



# THE CHESAPEAKE CHEMIST

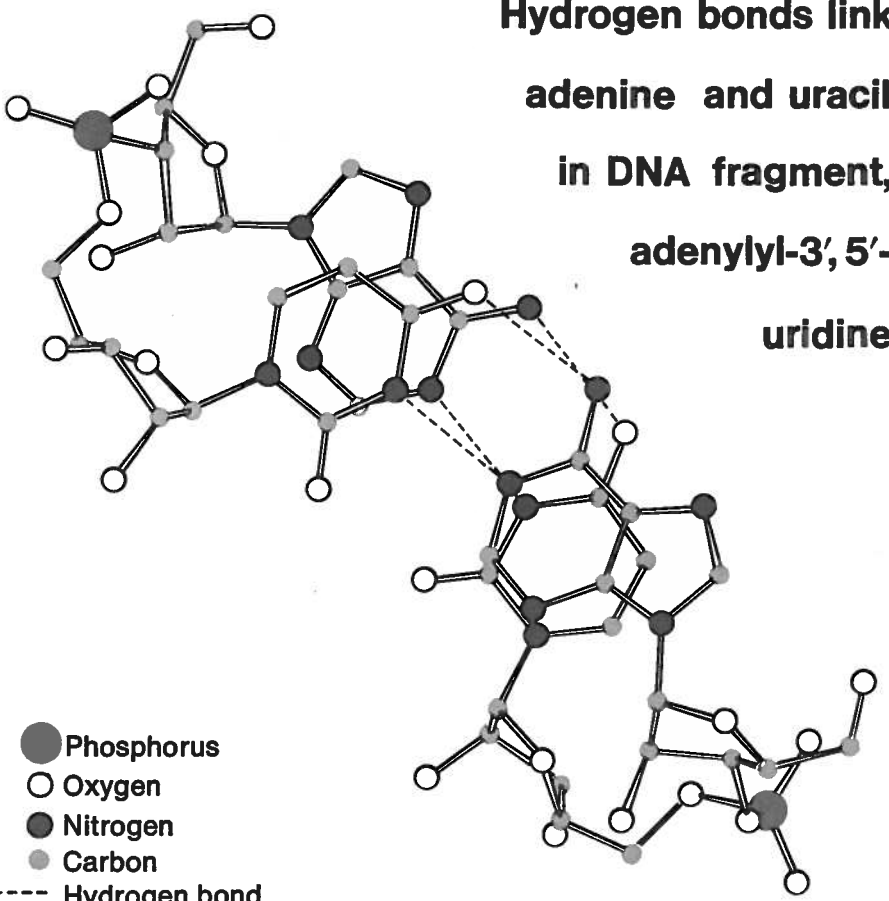
MARYLAND SECTION  
AMERICAN CHEMICAL SOCIETY

VOL. XXXIII

MARCH, 1977

NUMBER 3

**Hydrogen bonds link  
adenine and uracil  
in DNA fragment,  
adenylyl-3', 5'-  
uridine**



- Phosphorus
- Oxygen
- Nitrogen
- Carbon
- Hydrogen bond

# FISHER HPLC SOLVENTS



## A new purity grade designed to expedite critical work.

In high-pressure liquid chromatography, you need to know solvent purity **precisely**. Fisher Certified HPLC-Grade solvents provide that precision. In addition to insuring lot-to-lot uniformity. Ready-to-use convenience. And immediate delivery.

We purify each lot to ultra-stringent HPLC specs. Analyze them on some of the industry's most advanced instrumentation. Then give you the critical facts right on the label. **In detail.**

Facts like optical absorbance at variety of wavelengths (full spectral curve on request). Refractive index, directly traceable to NBS. Quantitative background fluorescence. Assay as

mol %, determined by GC. Water and preservative/inhibitor content. And more. Note too that we eliminate your particulate problems — each solvent is one-micron filtered before packaging.

**Certified HPLC-Grade.** It spells good news for purity-conscious chemists.

**P.S.** *Our comprehensive new line also includes convenient HPLC-Grade buffer salts. Send for HPLC catalog today!*



**Fisher Scientific Company**  
711 Forbes Avenue  
Pittsburgh, Pennsylvania 15219  
(412) 562-8300



# THE CHESAPEAKE CHEMIST

VOL. XXXIII

MARCH, 1977

NUMBER 3

#### EDITORIAL STAFF

Eli Freedman..... Editor  
2411 Diana Road  
Baltimore, MD 21209  
Phone: (301) 484-0632 *after 7 pm*

Raymond C. Petersen..Associate Editor  
9329 Joey Drive  
Ellicott City, MD 21043  
Phone: (301) 465-8520 *after 7 pm*

