



THE CHESAPEAKE CHEMIST

MARYLAND SECTION
AMERICAN CHEMICAL SOCIETY

VOL. XXX

JANUARY, 1974

NUMBER 1

NEW SECTION OFFICERS



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CHAIRMAN ELECT



MELVIN P. MILLER
SECRETARY



ERNEST F. SILVERSMITH
TREASURER

CHAIRMAN'S MESSAGE

Greetings for a successful and healthful New Year.

This past year has seen some progress for the chemical profession with regard to employment opportunities. Although employment openings still lag behind the number of people available, the upward trend is encouraging. The federal government's decision to restore some of the support for fundamental research is also encouraging, but is at this point far too little. Far more important to us all is the potential impact of the oil shortage on the chemical industry, particularly with regard to petrochemicals. The Society must attempt to have policies which reflect the chemist's and chemical engineer's expertise in order to deal with these problems. Similarly the continuing problems of the environment must be thought through reflecting the best advice available.

The Society has seen the election of two minority presidents which reflects differences of opinion among our members. Changes in structure of the Society in its committees and counsels may be the result of these elections. We have already seen some internal shift in emphasis of the ACS.

For these and other reasons it is absolutely essential that you and I speak out on all the issues affecting us as chemists and chemical engineers. We must see to it that the American Chemical Society, at the sectional, regional, and national levels, speaks from a position of being well informed about its members thinking. Your officers are anxious to hear from you.

One of the important aspects of the section is to provide opportunity for interchange of ideas of our members. It is hoped that the monthly meetings provide this opportunity. It is also hoped the quality and

balance of the programs add to your professional lives. We want to hear from you about the meetings.

The Education Committee is planning to continue the special topics teaching sessions. They welcome suggestions from you on areas of interest.

On the regional level, the Middle Atlantic Region has recently established a new award to honor outstanding teachers at small colleges. This award is in honor of Dr. E. Emmett Reid, who has been a distinguished member of our section for more than 50 years. Nominations for this award should be sent to our awards chairman as soon as possible. We also seek nominations for the Maryland Chemist as well as the Regional Conant Award for outstanding high school teaching.

In order to help your efforts to keep us informed, the practice of publishing the names and phone numbers of the various committee chairmen is being continued.

The effectiveness of the Society depends on you. Only with your help will a productive year be achieved.

Donald E. Jones
Chairman
Md. Section
ACS

WHY NOT ATTEND THE LOCAL ACS MEETINGS?



THE CHESAPEAKE CHEMIST

VOL. XXX

JANUARY, 1974

NUMBER 1

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The Chesapeake Chemist is published monthly September through May by the Maryland Section of the American Chemical Society. Address editorial comments to Howard J. Cohen, Glidden-Durkee, Div. of SCM Corp., 3901 Hawkins Point Road, Baltimore, Md. 21226. Phone 633-6400. Address advertising inquiries and copy to Kent R. Zeller, McCormick & Co., Inc., 204 Wight Ave., Hunt Valley, Md. 21031.

DR. GEORGE L. BRAUDE

Dr. Braude was born in Samara, Russia, on March 2, 1918. He studied chemical engineering at the Technical University of Berlin, Germany, and chemistry at the University of Vilnius in Lithuania, where he was awarded a bachelor's degree in 1942. He received a Ph.D. in organic chemistry from the University of Halle, Germany in 1945, following graduate work under Profs. Theodor Lieser and Karl Ziegler. In 1946, he was awarded a doctor's degree in economics by the same school. Dr. Braude held academic positions at the Universities of Halle and Frankfurt, Germany.

From 1948 to 1952, he was Chief Chemist with the Prosynthese Company in Paris, France. He came to the United States in 1952 and joined the Imperial Paper and Color Corporation in Glens Falls, New York as a research chemist. In 1956, he became Director of Commercial Research with the American Alcolac Corporation in Baltimore, Maryland.

Dr. Braude was employed by W.R. Grace & Co. between 1957 and 1972, first as Supervisor in Process Development in Baltimore, and, from 1963 on, in Clarksville, Md. He had a number of assignments in corporate research and development and in Government sponsored contract research, and his positions ranged from Supervisor and later Director of Special Projects to Manager, Organic Research.

In 1972, he joined the Food and Drug Administration in Washington as Branch Chief in the Bureau of Foods. His responsibilities are the study of industrial and environmental contaminants, which may enter the food chain.

