected to head the Edgewood Arsenal branch of the Scientific Research Society of America (RESA) for 1965. Dr. Wills is Chief of the Physiology Division of the Directorate of Medical Research at the U. S. Army Edgewood Arsenal Chemical Research and Development Laboratories. Other newly elected officers include Dr. Bernard Berger, vice president; Bernard M. Zeffert, secretary; and Gabrielle Asset, treasurer.

A group of some of the Nation's foremost scientific and engineering authorities met with Army officials at the U. S. Army Chemical Research and Development Laboratories recently in an effort to further advance the Laboratories' flame program. Among the participants in the meeting were Nobel Prize winners Dr. Peter Debye and Dr. Henry Eyring and former Deputy Assistant Secretary of the Army Wilbur S. Hinman. Dr. Paul Gross of the Department of Chemistry at Duke University served as chairman. The flame program encompasses research and development of flame throwers, fire bombs and other incendiary items and materials.

The ZD (Zero Defects) program was introduced at Edgewood Arsenal recently. Zero Defects is an employee motivation program which emphasizes error elimination rather than error detection. The basic ingredient is "pride

in workmanship" and instilling in every employee the idea of doing his job to the best of his ability.

FORT DETRICK

William L. Jacobs, Chief, Program Coordination Office, completed a course, "Fundamentals of Research and Engineering Management", sponsored by the American Management Association, New York City, January 11-15th.

Orley Bourland completed a course at Army Command Management School, Fort Belvoir, Virginia.

The Maryland Section of the American Institute of Chemical Engineers is presenting a series of lectures at Goucher College — "What's happened in Chemical Engineering in the last ten years." The following are in attendance: Messers: Abelow, Bloom, Bokesch, Bourland, Daniels, Dapper, Dashiell, Dobucki, Foreman, Hill, Murphy, and Lt. Small.



INDUSTRIAL

BORDEN CHEMICAL COMPANY

John A. Kerchner has been appointed Eastern Regional Manager of the ink division of the Borden Chemical Company. Mr. Kerchner joined the company in 1949, and has been operations manager for the Buffalo, Charlotte, N. C. and Baltimore plants. His office is in Baltimore.

RECENT PUBLICATIONS OF FACULTY MEMBERS OF THE
DEPARTMENT OF CHEMISTRY OF THE
JOHNS HOPKINS UNIVERSITY

- "Coordination polyhedra." J. D. H. Donnay, E. Hellner and A. Niggli, *Zeits. Kristallographie*, 120, 364 (1964).
- "Diffraction symbols." J. D. H. Donnay and Olga Kennard. *Acta Cryst.* 17, 1337-1340 (1964).
- "Crystal structure of a synthetic iron mica." G. Donnay, N. Morimoto, H. Takeda and J. D. H. Donnay. *Acta Cryst.* 17, 1369-1373 (1964).
- "Prediction of the structure from composition and cell dimensions." G. Donnay, J. D. H. Donnay and H. Takeda. *Acta Cryst.* 17, 1374-1381 (1964).
- "Proton Magnetic Resonance Evidence for Ligand-Porphyrin Interaction in Magnesium Porphyrins." C. B. Storm and A. H. Corwin, *J. Org. Chem.*, 29, 3700 (1964).
- "The Structure of Acetonepyrrole," A. H. Corwin, A. B. Chivvis and C. B. Storm, *J. Org. Chem.*, 29, 3702 (1964).
- "Approximate Hartree-Fock Wavefunction for the Helium Atom" J. T. Zung and R. G. Parr, *J. Chem. Phys.* 41, 2888-2892 (1964).
- "Integral Hellmann-Feynman Theorem," H. J. Kim and R. G. Parr, *J. Chem. Phys.* 41, 2892-2897 (1964).
- "Origin of the Barrier Hindering Internal Rotation in Ethane," R. E. Wyatt and R. G. Parr, *J. Chem. Phys.* 41, 3262-3263 (1964).
- "The Chemiluminescence of Lophine," E. H. White and M. J. C. Harding, *J. Am. Chem. Soc.*, Dec. 20, 1964 (a communication).
- "Transient Species Observed in the Catalyzed Decomposition of Ammonia," C. E. Melton and P. H. Emmett, *J. Phys. Chem.* 68, 3318 (1964).