#### CONTRIBUTING EDITORS

Howard J. Cohen, Glidden-Durkee Div.  
of SCM

Carl E. Minnier, Essex Community  
College

Linda M. Sweeting, Towson State  
University

#### SECTION OFFICERS

Ernest L. Silversmith.....Chairman  
Chemistry Department  
Morgan State University  
Baltimore, MD 21239

James Leslie.....Chairman-Elect  
University of Maryland  
636 W. Lombard Street  
Baltimore, MD 21201

Robert Schneider.....Secretary  
Beckman Instruments Inc.  
1021 St. Michael Road  
Mt. Airy, MD 21771

Howard Cohen.....Treasurer  
Glidden-Durkee Div. of SCM  
3901 Hawkins Point Road  
Baltimore, MD 21226

#### COUNCILLORS

Donald E. Jones  
Carl Minnier

F. Timothy Parr  
David Roswell

COVER: From *C&EN*, Sept., 1973  
Based on work of Professor Rich  
and his collaborators.

#### COMMITTEE CHAIRPEOPLE - 1977

Awards and National Nominations  
.....Joyce J. Kaufman  
The Johns Hopkins University  
366-3300

Chemical Education.....Melvin Miller  
Loyola College  
323-1010

Program.....Ernest F. Silversmith  
Morgan State University  
444-3216

House.....Ronald Kassel  
Edgewood Arsenal  
671-2761

Member Assistance....Joseph Cogliano  
W. R. Grace & Co.  
531-5711

Public Relations.....Carl Minnier  
Essex Community College  
682-6000, X 513

Membership.....Frances Hummel  
Alcolac, Inc.  
355-2600

Publicity.....Dave Roswell  
.....Norbert Zaczek  
Loyola College  
323-1010

Rensen Award.....Brown Murr  
The Johns Hopkins University  
366-3300

Finance.....William Stahl  
377-8022

#### BUSINESS MANAGER

Kent Zeller  
McCormick & Co., Inc.  
Hunt Valley, Maryland 21031  
Phone: 667-7432

#### ALTERNATE COUNCILLORS

Clara I. Adams Patrick Callery  
Alvin Bober Thomas Simmons

*The Chesapeake Chemist* is published monthly September through May by the Maryland Section of the American Chemical Society. Address editorial comments to Eli Freedman, 2411 Diana Road, Baltimore, Md. 21209. Send advertising copy and inquires to Kent R. Zeller, McCormick and Co., Inc., 204 Wight Avenue, Hunt Valley, Md. 21031. The Maryland Section is not responsible for opinions expressed herein. Editorials express the opinions only of their authors. The Editor is responsible for all unsigned material.



## THE EDITOR'S FIST

### A BELATED WELCOME TO RAY PETERSEN

Page three is not the page most carefully scrutinized by readers of *The Chesapeake Chemist*, judging from the fact that it sometimes takes up to six issues for somebody to tell us about an incorrect telephone number.

Thus, only the faithful few readers of that page noted the addition last month of the name of Raymond C. Petersen as associate editor. Ray is a *very* welcome addition to the staff; I am very glad to have him.

Last year, some of the issues noted the name of the "Editor-in-Charge." This experiment will be dropped this year. Instead, you are invited to guess which of us is responsible for any given issue. (Alas! There is no prize for the first correct answer. Sorry about that.)

### THE POSTAL SERVICE RELENTS--SLIGHTLY

Last month in this space, we discussed the potentially disastrous effects of the US Postal Service's harsh new edict that defined scientific articles in *JACS* and other journals to be "advertising matter" if their publication was assisted by the payment of page charges. A recent article in *Science* notes that postal officials have yielded somewhat. They have said that they will not apply this ruling to journals in which the acceptance or rejection of submitted papers is made independently of whether the page charges are honored. Such journals will be required to print a notice to this effect in each issue.

This interpretation removes the pressure from *JACS*, *Physical Review*, and many other journals. But there remain a number of others, including the prestigious *Proceedings of the National Academy of Sciences*, for which page charges are mandatory. If the Postal Services ruling is upheld, they will have to label all such articles as "advertising" on each page, and pay higher postal rates. This matter is far from settled.

### A IS FOR ANNA...

In the normal course of events, the announcement that Professor A. J. Harrison has been elected President-Elect of the ACS would be cause for routine congratulations, perhaps a few lines of suggestions, and that would be it. But in this case, the A stands for Anna, and one realizes that our stodgy and conservative ACS has made a good start on its second century by electing its first woman president. (Lest we be overwhelmed, remember that the American Physical Society and the American Association for the Advancement of Science had both made a similar step into the twentieth century some years earlier.)