His main areas of interest are polymers, organic and specialty chemicals and colloid chemistry, and he is the author of papers and patents in these fields. He was the 1968 recipient of the Maryland Section Award, ACS.

Dr. Braude served on a number of committees of the Maryland Section of the ACS, was the 1962 chairman, and a councilor from 1969-72. He is also a member of the American Institute of Chemical Engineers and the American Oil Chemists Society.

DR. JEROME GAVIS

Dr. Gavis is a native of Hartford, Connecticut, where he was born on June 18, 1928. He grew up and attended school in New York City. Receiving his Bachelor's degree in chemical engineering from the Polytechnic Institute of Brooklyn (now Polytechnic Institute of New York) in 1949, he did graduate work in inorganic and physical chemistry at Cornell where he received his Ph.D. in 1953. After a year in industry and two years of military service he came to Hopkins in 1956 and has been there since.

As a member of the Chemical Engineering faculty his research interests had been in the fields of transport phenomena and non-Newtonian fluid mechanics, including studies of charge generation and transport in flowing dielectric fluids and the mechanics of liquid capillary jets.

More recently, having joined the Geography and Environmental Engineering Department at Hopkins, Dr. Gavis has begun to devote his attention to the application of chemical and engineering principles to environmental problems. He is currently conducting research on the physical and chemical limitations to the rate of uptake of inorganic nutrients by phytoplankton, and on the oxidation of sulfur dioxide coupled with dispersion in the atmosphere. His interests also range to methods of describing ecological systems mathematically and to the development of quantitative theories of ecology.

IF YOU CHANGE YOUR ADDRESS . . . Please do not notify the Editor of the *Chesapeake Chemist*, but send your new and old addresses to: The American Chemical Society, 1155 Sixteenth Street, N.W., Washington, D. C. 20036. The Maryland Section will then be notified.

It's better to have a little taffy now than epitaphy later.

JANUARY MEETING

ENVIRONMENTAL NIGHT

DATE:

Wednesday, January 23, 1974

PLACE:

Eudowood Gardens Lecture Room,
Eudowood Plaza, Joppa Road near
Goucher Boulevard.

SPEAKERS AND TOPICS:

5.30 P.M. - Dr. Jerry Gavis,
The Johns Hopkins University,
"Oxidation of SO₂ in Water
Solutions - An Air Pollution
Problem for Chemists"

8.30 P.M. - Dr. George L. Braude,
Food and Drug Administration,
"Pollutants and Food
Contaminants"

SOCIAL HOUR:

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



DR. JERRY GAVIS



DR. GEORGE L. BRAUDE

COCKTAILS AND DINNER:

Eudowood Gardens Dining Room
Price is \$5.00 per person for
cocktails (6:30-7:15, unlimited
quantity) and hot buffet dinner
(7:15). Students and their
spouses may attend the dinner
for \$3.00 each. Reservations
are necessary for the dinner,
and should be made with
Mr. Allen Bednarczyk
McCormick and Co., Inc.
204 Wight Avenue
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phone 667-7450, 667-7470,
no later than January 18.
It is not necessary to be a
member of the American Chemical
Society to attend the dinner or
the talks, and the talks may be
attended without attending the
dinner. You are invited to
bring your wife and friends to
both the dinner and the meeting.

POLLUTANTS AND
FOOD CONTAMINANTS

Over the last several years a number of well documented cases of environmental pollutants contaminating the food supply of man have been reported. The best known of these, aside from pesticides, are mercury, cadmium, polychlorinated biphenyls and phthalate esters.

In these and other instances, a number of questions have to be answered: what the contaminants are; where they come from; what was their pathway; are they metabolically modified; and what can one do about it all?

The answer to the last question is frequently complex, as many factors have to be taken into account. A good example is the present controversy on the application of sewage sludge and waste water to agricultural land and crops. Use of land as the "living filter" is being advocated by many as the ideal solution to overcome river and sea pollution and to preserve a valuable resource. On the other side of the coin, however, is the potential for contamination of crops by organic and inorganic compounds and pathogens present in some sluges, with resulting adverse effects on the human food chain.