MEMBERSHIP CHANGES

New Members

- Brand, Dr. Ludwig, Biology Dept. and McCollum Pratt Inst., Johns Hopkins Univ., Baltimore, Md. 21218
- Ehrmantraut, John William, 5 Monroe Rd., Arundel Estates, Annapolis, Md. 21402
- Martin, Robert Leo, Morgan State College, Baltimore, Md. 21212
- McCloud, Ralph deWitt, 557 Girard St., Havre de Grace, Md. 21078
- Vance, Dr. Hugh Gorgon, 1826 East Joppa Rd., Baltimore, Md. 21234

Whang, Miss Clara C. T., 636 W. Lombard St., Baltimore, Md. 21201

Transferred In

- Gardels, Dr. Marvin C., The Glidden Co., 3901 Hawkins Point Rd., Baltimore, Md. 21226
- Huang, Miss Elizabeth C. Y., RIAS, 7212 Bellona Ave., Baltimore, Md. 21212
- Jarabak, Mrs. Rebecca R., 14 W. Cold Spring Lane, Baltimore, Md. 21210
- Levin, Stanford M., 5209 Goodnow Rd., Baltimore, Md. 21206

CHEMICAL SAFETY NEWSLETTER

LIQUID PROPELLANTS

An extraordinary valuable manual, *The Handling and Storage of Liquid Propellants*, puts countless man-years of priceless experience with twenty-one hazardous substances at the fingertips of those concerned with chemical safety. The manual was prepared for the Office of the Director of Defense Research and Engineering by the Working Group on Safety Regulations for Liquid Propellants of the Advisory Panel on Fuels and Lubricants. Published as a source of information, the manual is intended for use as the basis for the preparation of local rules and operational procedures for liquid propellants.

One edition of this manual, published January 1963, is available from the U. S. Government Printing Office, Washington, D. C. 20402 for \$1.75. A later edition, published April 1964, by the Air Force as AFM 160-39, corrects several errors in the GPO edition and incorporates a new section (in general, this edition is available only to those with Air Force contracts).

Following a chapter on general principles, the following specific substances are covered, each in its own detailed chapter: the alcohols, alkyl boranes, anhydrous ammonia, aniline, chlorine trifluoride, ethylene oxide, fluorine, hydrazine, hydrocarbon fuels, liquid hydrogen, hydrogen peroxide, monomethylhydrazine, fuming nitric acids, liquid nitrogen, nitrogen tetroxide, liquid oxygen, pentaborane, perchloryl fluoride, inert pressurizing gases, n-propyl nitrate, and 1,1-dimethylhydrazine.

In addition to the references at the end of each chapter, there is a five-page bibliography. Appendix A is a glossary of key terms. Other appendices include: fire-fighting techniques; propellant fire-protection and extinguishment characteristics; basic cleaning procedure for liquid propellants; characteristics of

propellants relating to hazards in storage and handling; and (in AFM 160-39 only) medical and industrial hygiene procedures.

The excellent chapter format could well serve as a model for anyone in industry faced with the necessity of preparing chemical safety data sheets. The following information is given for each propellant in the manual: general properties (chemical and physical, solubility, stability); health, fire and explosion hazards; safety measures; transfer and storage (including materials, equipment, transfer procedures, spills, leaks, decontamination); and shipping requirements. A one-page safety instruction, intended for posting at the operating site, summarizes in non-technical language the data on hazards, first aid and safety precautions.

(Continued on page 13)



"The Versatile Desiccant!"

For Drying
SOLIDS—LIQUIDS—GASES

- Efficient** — Dries all organic liquids instantly in liquid or vapor phase. Gases retain only 0.005 mg. H₂O per liter.
- Versatile** — An all-purpose desiccant.
- Non-Wetting** — Does not become wet on saturation, nor crystallize to walls of tubes, towers or desiccators.
- Neutral** — Dries without reacting with either acid or alkaline materials.
- Inert** — Except toward water. Does not decompose, polymerize, or catalyze organic substances by contact. Insoluble in organic liquids.
- Regenerative** — Repeatedly after any normal use, by dehydration at 200 to 225°C.
- Economical** — Lowest priced high grade desiccant. Available in quantity for Industrial Processes.
- Granule Sizes:** 4, 6, 8, 10-20 and 20-40 Mesh. Regular or Indicating.