### ...AND H IS FOR HENRY

Dr. Harrison's election marks the automatic transition from ACS President-Elect to President for Dr. Henry A. Hill, the first black person ever to hold the office. This too marks a significant advance, and is hardly less noteworthy. In our (admittedly limited) experience, however, male black professionals have instantaneously become "one of the boys" in groups where previously 100% white male dominance had been the rule. Women, black or white, are not accepted as "one of the boys" nearly so readily.

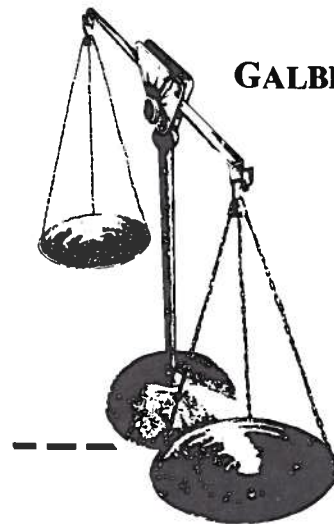
...continued on p. 6

### SAFE?

Having worked in a variety of different laboratories (six) in my professional life so far, I have observed a great diversity of laboratory technique. But in only half of those laboratories was anything more than lip service paid to safety. I have observed free-standing gas cylinders with regulators attached, chemists and their students working in a lab with no eye protection, and enormous hoards of flammable solvents stored in the open, often near flames. In many cases these dangerous practices are routine for professional chemists who know better. It takes some time and money to outfit a lab for safe operation; however, compared to the cost of an eye or a life, this startup cost is negligible. Once the basic equipment is installed -- cylinder straps, flame-proof cabinets, etc. -- doing research or routine measurements safely costs no more.

The only laboratories I have known which operated safely were those in which at least one person in authority had had experience with a serious accident. Does it take a serious injury to arouse the professional chemist? Fortunately, workers in chemical factories, who are members of the Oil, Chemical and Atomic Workers Union, have some legal protection from careless lab management. Apparently it is assumed that a professional chemist can take care of himself.

Recently the *Baltimore Sun* checked the state's schools for carcinogens and found them widely stocked. EPA, OSHA, and other federal agencies are beginning to study laboratory safety. If professional chemists do not adopt safe laboratory techniques now, in compliance with current laws, state and federal agencies may see fit to develop very strict guidelines to control the chemicals and equipment permitted in laboratories. Such guidelines could be strict enough to inhibit research significantly, and we may regret our carelessness. --LMS



## GALBRAITH LABS IS WEIGH AHEAD!

Galbraith Laboratories' proven ability is "weigh" ahead of its competition. Eight chemists and twenty-five technicians carry out over 150,000 microanalyses a year, working with the latest equipment housed in 10,000 square feet of temperature-controlled space. But size has never proven to be an accurate measure for quality, that is why Galbraith Laboratories continually strives to maintain and excel in fast and accurate microanalytical work! Galbraith Labs now serves over a thousand colleges and universities, industrial firms, research foundations, hospitals and government agencies.



**GALBRAITH LABORATORIES, INC.**  
P. O. Box 4187-2323 Sycamore Drive  
Knoxville, TN. 37921-615/546-1335

For more detailed information on how Galbraith Labs is "weigh" ahead, complete and return this form:

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

...continued from p. 4

#### HOW FAR IS LONG?

Yes, indeed, "you've come a long way, baby," the ad tells us, in a phrase that is pejorative, even sexist. But how does one measure the advance? In his book, *Darwin and the Beagle* (London, 1969; p. 99), Alan Morehead notes that Darwin was horrified to learn, during his visit to Tierra del Fuego in 1834, that the Fuegians were cannibals. Sometimes during a hard winter they would kill and eat their women. Darwin reported a conversation between the captain of a whaling ship and a Fuegian boy. Why, the captain asked, did the Fuegians not eat dogs instead? "Dog catch otter," the boy replied, "women good for nothing; men very hungry."

In Darwin's own England in 1834 (and for some 13 years yet to come), women were working in underground mine shafts, dragging 75 to 300-pound loads of coal distances of 10,000 yards and more. One mine owner said that it was impossible to use horses for this work.

Mrs. Betty Harris testified to a Royal Commission investigating conditions in the mines: "I have a belt around my waist and a chain passing between my legs, and I go on my hands and feet. The road is very steep, and we have to hold by a rope, and where there is no rope, by anything that we can catch hold of. My clothes are wet through almost all day long. I have drawn till I have had the skin off me. The belt and chain is worse when we are in the family way." Another witness: "I have had three or four children born the same day that I have been at work, and have gone back to my work nine or ten days after: four out of eight were still-born." Today, argument rages over whether employers must include pregnancy in their medical-benefits package, so there has been some progress.

