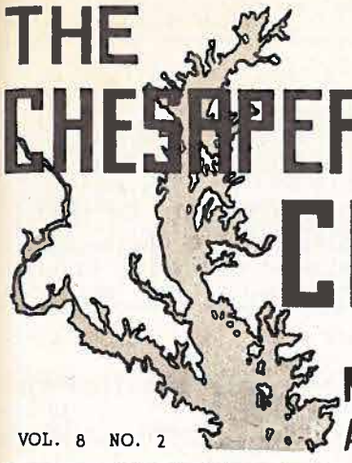
FEBRUARY 1952

# THE CHESAPEAKE CHEMIST



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## THE FEBRUARY MEETING

The next meeting of the Section will be held on Friday, February 29, and will be devoted to chemistry at the local level. Reports will be made on some of the varied chemical research activities pursued in this area.

There will be afternoon sessions (5:00 P.M.) on industrial and engineering chemistry, inorganic and physical chemistry, and biological and medicinal chemistry, and evening meetings (8:00 P.M.) for industrial and engineering chemistry, analytical chemistry and organic chemistry. Dinner, served between the two sessions, will give an opportunity to meet old friends and to make new ones among newcomers to the Section. Further time for informal discussion will be available at the refreshment hour following the evening meetings, when there will be an exhibition of laboratory and industrial safety equipment. All the sessions will be held on the Homewood Campus of The Johns Hopkins University, North Charles Street, Baltimore. Details of time, place and subject are given in the complete program appearing on pages 3 and 4. Abstracts of papers are printed on page 5 and thereafter. All events will start promptly as scheduled.

The Section dinner, open to anyone attending the meetings, will be held at 6:30 P.M. in Levering Hall. The price of $2.25 includes all gratuities and is payable in advance. Reservations, accompanied by check, may be made at any time before February 26 with Dr. Winslow Hartford, Mutual Chemical Company, 1348 Block Street, Baltimore 31, Maryland. The labor of handling reservations will be reduced if all those attending from one laboratory will make a group reservation through one person. It is requested that all reservations be made in advance, since no additional table space can be made available at the last minute. The Levering Hall cafeteria will be available before 6:30 for any who could not make advance reservations.

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Section Officers
Chairman — Leslie Hellerman, Department of Physiological Chemistry, Johns Hopkins School of Medicine, Baltimore 5
Vice-chairman — Winslow H. Hartford, Mutual Chemical Company of America, Baltimore 31
Secretary — H. H. Lloyd, Goucher College, Baltimore 4
Treasurer — E. A. Metcalf, 907 Litchfield Road, Baltimore 12

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Editor: Belle Otto, Goucher College, Baltimore 4, Maryland.

## MARYLAND SECTION NOTES

Local Dues The envelope carrying this Chesapeake Chemist also contained either the receipt for payment of 1952 Maryland Section dues or a reminder that such payment is due. If you neglected to send your money in the confusion of December's activities, remittance may be made now to the new Treasurer, Edward A. Metcalf, whose address appears on the enclosed statement. Dr. Metcalf will be grateful if any errors which may have been made in the original tally are called to his attention.

Plea Due to a misunderstanding, all extra copies of the December and January issues of The Chesapeake Chemist were destroyed. There are not even copies for the Secretary's record or the editor's file! If a few members who have copies are willing to surrender them, the Secretary and the editor will be grateful. Any available copies may be mailed to Dr. Belle Otto, Department of Chemistry, Goucher College, Towson, Baltimore 4, Maryland.

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from page 1) The February Meeting

Limitations of space at most of our meetings make it difficult to move about and chat with fellow chemists. Such restrictions will not exist at the February meeting, so it is the hope of those planning the meeting that new members will make a special effort to attend, and that old members will be ready to welcome them. The Hospitality Committee will be on hand to expedite matters.

At the evening exhibit in Remsen Hall, Fisher Scientific Co., Will Corporation and A. S. Aloe Co. will display laboratory safety equipment. Industrial safety equipment will be exhibited by Mine Safety Appliances, Record Industrial Co., American Optical Co., Ansul Chemical Co., Carey Machine and Supply Co. and Jobe and Co. To these organizations the Maryland Section is grateful for their interest and active cooperation. Thanks are also due Crosse and Blackwell for their generous contribution to the refreshments which will be served after the meeting.

The Section is likewise indebted to many who have worked hard in planning this meeting, particularly to Dr. Geo. P. Hager, Jr., general chairman, Mr. Ray Costa, who managed the exhibit, Mr. Herman Bittner, who has helped in making many arrangements, and to the presiding chairmen whose names are listed in the program.