from your
LABORATORY SUPPLY DEALER

Manufactured by
W. A. HAMMOND DRIERITE CO.
XENIA, OHIO

DETROIT SYMPHONY PROGRAM ANNOUNCED

During the week of April 4 thru 9, 1965 the Detroit Section of the ACS will host the 149th Annual Meeting of the ACS. One of the outstanding non-chemical sessions will be the Special Private Concert by the Detroit Symphony Orchestra under the baton of Sixten Ehrling followed by a champagne reception. A fine program has been selected by Ron Graham's committee and the Detroit Symphony Orchestra.

The formal program will be:

- | | |
|--------------|--|
| Tchaikovsky | Overture to "Romeo and Juliet" |
| Rachmaninoff | Rhapsody on a Theme by Paganini, Op. 43.
Mischa Kottler, soloist. |
| Brahms | Symphony No. 1 in C Minor, Op. 68. |

There will be choice of two types of tickets; those at two dollars (\$2), which will be unreserved, and a second group at four dollars (\$4) for those who may desire a reserved seat.

All of the seats in the beautiful Henry and Edsel Ford Auditorium are excellent.

Since the number of tickets is limited it is recommended that they be purchased as soon as possible.

Dr. Harold E. Machamer, Ticket Chairman, ACS — Symphony Concert c/o Parke Davis and Company, P. O. Box 118, G. P. O., Detroit, Michigan 48232.

Please send me _____ tickets for the Detroit Symphony Orchestra Concert on Wednesday, April 7, 1965, as indicated:

	Price	No. of Seats	Total Remittance
Reserved Seats —	\$4.00 each	_____	_____
Unreserved Seats —	\$2.00 each	_____	_____

for which I remit in full and enclose a self-addressed and stamped envelope. (Make checks payable to The Detroit Section of the ACS.)

Signed _____

Address _____

City, Zone and State _____

(Please print the above information.)

Arthur H. Thomas Co. Announces A Printed Record Of Absorbance Readings

A modular printout system for use with the Hitachi Perkin-Elmer Model 139 Spectrophotometer has been introduced by Arthur H. Thomas Company, of Philadelphia. This provides an 8-column printed record of readings and their identification on standard paper tape as used on adding machines. The system consists of a special Digital Readout, the Printer and an Identification Sequencer.

On the Printout a 4-digit absorbance or transmittance readings is imprinted at the right of the tape when the Printout is activated. Simultaneously a 4-digit identification number, fed from the Digital Readout through the Se-

quencer, is printed automatically at the left of each consecutive absorbance or transmittance reading. The first of the latter four digits is set manually and codes the series of readings to a particular operator, group of tests, etc.

The Printout is fed by a special model of the Thomas Digital Readout with circuitry for this purpose. The Readout indicates the absorbance or transmittance readings directly as four large digits in an illuminated window. Readings are accurate to $\pm 0.1\%$. The Sequencer can be omitted if the four identification digits are not required.

These accessories increase speed and accuracy of readings, particularly in routine serial determinations. They can be used only on Model 139 Spectrophotometers which have been modified by Thomas for this purpose. — ARTHUR H. THOMAS COMPANY, Vine St. at 3rd, P. O. Box 779, Philadelphia 5, Pennsylvania.

----- Tear-Out Dinner Reservation Form -----

There is enclosed \$_____ (\$2.25 per person)* for cocktails and dinner at Eudowood Caterers, Eudowood Plaza, on Wednesday, March 17, 1965 for the following persons.**

(Please Print or Typewrite.)

Name	Address
_____	_____
_____	_____

*Make checks payable to Maryland Section, ACS and mail together with reservation form to Dr. F. Marion Miller, School of Pharmacy, University of Maryland, Lombard and Greene Sts., Baltimore, Md. 21201.

**Return by March 12th. Please be prompt. If required, it is possible to accommodate a few late reservations.

CLOSTRIDIUM BOTULINUM

Scientists at The University of Michigan say the toxin responsible for botulism is the most powerful and deadly poison known to man. Cobra venom, curare and arsenic are mild by comparison.