Let us not be overly smug, however. The Victorian solution to the problem amounted to the idea that a woman's place was behind the pots, not in them. The price paid for liberation from degrading and brutal physical labor was a form of mental and spiritual captivity. Another result was that a division was created between "blue collar" women workers and those in business and the professions. It is the latter groups who have been the cutting edge of the "women's lib" movement. The split shows clearly in the writings of women opposed to the passage of the Equal Rights amendment to the Constitution.

These problems will not be solved in a few years (or in a few paragraphs, either). One lesson can be learned from the past, a lesson that applies equally to miners and to chemists: men cannot be free while women are oppressed, whether the oppression is physical or social, legal or mental.

So we celebrate the electoral victory of Anna J. Harrison, not as a victory for women's lib, but as a victory for the human spirit.

### **Please Patronize Our Advertisers They Make Our Publication Possible**

In the photograph on the facing page, Dr. Richard L. Hall (second from left) receives the Scroll of the Maryland Chemist of the Year from Maryland Section Chairman John L. Kolbe. Mrs. Hall and Miss Nancy Hall are the witnesses.

The presentation was made at the December, 1976, meeting at the College of Notre Dame.





Richard L. Karpel is a native of New York City, and received his primary and secondary education in the public schools there. He attended the Cooper Union School of Engineering (1961-63), and switched to chemistry at Queens College, CUNY, where he received his B.A. (1965).

His graduate training in the Department of Chemistry at Brandeis University (1965-70) dealt with the kinetics and mechanisms of rapid transition metal ion complexation. Utilizing relaxation techniques, mainly the temperature-jump method, he studied the association kinetics of biologically important ligands, e.g., amino acids and purine bases, with labile metal ions, e.g., Ni(II), Co(II) and Cu(II).

After receiving his Ph.D. (1970), he decided to pursue postdoctoral research in a more biologically oriented field. He joined Professor J. R. Fresco's group at Princeton University, where for six years he was associated with a number of projects that dealt with the effects of metals and proteins on ribonucleic acid (RNA) structure and function. These included studies on the interactions of highly charged cationic metal complexes with transfer RNA and with polynucleotides, the use of these complexes in the preparation of isomorphous heavy atom derivatives of tRNA crystals, the kinetics of a metal ion-induced tRNA conformational change, and most recently, the interaction of and unusual effects of "unwinding" proteins with tRNA and other nucleic acids.

Since September, 1976, he has been an assistant professor in the Department of Chemistry at the University of Maryland Baltimore County, where he divides his time between teaching biochemistry and other chemistry courses, and establishing a laboratory where he is continuing his research on protein and metal ion-nucleic acid interactions.

*Abstract of Dr. Karpel's Talk*

RNA UNWINDING PROTEINS

In cells, nucleic acids are involved in a variety of processes in which their capacity to undergo conformational changes can be a rate-determining factor. It is not unreasonable then to expect that proteins or other factors may exist that "catalyze" or otherwise facilitate such conformational changes. Indeed, DNA "unwinding" proteins have been accorded important roles in DNA replication and genetic recombination. Such proteins, or analogous ones, might also be required in facilitating RNA conformational interchange, and may thus play a role in RNA synthesis, processing, transport and translation (i.e., protein synthesis).

We recently demonstrated that several unwinding proteins from calf thymus and human tissue culture cells can, *in vitro*, accelerate the conformational changes of transfer RNA and 5S RNA molecules. In the absence of these proteins, the conformational changes are characterized by high activation barriers, with half-lives in the order of years at 0°C. However, in the presence of a stoichiometric excess of an unwinding protein, the conformational change at 0°C is complete in the order of minutes. We will present evidence that these proteins form complexes with their RNA substrates, and that at least some of the intrinsic RNA substrates, and that at least some of the intrinsic RNA secondary structure, which is broken during the conformational change, is destroyed upon complexing. The relevance of this model system to the (as yet unknown) physiological roles of the proteins, as well as the cellular location of one of the calf thymus proteins will also be discussed.

## MARCH MEETING

DATE:

Wednesday, March 16, 1977

PLACE:

University of Maryland  
Baltimore County Campus  
(see map in this issue)

SPEAKERS & TOPICS:

5:30 pm  
C-P Bldg, Room 108  
Dr. Richard L. Karpel  
Department of Chemistry  
UMBC  
"RNA Unwinding Proteins"

8:30 pm  
Lecture Hall 2  
Dr. Alexander Rich  
Department of Biophysics  
MIT  
"The Molecular Structure and  
Biological Function of  
Transfer RNA"

SOCIAL HOUR:

There will be a social hour  
after the meeting. Refreshments  
will be served.