COMMITTEE CHAIRMEN

| | |
|--------------------------------------|--|
| Awards and National Nominations..... | William Galetto 667-7481 |
| Chemical Education.... | Melvin Miller 323-1010 |
| House and Program..... | A. Bednarczyk 667-7480 |
| Member Assistance..... | Joseph Cogliano 531-5711 |
| Membership..... | John Kolbe 531-5711 |
| Public Relations..... | Carl Minnier 682-6000 |
| Publicity..... | Dave Roswell Norbert Zaczek 323-1010 |
| Remsen Award..... | Brown Murr 366-3300 |
| Scholarship..... | E. Silversmith 323-2270 |
| Chesapeake Chemist.... | Howard Cohen 633-6400 |
| MARM Delegate..... | Tim Parr 765-2658 |

OXIDATION OF SO₂ IN WATER
SOLUTIONS - AN AIR POLLUTION
PROBLEMS FOR CHEMISTS

As one of our most serious air pollutants, sulfur dioxide has engendered an enormous amount of research and provided countless pages of text in the air-pollution literature. Yet for all the work done and reported, we know relatively little about its chemistry in the atmosphere. Moreover, there are serious gaps in our knowledge of its fundamental aqueous chemistry.

We have started out to see if we can describe quantitatively how sulfur dioxide becomes oxidized to sulfuric acid in a plume emerging from a smoke stack into the atmosphere and at the same time dispersing in gusts as it travels downwind. It is known that the sulfur dioxide becomes oxidized as it is dispersed, but the rate at which it is converted to sulfuric acid must depend upon the dispersion characteristics since these affect concentrations. The problem is ultimately one of a transport-influenced chemically reacting system.

Before the influence of transport can be investigated, however, we must know the characteristics of the oxidation in a quiescent system: we must know the ordinary kinetics of the oxidation. Among the several different possible routes the oxidation may take we believe that it is effected by oxygen in solution in the microdroplets of water that condense around particles in the plume and is catalyzed by traces of metal ions, particularly iron, that dissolve into the droplets from the nucleus particles.

Assuming that there is little resistance to the solution of sulfur dioxide in the droplets, we need to know the kinetics of iron catalyzed oxidation of sulfur dioxide by dissolved oxygen in acid solution in water. It is here that we were most surprised by the lack of reports on any previous definitive kinetic studies of the reaction, despite

many discussions of the reaction in the air pollution literature and in publications devoted to more fundamental pursuits. We found only one paper in which rates of oxidation were measured in great enough detail to try to extract the needed rate expressions from them.

Although the data were obtained without thought for ionic strength effects or of complex ion formation, we were able to extract from them a complex inverse dependence on pH over a limited pH range between 1 and 2, a second order dependence on sulphur dioxide concentration at a fixed initial concentration, zero order dependence on oxygen, and a complex dependence on iron concentration. The data, however, tantalizingly suggest a dependence on initial sulfur dioxide concentration, but are neither sufficient nor precise enough to allow us to extract the dependence. More distressingly, the reaction probably takes place at pH values closer to 3 in the plume, and we have no data for this range; the rate appears to become more strongly dependent on pH as the pH increases. We have thus been forced to initiate an experimental program to study the kinetics of the oxidation over a range of conditions of interest in environmental problems.

Closer investigation of other problems occurring in nature will reveal many such gaps in knowledge that have been by-passed by chemists and other scientists. This is but one example of a world of problems, requiring application of already familiar theories and techniques, that await both newly hatched and well seasoned chemists who are willing and able to divert their thinking from chemistry on a molecular scale to chemistry on an environmental scale.

COPY DEADLINE
Copy for the CHESAPEAKE CHEMIST should be forwarded to the Editor not later than the first of the month preceding publication.

..... Tear-Out Dinner Reservation Form

There is enclosed \$.....(\$5.00 per person)* for dinner reservations at Eudowood Caterers, Eudowood Plaza, for the following persons.**

| <u>Name</u> | (Please print or typewrite) | <u>Affiliation</u> |
|-------------|-----------------------------|--------------------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |

*Please make checks payable to Maryland Section, ACS and mail together with reservation form to Mr. Allen Bednarczyk, McCormick and Co., Inc., 204 Wight Ave., Hunt Valley, Md. 21031, or phone 667-7480, 667-7470.

**Return by Friday preceeding next meeting.

[Report No. 93-498]

A BILL

To authorize and direct the President and State and local governments to develop contingency plans for reducing petroleum consumption, and assuring the continuation of vital public services in the event of emergency fuel shortages or severe dislocations in the Nation's fuel distribution system, and for other purposes.