Controlled experiments on mice have shown that one 1-hundred billionth (1/100,000,000,000) part of a gram of pure botulism toxin will kill. It is so potent, it has long been recognized as a prospective weapon for bacteriological warfare.

The poison itself is a protein substance produced by a microscopic organism called "Clostridium botulinum." Oddly, the protein content gives the deceptive signs of being a very good food. Bacteriologists say it is the peculiar arrangement of the amino acids in the protein that turns it into a lethal poison.

According to Dr. Walter J. Nungester, chairman of the U-M department of bacteriology, people can be immunized against the disease with an injection of the proper toxoid. It is customary for researchers to take such shots when they are going to work with the bacteria and its deadly by-product. But because the disease is so rare, immunization has never been recommended for the general population.

The rare victim of the poison usually gets it by eating improperly canned foods — meat, fish or non-acid vegetables. Once in the body, the toxin is absorbed sluggishly by the intestines, but when it gets into the blood stream, the consequences are swift. The poison sets up "roadblocks" between nerves and muscles, causing paralysis. Breathing muscles are the first to suffer, then the heart.

Prof. Lloyd L. Kempe of the U-M College of Engineering has been working with botulism problems for some 10 years in a series of studies on the chemical engineering of food preservation. Kempe and research bacteriologist John

T. Graikoski helped identify the strain of botulism that killed two Grosse Ile (Michigan) women earlier this year.

Their studies have shown that the bacteria can produce toxin at normal refrigerator temperature. The poison, however, can be rendered harmless by cooking it at about 150 degrees Fahrenheit for 15 minutes, although it takes 1 hour's cooking at 195 degrees to kill the poison-producing bacteria.

In a recent scientific report to the Society of American Microbiologists, Kempe and Graikoski showed that type E botulina can grow and form toxin at temperatures below 40 degrees, whereas the temperature of the average refrigerator is just about 40 degrees. The U-M researchers noted that they can incubate the botulina for research in laboratory refrigerators.

At The University of Michigan's School of Public Health, epidemiologists expressed surprise that anyone could ever eat food well-contaminated by botulina poison.

Commented one public health scientist: "True it's the most powerful biological known to man. But it usually tastes and smells absolutely horrible. A contaminated food advertises its hazard in no uncertain terms. Sometimes cans and bottle explode under pressure of the gas generated by the bacteria, and the smell is ghastly."

From the *RESONATOR*

DEADLINE

Material for publication in the April issue should reach the Editor by March 15.



THE LISTENING POST

ADVANCE REGISTRATION NATIONAL MEETINGS

Advance registration for national meetings is becoming increasingly popular. Over 2,200 persons registered in advance for the 148th National Meeting of the Society in Chicago last September. The plan is advantageous both to the registrant and to operations in that it helps to eliminate delay in registering at the meeting site. A meeting identification badge, mixer ticket, and registration receipt are mailed to advance registrants prior to the meeting. Booklet programs and group event tickets are available during the regular hours announced for registration. No check-in prior to attendance at technical sessions is required. The advance registration form was published in the preliminary program for the 149th National Meeting of the Society in Detroit, April 4-9th in the January 11th issue of C&EN. The form also appears in the final program published February 22nd.

DIRECTORY OF ACADEMIC CHEMISTRY DEPARTMENTS

Work is progressing on this directory which will list the faculty (including rank) of chemistry and biochemistry departments in United States colleges and universities. Chemical engineers will not be included because they are already listed in the annual AIChE directory. Plans are to have the directory completed early this spring. Distribution will include departments of chemistry, biochemistry, and chemical engineering.

ALPHA CHI SIGMA AWARDS

Two students of the Baltimore Junior College received awards from the Baltimore Professional Chapter of Alpha Chi Sigma Fraternity at ceremonies at the college on February 23.

Miss Clara Sitzamer was presented a plaque for having achieved the most advancement in the study of chemistry during the two years; and Mr. William Lee Kneas received a Certificate of Merit for having shown excellent progress in Freshman Chemistry.

The presentations were made by William Waxter, President of the Baltimore Professional chapter.

AEC MOBILE LABORATORY

The Atomic Energy Commission Mobile Laboratory will be at Hood College, Frederick, Md. from March 8th through March 19th for a series of ten lectures, Monday to Friday of each week, to which the public is invited.