Dr. ALEXANDER RICH

COCKTAILS & DINNER:

UMBC Dining Hall III  
Hospitality Hour, courtesy  
Fisher Scientific Company  
6:30 - 7:15

Dinner at 7:15 at \$6.25 for  
section members and other  
chemists; \$4.25 for spouses,  
students, and retired chemists.

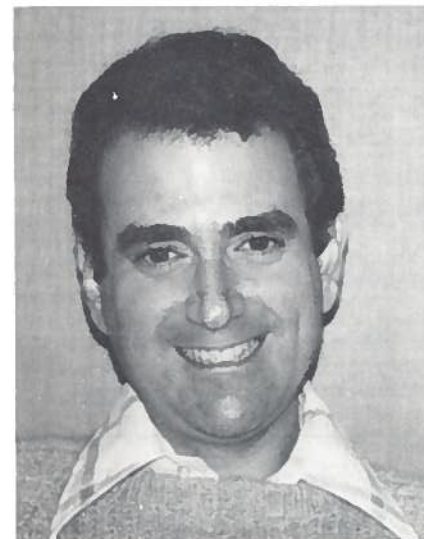
Reservations are necessary for  
the dinner and should be made no  
later than March 11 with

ACS RESERVATIONS  
c/o Dr. Ernest Silversmith

Phone 444-3216, 8 am-4:30 pm  
358-0619 evenings

Or: USE THE CONVENIENT COUPON  
THAT APPEARS ELSEWHERE IN  
THIS ISSUE

It is not necessary to be a mem-  
ber of the American Chemical  
Society to attend the dinner or  
the talks. The talks may be  
attended without going to the  
dinner. You are invited to  
bring your spouse and friends to  
both the dinner and the meeting.



Dr. RICHARD KARPEL

ALEXANDER RICH

Alexander Rich was born in Hartford, Connecticut, in 1924. He received his undergraduate education at Harvard University (A.B., 1947), and, from the same university, the M.D. (1949). He was a research fellow in chemistry at the California Institute of Technology from 1949 to 1954, and then went to the National Institutes of Health, where he was a section chief in physical chemistry from 1954 to 1958.

In that year, he was appointed an associate professor of biochemistry at the Massachusetts Institute of Technology, where he is currently the Sedgwick Professor of Biochemistry.

He was a visiting scientist at the Cavendish Laboratory in 1955, and a Guggenheim Fellow in 1963. As well as being a member of many scientific societies, he is a fellow of the National Academy of Sciences and of the American Academy of Arts and Sciences.

Dr. Rich is well-known for his work on the molecular structure of biological systems, the mechanism of information transfer in biological systems, and especially for the application of high-resolution X-ray crystallography to proteins.

*Abstract of Dr. Rich's Talk*

THE MOLECULAR STRUCTURE AND BIOLOGICAL  
FUNCTION OF TRANSFER RNA

The three dimensional structure of yeast phenylalanine transfer RNA (tRNA) has been determined to a resolution of 0.25 nm. From a knowledge of the sequence of other transfer RNA's, it is likely that the molecular structure of this tRNA can be used as a model for understanding the three dimensional structure of all tRNAs. This is due to the fact that many of the nucleotides which are invariant in the different tRNA sequences have a distinct structural role in yeast phenylalanine transfer RNA, and it is likely that they have a similar role in the structure of other species. The molecular structure will be described both in terms of its overall stabilization due to the stacking of the bases and the high specificity of the hydrogen bonding interactions. Functionally related aspects of the structure will be discussed including the codon-anti codon interaction during protein synthesis. Unsolved problems dealing with the structure and biology of transfer RNA will also be discussed.

----- TEAR-OUT DINNER RESERVATION FORM -----

Enclosed is \$ \_\_\_\_\_ (\$6.25/\$4.25\* per person) for dinner reservations at the UMBC Dining Halls for the following persons:

NAME	(Please print or type)	AFFILIATION
------	------------------------	-------------

_____	_____	_____
_____	_____	_____

Please make check payable to Maryland Section, ACS, and mail together with reservation form to Dr. Ernest Silversmith, 2607 Taney Road, Baltimore, MD 21209. Or phone 444-3216 (8-4 weekdays), 358-0619 (evenings & weekends).

\*See note on p. 9.

*Return by March 11*

## Silver Findings

The Maryland Section wants to do everything it can to serve its members. The monthly meetings, short courses, and tape library are designed for your benefit. The Member Assistance Committee under Joseph Cogliano, W. R. Grace & Co., is another example of the Section's efforts to help its individual members and the firms in the area. We invite firms to list all vacant positions with Dr. Cogliano; his telephone number is 531-5711. Chemists who are seeking a position may also contact him. Perhaps he has an opening on file. In any case, he will try to help in any way possible.