By Mr. JACKSON, Mr. BIBLE, Mr. CANNON, Mr. GURNEY, Mr. HUMPHREY, Mr. JAVITS, Mr. KENNEDY, Mr. MAGNUSON, Mr. MCCLELLAN, Mr. MOSS, Mr. RANDOLPH, Mr. STEVENS, and Mr. STEVENSON

OCTOBER 18, 1973

Read twice and referred to the Committee on Interior and Insular Affairs

NOVEMBER 13, 1973

Reported with an amendment in the nature of a substitute

93d CONGRESS
1st Session

S. 1134

A BILL

To provide the Secretary of the Interior with authority to promote the conservation and orderly development of the hard mineral resources of the deep seabed, pending adoption of an international regime therefor.

By Mr. METCALF, Mr. BARTLETT, Mr. BELLMON, Mr. BIBLE, Mr. FANNIN, Mr. HANSEN, and Mr. STEVENS

MARCH 8, 1973

Read twice and referred to the Committee on Interior and Insular Affairs

93d CONGRESS
1st Session

S. 1217

A BILL

To phase out the operation, construction, and export of civilian nuclear-fission powerplants by January 1980.

By Mr. GRAVEL

MARCH 14, 1973

Read twice and referred to the Joint Committee on Atomic Energy

A BILL

To amend the National Science Foundation Act of 1950 in order to establish a framework of national science policy and to focus the Nation's scientific talent and resources on its priority problems, and for other purposes.

By Mr. KENNEDY, Mr. BAYH, Mr. BENTSEN, Mr. BROOKE, Mr. CANNON, Mr. CASE, Mr. CRANSTON, Mr. GRAVEL, Mr. HART, Mr. HUGHES, Mr. HUMPHREY, Mr. INOUE, Mr. JAVITS, Mr. MCGEE, Mr. MCGOVERN, Mr. MANSFIELD, Mr. MONDALE, Mr. MONTROYA, Mr. MOSS, Mr. MUSKIE, Mr. PASTORE, Mr. PELL, Mr. RANDOLPH, Mr. RIBICOFF, Mr. SCHWEIKER, Mr. SPARKMAN, Mr. STEVENS, Mr. STEVENSON, Mr. TUNNEY, Mr. WEICKER, and Mr. WILLIAMS

JANUARY 4, 1973

Read twice and referred to the Committee on Labor and Public Welfare

93d CONGRESS
1st Session

S. 1686

A BILL

To authorize the National Science Foundation to carry out a program to facilitate the application of science and technology to civilian needs, and to assist in establishing civilian research and development priorities, and for other purposes.

By Mr. DOMINICK

MAY 2, 1973

Read twice and referred to the Committee on Labor and Public Welfare

93d CONGRESS
1st Session

S. 1751

A BILL

To amend the Outer Continental Shelf Lands Act and to authorize the Secretary of the Interior to regulate the construction and operation of deepwater port facilities.

By Mr. JACKSON, Mr. BAKER, Mr. COTTON, Mr. FANNIN, Mr. JOHNSTON, and Mr. RANDOLPH

MAY 8, 1973

Read twice and referred to the Committees on Interior and Insular Affairs, Public Works, and Commerce

AN ACT

To reduce the burden on interstate commerce caused by avoidable fires and fire losses, and for other purposes.

NOVEMBER 5, 1973

Referred to the Committee on Science and Astronautics

93d CONGRESS
1st Session

S. 39

AN ACT

To amend the Federal Aviation Act of 1958 to provide a more effective program to prevent aircraft piracy, and for other purposes.

FEBRUARY 22, 1973

Referred to the Committee on Interstate and Foreign Commerce

93d CONGRESS
1st Session

H. R. 2370

A BILL

To create a comprehensive federal system for determining the ownership of and amount of compensation to be paid for inventions made by employed persons.

By Mr. MOSS

JANUARY 18, 1973

Referred to the Committee on the Judiciary

93d CONGRESS
1st Session

H. R. 5111

A BILL

To reorganize the functions of the executive branch of the Government which relate to the regulation of commercial uses of nuclear power, except those which relate to source materials, by transferring such functions from the Atomic Energy Commission to the Administrator of the Environmental Protection Agency subject (in certain cases) to disapproval by the Federal Power Commission or the Secretary of the Interior.

By Mr. BINGHAM

MARCH 5, 1973

Referred to the Joint Committee on Atomic Energy

A BILL

To provide a national program in order to make the international metric system the predominant but not exclusive system of measurement in the United States and to provide for converting to the general use of such system within ten years.