Participants in the laboratory are four faculty members in the fields of chemistry and biology, and twelve students majoring in chemistry, biology, and psychology. Some tours of the laboratory may be arranged through Mr. Long, Publicity Director at Hood College. Further information may be obtained from Mr. Long.

CHEMICAL NEWSLETTER

Liquid Propellants

(Continued from page 9)

The Liquid Propellant Manual may not serve every purpose. But it does demonstrate the great benefits to be derived from the cooperative efforts of industrial and governmental experts, working together at the frontiers of technology.

Ernest Levens, Manager,
Safety Aerojet-General
Corp., Azusa, California

GEORGETOWN UNIVERSITY
**NUCLEAR MAGNETIC
 RESONANCE WORKSHOP**

APRIL 19-22, 1965

The second annual GEORGETOWN UNIVERSITY NUCLEAR MAGNETIC RESONANCE WORKSHOP is designed primarily to meet the needs of the scientist with little or no background in N.M.R. Lectures and discussions will provide a basic understanding of high resolution N.M.R. Spectroscopy and a survey of applications, particularly organic applications. This year's expanded Workshop will go more thoroughly into the background of N.M.R. but will also be able to cover the most recent advances in this rapidly growing field. Participants in the laboratory sessions will have an opportunity to operate the Varian A-60 spectrometer and interpret spectra under the direction of experienced N.M.R. spectroscopists. In addition there will also be available for demonstration and use a CAT C-1024 time-averaging computer, and a Spin Decoupler.

Monday, April 19

**A. ELEMENTARY THEORY OF
 N.M.R. — AN INTRODUCTION**

Dr. Edwin Becker, National
 Institutes of Health

**B. EMPIRICAL APPROACH TO
 N.M.R. — INTRODUCTION
 CONTINUED**

Prof. Charles F. Hammer,
 Georgetown University

**C. INTRODUCTION TO HIGH
 RESOLUTION N.M.R.
 INSTRUMENTATION**

Mr. Ross Pitcher, Varian
 Associates

Tuesday, April 20

**A. THEORY OF CHEMICAL
 SHIFTS**

Prof. Steven Danyluk, Argonne
 National Laboratories

Workshop participants may register for both lectures and laboratory sessions or for lecture sessions only. Since small working groups are more efficient and desirable, registration for the laboratory will be limited to 72, and the Workshop itself will be limited to 125 persons total. For these reasons it might be necessary to limit enrollment in the laboratory sessions to two persons from any one laboratory.

Further information may be obtained from Prof. Allen J. Rosen, Director, N.M.R. Workshop, Dep't. of Chemistry, Georgetown University, Washington, D. C. 20007.

**B. ANALYSIS OF N.M.R. SPECTRA
 — AN INTRODUCTION**

Prof. Barry Shapiro, Illinois
 Institute of Technology

Wednesday, April 21

**A. APPLICATIONS OF N.M.R. TO
 POLYMER CHEMISTRY**

Dr. William Ritchey, Standard
 Oil of Ohio

**B. ANALYSIS OF N.M.R. SPECTRA
 — CONTINUED**

Dr. Ernest Lustig, Food and
 Drug Administration

Thursday, April 22

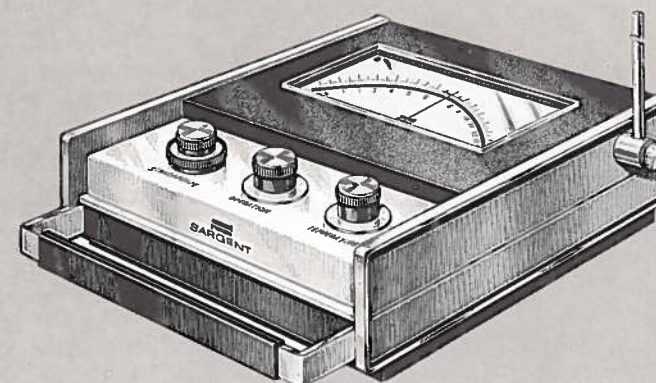
**A. ILLUSTRATIVE APPLICATIONS
 OF N.M.R.**

Prof. Barry Shapiro, Illinois
 Institute of Technology

B. FURTHER TOPICS IN N.M.R.

Dr. Edwin Becker, National
 Institutes of Health

A new concept in pH meters...