The University of Maryland Baltimore County (UMBC) has recently been selected to be one of the first colleges for the "Catalyst-77" program. In this program, which is sponsored by the American Chemical Society's "Project SEED," high school students spend the summer in research activities in the Department of Chemistry. We are delighted that an institution within our section is participating in this worthwhile program.

The Morgan State Student Affiliates of the ACS will host a regional (Maryland-D.C.) meeting of Student Affiliates on Saturday, March 12. The meeting will start at 11:30 a.m. in Calloway Hall. Student papers, exhibits by industrial firms, and a dinner are the feature attractions; all this costs only \$3.25! All interested students and faculty are cordially invited.

### DEADLINE NOTICE

Editorial material intended for the Nth issue of *The Chesapeake Chemist* must be received by the 25th of month N-2. Time and tide and the printer wait for no person.

### LET'S GIGO

The Committee on the Role of Computers in Chemical Education of the Division of Chemical Education, Inc., has announced the Workshop on Computers in Chemistry III to be held at Montclair State College, Upper Montclair, NJ 07043, June 26 - 29, 1977. The Workshop is cosponsored by the Divisions of Chemical Education, Inc., Chemical Information, and Computers in Chemistry. Workshop Sessions (with hands-on experience) will be presented in (a) Computers in Chemical Education, (b) Computers in the Undergraduate Chemical Laboratory: Graphics and Hardware, (c) Computer-Instrument Interfacing, (d) Computers in Introductory Chemistry, and (e) Computer Based Information Storage and Retrieval.

For more information, write or call:

Mark L. Lyndrup  
Department of Chemistry  
Montclair State College  
Upper Montclair, NJ 07043  
201 - 893-5138

# THE CHESAPEAKE CHEMIST

Yearly Financial Statement for 1976

Cash Balance January 1, 1976		\$ 996.42
Receipts:		
Advertising	\$1,426.63	
Allowances from Section:		
April 5, 1976	1,500.00	
November 15, 1976	1,000.00	
	<u>\$3,926.63</u>	<u>\$3,926.63</u>
<b>Total</b>		<b>\$4,923.05</b>
Disbursements:		
Postage	\$ 382.47	
Printing Costs	3,181.78	
Addressographing	420.00	
Mailing	45.00	
Secretarial Assistance	172.73	
Miscellaneous		
(Checking Account Charges, Typewriting Accessories, Photography)	<u>54.04</u>	
	<u>\$4,256.02</u>	<u>\$4,256.02</u>
<b>CASH BALANCE JANUARY 1, 1977</b>		<b>\$ 667.03</b>

## MARYLAND SECTION EXECUTIVE COMMITTEE MEETINGS SCHEDULED

The Executive Committee of the Maryland Section of the American Chemical Society will meet on March 30, May 25, October 5, and November 30.