By Mr. PELL and Mr. INOUE

JANUARY 4, 1973

Read twice and referred to the Committee on Commerce

93d CONGRESS
1st Session

H. R. 3214

A BILL

To prohibit any instrumentality of the United States from using as a prefix to the name of any person any title which indicates marital status, and for other purposes.

By Ms. ABZUG and Mr. METCALFE

JANUARY 30, 1973

Referred to the Committee on the Judiciary

93d CONGRESS
1st Session

H. R. 7508

A BILL

To protect the public health and safety by assisting local fire protection districts and departments maintain and improve their firefighting and rescue operations.

By Mr. SYMINGTON, Mr. JONES of North Carolina, Mr. BEVILL, Mr. HELSTOSKI, Mr. ELLBERG, Mr. GROVER, Mr. WON PAT, Mr. STARK, Mr. WRIGHT, Mr. LEHMAN, Mrs. CHISHOLM, Mr. PARRIS, Mr. PREYER, Mr. MOAKLEY, Mr. BROWN of California, Mr. CORMAN, and Mr. DE LUIGO

MAY 8, 1973


Referred to the Committee on Science and Astronautics

EDITORS NOTE

The information on Bills and Acts were supplied to us by the office of Senator Beall.

| <u>Date</u> | <u>Subject and Speaker</u> | <u>Time P.M.</u> |
|--------------------|--|------------------|
| <u>January 23</u> | ENVIRONMENTAL NIGHT Dr. Jerry Gavis Department of Geography and Environmental Eng. The Johns Hopkins University "Oxidation of SO ₂ in Water Solutions - An Air Pollution Problem for Chemists" | 5:30 |
| | Dr. George L. Braude Food and Drug Administration "Pollutants and Food Contaminants" | 8:30 |
| <u>February 20</u> | BIOCHEMISTRY NIGHT I Dr. Wolfgang Vogel Department of Pharmacology Jefferson Medical College Thomas Jefferson University "Is There a Chemical Basis of the Mind" | 5:30 |
| | Dr. Sol Snyder Medical School - Johns Hopkins University "Opiate Receptors" | 8:30 |
| <u>March 20</u> | ANALYTICAL-COMPUTER NIGHT Dr. Stuart Cram Analytical Division National Bureau of Standards "Optimization of Gas Chromatographic Separation with Mini Computers" | 5:30 |
| | Dr. Sam Perone Department of Chemistry - Purdue University "Computer Enhancement of Analytical Techniques - State of the Art" | 8:30 |
| <u>April 17</u> | BIOCHEMISTRY NIGHT II Dr. Barry Rosen Department of Biochemistry University of Maryland Medical School "Energetics of Active Transport" | 5:30 |
| | Dr. S. Udenfriend Hoffman - LaRoche Company "Fluorescence Assay of Proteins, Peptides and Aminoacids in the Picomole Range" | 8:30 |
| <u>May 22</u> | REMSEM AWARD TO BE ANNOUNCED Homewood Campus The Johns Hopkins University | |

The meetings for January, February and March of 1974 will be held at Eudowood Gardens. The April, 1974 meeting at University of Maryland, Baltimore County and the May 1974 meeting will be held at The Johns Hopkins University.



Varian Instrument Division
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**A Steam Engine Railroad Trip to
the Historic American Home of
Joseph Priestley in Northumberland,
Pennsylvania, at the Priestley MARM**

April 23-26, 1974

THE CALL FOR PAPERS

Divisions and Symposia:

Analytical

Chromatography

Environmental Chemistry

Susquehanna River Basin

Inorganic Chemistry

Active Oxygen Compounds

Metals in Biological Systems

Polymer Chemistry

Medicinal Chemistry and Biochemistry

Organic Chemistry

Organometallic Chemistry

Chemistry of Fatty Acids

Physical Chemistry

Molecular Spectroscopy

Reactive Intermediates in Oxidation Reactions

Chemical Documentation

Chemical Education

Chemistry Curricula for Allied Health Professions

History of Chemistry

Undergraduate Research Papers

A list of chairmen and further information may be obtained from the technical program chairman: Dr. Bennett Willeford, Chemistry Department, Bucknell University, Lewisburg, Pa. 17837.

Abstracts Receipt Deadline—January 15, 1974.