Interchangeable power supplies for laboratory and field.

Accuracy and stability found heretofore only in the highest priced meters.

Rugged construction for use in any environment under field conditions.

SARGENT MODEL PB—with modular mercury cell power source providing over 6 months of normal usage in the field.
 MODEL PL—with modular Zener reference line power source for continuous use in the laboratory.

- **Relative Accuracy** ■ for the most exacting purposes, readable to 0.02 pH, with meter accuracy of ± 0.03 pH within 4 pH of the standardized point, and ± 0.05 pH anywhere on the scale.
- **Stability** ■ for long term use without need for readjustment, eminently suitable for recording, with circuit drift less than 0.02 pH per hour after short initial warm-up.
- **Rugged Construction** ■ for use in any locale, any climate; moisture-proofed, transistorized circuitry, shock-proof case.

MODEL PB—Cat. No. S-30007 with batteries, buffers and electrodes... \$255.00
 Cat. No. S-30007-10 with batteries only, for use with any electrodes \$215.00

MODEL PL—Cat. No. S-30008 with line power source, buffers and electrodes \$295.00
 Cat. No. S-30008-10 with line power source only, for use with any electrodes \$255.00

Power Supplies Cat. No. S-30007-15 Zener Line Source for substitution in Model PB meters ... \$60.00; Cat. No. S-30008-15 Mercury Cell Source for substitution in Model PL meters ... \$20.00.

For information, write for bulletin pHP.

SARGENT[®] SCIENTIFIC LABORATORY INSTRUMENTS • APPARATUS • CHEMICALS
 E. H. SARGENT & CO., 10558 METROPOLITAN AVENUE, KENSINGTON, MD. 20795
 Chicago • Anaheim, Calif. • Birmingham • Dallas • Denver • Detroit • Springfield, N.J. • Toronto, Canada

The Chesapeake Chemist
University of Maryland
636 W. Lombard Street
Baltimore, Maryland 21201

Nonprofit Org.
U.S. Postage
PAID
Baltimore, Md.
Permit No. 2917

Available only from *Thomas . . .*

**Hitachi Perkin-Elmer
Model 139 SPECTROPHOTOMETER
with DIGITAL READOUT and PRINTOUT**



A modular printout system for use with Model 139 Spectrophotometer has been introduced by us to provide a printed record of readings and their identification on standard paper tape. The system consists of a special Digital Readout,* a Printout and an Identification Sequencer.

A four-digit reading of absorbance or transmittance is printed on the tape together with a four-digit identification number fed simultaneously and automatically through the Sequencer. The latter codes the readings to the operator, group of tests, etc. This presentation increases convenience and accuracy of readings in routine serial determinations.

9096-E30. MODEL 139 SPECTROPHOTOMETER with Printout System, range 195 to 900 $m\mu$, complete outfit as shown in illustration consisting of Spectrophotometer with standard wide-range phototube, hydrogen and tungsten lamps, 4-place cell holder, set of 4 matched fused silica 10 mm absorption cells, etc., and accessories to provide printed readings, i.e. Thomas Print-Drive Readout,* Printout and Identification Sequencer. For 115 volts, 50 or 60 cycles, a.c. **5650.00**

9096-J10. Print-Drive Readout,* Thomas, with circuitry to feed Printout. For 115 volts, 50 or 60 cycles, a.c. **900.00**

9096-J50. Printout, to provide 8-column printed record on paper tape. For 115 volts, 50 or 60 cycles, a.c. **1500.00**

9096-J80. Identification Sequencer, to provide automatic identification of printed readings. Can be omitted if not required. **350.00**

*For use only on Model 139 Spectrophotometers sold by us which have been modified in our plant for this purpose.

More detailed information sent upon request.



ARTHUR H. THOMAS COMPANY

Scientific Apparatus and Reagents

VINE STREET AT 3RD • P. O. BOX 779 • PHILADELPHIA 5, PA., U. S. A.

Telephone Service: For toll free, direct service from Baltimore Metropolitan Area ask Operator for . . . Enterprise 9-5600.