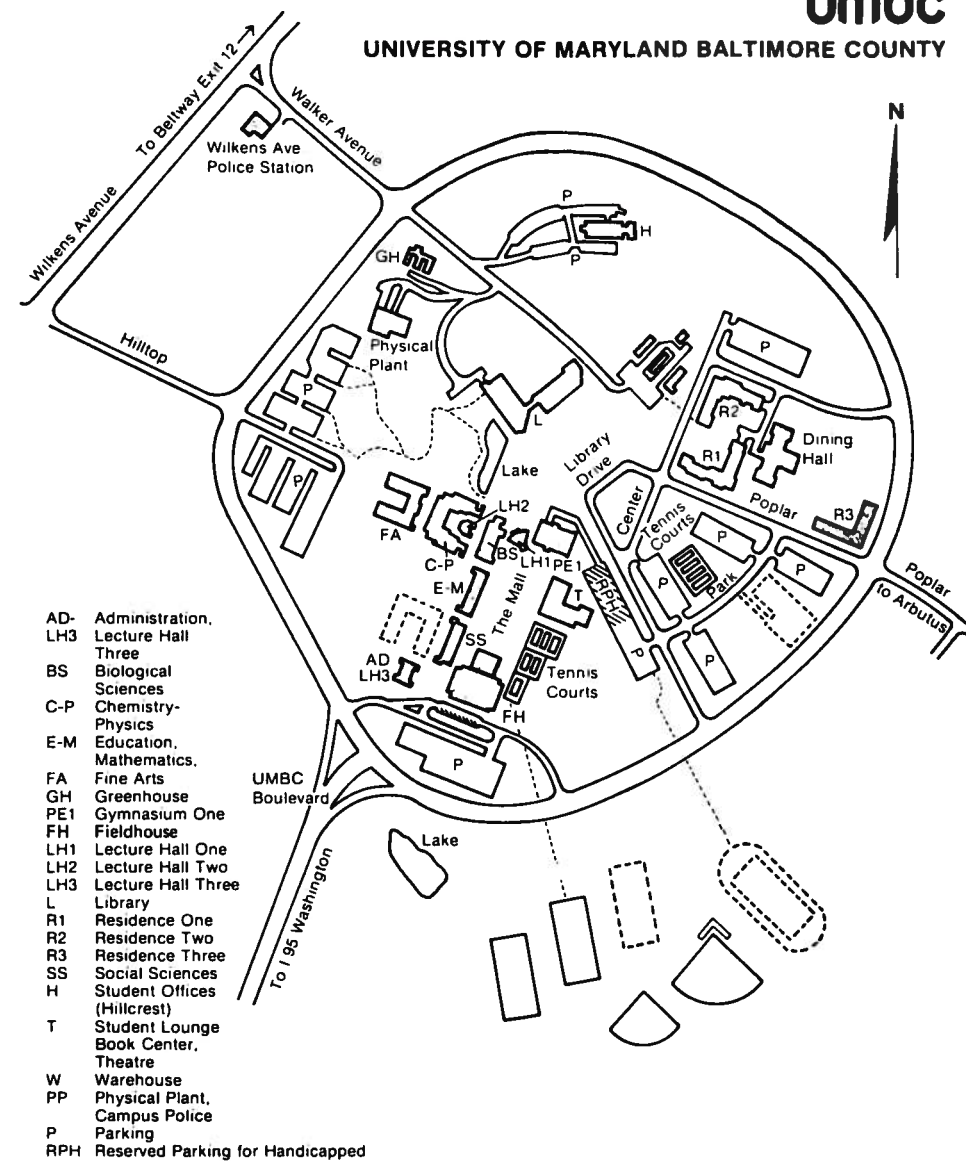
All meetings will be held at 8:15 p.m. in room 236 (directly opposite the elevator) of the Knott Science Center on the campus of the College of Notre Dame, Charles Street and Homeland Avenues, in Baltimore.

Dr. Ernest Silversmith, the Section Chairman for 1977, invites all interested members of the Maryland Section to attend these meetings.

# When did you last attend an ACS meeting?

**umbc**

UNIVERSITY OF MARYLAND BALTIMORE COUNTY



MARYLAND SECTION ELECTIONS

Local Sections of the ACS are now required to elect Councilors and Alternate Councilors by means of a mail ballot. The Executive Committee of the Maryland Section decided that the election of all 1977 Officers and Members-at-large of the Executive Committee should also be conducted by mail. Ballots listing the candidates submitted by the Nominating Committee chaired by A. Bednarczyk were mailed to the 1217 members of the Maryland Section by the Secretary, J. Leslie. Of the 151 responses received, 11 were invalid because the sender could not be validated as being a member of the Section. The ballots were counted by A. Bober, Y. Caplan, and E. Krikorian. The numbers of votes cast for each person on the ballot were as follows:

Chairman Elect:	James Leslie	137
Secretary:	Robert J. Schneider	137
Treasurer:	Howard J. Cohen	137
Councilor:	Carl E. Minnier	135
Alternate Councilor:	Clara I. Adams	137
Members-at-large:	Merle I. Eiss	135
	Sister Mary Vincent	134
	Richard L. Smith	135
	Raymond C. Petersen	136
	Elwin C. Penski	136

There was one write-in vote which, however, was not accompanied by a statement of the candidate's willingness to serve if elected.

Since the Chairman-elect automatically becomes Chairman of the Section, E. Silversmith who was Chairman-elect in 1976 becomes Chairman of the Section in 1977.

A Nominating Committee for selection of candidates for the 1978 offices of the Section will be formed early in 1977. The names of any potential candidates should be referred to the Chairman whose name will be published in *The Chesapeake Chemist*.

James Leslie  
1976 Secretary

**RESERVE THESE DATES!**  
**1978 MARM MEETING**  
**APRIL 5, 6, 7, 1978**  
**HUNT VALLEY, MARYLAND**

11<sup>th</sup>



Central Pennsylvania  
Delaware  
Lehigh Valley  
Maryland

**Sponsoring Local Sections**

Monmouth County  
Philadelphia  
Princeton  
Southeastern Pennsylvania  
South Jersey

Susquehanna Valley  
Trenton  
Washington  
Western Maryland

April 20-23, 1977  
John M. Clayton Hall, University of Delaware  
Newark, Delaware 19711

**SPECIAL SYMPOSIA**

"CHEMICALS: COMING, GOING AND GONE"

- Organic Feedstocks of the Future
- Environmental Controls
- Carcinogenic Materials
- Chemical Recycling
- Industry—University Interaction

Special luncheon programs and speakers will be included as part of the Special Symposium Sessions.

**GENERAL SESSIONS AND SYMPOSIA**

**ANALYTICAL**—H. Hauer, Hercules Research Center, (302) 995-3252

- Advances in Liquid Exclusion Chromatography
- Analytical Aspects of Pulsed NMR
- Delaware Valley Chromatography Forum (Detectors for Chromatography)
- General Sessions

**CHEMICAL DOCUMENTATION**—H. Skolnik, Hercules Research Center, (302) 995-3480

- Users Reaction to an Evaluation of On-Line Databases
- In-House Computerized Information Systems
- Informational Requirement of Government Regulatory Agencies
- General Sessions

**CHEMICAL EDUCATION**—J. Burmeister, University of Delaware, (302) 738-1130

- Frontiers in Chemistry
- General Sessions

**CHEMICAL TECHNICIANS**—F. Barney, Du Pont Experimental Station, (302) 772-3738

- Instrumental Demonstrations
- Continuing Education for Technicians
- General Sessions

**COMPUTERS IN CHEMISTRY**—R. Cramer, Smith Kline & French, (215) 854-5648

- Drug Design by Computer (Invited Papers Only)

**ENVIRONMENTAL CHEMISTRY**—T. Church & C. P. Huang, University of Delaware, (302) 738-1212

- Symposium on the Estuarine Watershed
- Chemistry of Water & Waste Treatment
- Photochemistry of the Atmosphere
- General Sessions

**INORGANIC CHEMISTRY**—F. Tebbe, Du Pont Experimental Station, (302) 772-3256

- Homogeneous Catalysis
- Heterogeneous Catalysis
- Chemistry of Evaporated Metal Atoms
- Porphyrin Chemistry
- General Sessions

**MEDICINAL & BIOCHEMISTRY**—N. Heindel, Lehigh University, (215) 691-7000 Ext. 598

- Radioactive Pharmaceuticals (Invited Papers Only)

**ORGANIC CHEMISTRY**—R. Murray, University of Delaware, (302) 738-2461

- Modern Advances in Organic Chemistry
- General Sessions

**PHYSICAL CHEMISTRY**—J. Kay, Drexel University, (215) 895-2639

- Surfaces and Heterogeneous Catalysis
- Porphyrin Chemistry
- Photochemistry of the Atmosphere
- General Sessions

**POLYMER CHEMISTRY**—R. McCullough, University of Delaware, (302) 738-2543 and

- R. Samuels, Hercules Research Center, (302) 995-3000
- Structure-Property Correlation in Polymeric Materials (Invited Papers Only)

**UNDERGRADUATE RESEARCH**—R. Medeiros, West Chester State College, (215) 436-2975

- General Sessions



The Chesapeake Chemist  
University of Maryland Dr. Yale Howard Caplan  
636 W. Lombard Street 8100 Tapscott Court  
Baltimore, Maryland 21201 Hikesville, Md. 21203

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

PLEASE DO NOT DELAY — ~~DATED~~ NOTICE INSIDE



ANALYTICAL SERVICE LAB  
P. O. BOX 3536, WILM., DE 19807  
PHONE 302 - 998-1184, 998-1185

## SPECIALISTS IN MICROSTRUCTURAL ANALYSIS

*10 Years Of Unexcelled Services*

- \* **SCANNING ELECTRON MICROSCOPY**  
*High resolution (100A) 3 dimensional microscopy*
- \* **TRANSMISSION ELECTRON MICROSCOPY**  
*High resolution (10A) microscopy of replicas and thin films*
- \* **OPTICAL MICROSCOPY**  
*Reflection, transmission, polarized, phase contrast*
- \* **QUANTITATIVE IMAGE ANALYSIS (STEREOLOGY)**  
*Particle or feature size and size distribution analysis*
- \* **ELECTRON PROBE X-RAY MICROANALYSIS**  
*Qualitative and quantitative elemental (>Be) microanalysis*
- \* **ELECTRON SPECTROSCOPY FOR CHEMICAL ANALYSIS**  
*Analysis of thin (25-50A) surface films*
- \* **OPTICAL EMISSION SPECTROSCOPY**  
*Semi quantitative and quantitative analysis of trace elements*
- \* **X-RAY AND ELECTRON DIFFRACTION**  
*Identification of crystalline compounds*
- \* **MICRO-HARDNESS TESTING (KNH & DPH)**

*All the above services are in house capabilities*

**Special Proprietary Sample Preparation Techniques  
Have Been Devised To Optimize The Analytical Data**

**For Further Information Contact J. F. Ficca Jr.**