## COMPLETE PROGRAM FOR FRIDAY, FEBRUARY 29

### AFTERNOON SESSIONS — 5:00 P.M.

#### Industrial and Engineering Chemistry

Room 1, Remsen Hall — Dr. J. E. Ahlberg presiding

Silica Gel in Static and Dynamic Drying Applications
Stephen Hubard — Davison Chemical Company

Ceramic Coatings
George H. Spencer-Strong and E. G. Porst — Pemco Corporation

#### Inorganic and Physical Chemistry

Room 111, Mergenthaler Hall — Dr. J. W. Gryder presiding

The Hydrogen Bond in Alcohols
Lester P. Kuhn
Ballistic Research Laboratories, Aberdeen Proving Ground

The Thermal Decomposition of Nitrous Oxide
Frederick Kaufman
Ballistic Research Laboratories, Aberdeen Proving Ground

The Entropy of Aqueous Ions
Walter A. Patrick
Department of Chemistry, The Johns Hopkins University

Solubility and Melting Point of Chromic Nitrate
R. W. McQuaid — Mutual Chemical Company of America

#### Biological and Medicinal Chemistry

Room 101, Remsen Hall — Dr. R. M. Burgison presiding

Physico-chemical Factors in the Passage of Substances Across Blood Capillary Walls
Francis P. Chinard — The Johns Hopkins School of Medicine

Serine Phosphoric Acid from Diisopropylphosphorylated Chymotrypsin
Norwood K. Schaffer, Stephen C. May, Jr. and Wm. H. Summerson
Chemical Corps Medical Laboratories, Army Chemical Center

Dialkylaminoalkyl Half-esters of Dicarboxylic Acids as Hypotensive Agents
Leonard M. Rice — School of Medicine, Georgetown University

Studies on Systems Containing Ferromesoporphyrin-IX and Proteins
Lawson L. Rosenberg and W. M. Clark
The Johns Hopkins School of Medicine

### DINNER

Levering Hall — 6:30 P.M.
For details see page 1

Program continued on page 4

## EVENING SESSIONS 8:00 P.M.

### Industrial and Engineering Chemistry

Room 1, Remsen Hall — Mr. F. C. Hettinger presiding

Testing of Petroleum Cracking Catalysts for Activity and Selectivity
A. T. Blackwell — Davison Chemical Company

Notes on the Progress of Aircraft Gas Turbines and Turbojet Engines
R. W. Bonner and Regis Raab — Glenn L. Martin Company

Determination of Particle Size Distribution of Fluid Cracking Catalysts
F. Emerson Ivey, Jr. and A. T. Blackwell
Davison Chemical Company

### Analytical Chemistry

Room 111, Mergenthaler Hall — Dr. H. C. Freimuth presiding

Chromogens Produced by Certain Steroids with the Anthrone Reagent
Morris M. Graff, John T. McElroy and Albert L. Mooney
Clinical Research Unit, National Cancer Institute

Macrodetermination of Compounds Containing $C_1$ to $C_4$ Alkoxy Groups
Samuel Sass and Nathan Beitsch
Analytical Chemistry Section, Army Chemical Center

The Critical Orifice - An Automatic Device for Metering and Regulating Air Flows
George B. Wilson and Stuart S. Cruikshank
Analytical Chemistry Section, Army Chemical Center

The Detection of Drugs in the Urine and Saliva of Horses
John A. Herculson — Maryland Racing Commission

### Organic Chemistry

Room 104, Remsen Hall — Dr. Evans B. Reid presiding

The Action of Lithium Aluminum Hydride on Nitrate and Nitrite Esters
Louis Soffer
Ballistic Research Laboratories, Aberdeen Proving Ground

The Synthesis of Xanthine Derivatives
John B. Harmon — Department of Pharmacology, School of Medicine, University of Maryland

Monobromination of 3-Methyl-4-carbethoxypyrrole
Alsoph H. Corwin and George G. Kleinspehn
Department of Chemistry, The Johns Hopkins University

Model Reactions with Phosphorus-containing Enzyme Inactivators
T. Wagner-Jauregg
Chemical Corps Medical Laboratories, Army Chemical Center

Remsen Hall — EXHIBITS AND REFRESHMENTS — 9:30 P.M.
Exhibits of Laboratory and Industrial Safety Equipment



## ABSTRACTS OF PAPERS PRESENTED IN THE AFTERNOON SESSIONS

### Biological and Medicinal Chemistry

Physico-chemical Factors in the Passage of Substances Across Blood Capillary Walls — Francis P. Chinard

The working hypothesis has been developed that diffusion, rather than filtration, is the mechanism by which water and other substances cross capillary walls. Data bearing on this hypothesis, on the physico-chemical factors involved and on the possible structure of the capillary walls will be discussed.

Serine Phosphoric Acid from Diisopropylphosphorylated Chymotrypsin
Norwood K. Schaffer, Stephen C. May, Jr. and William H. Summerson

The enzyme chymotrypsin reacts stoichiometrically and irreversibly with the powerful drug diisopropylfluorophosphate (DFP) to form the enzymatically inactive dialkylphosphorylated protein. Degradation of the enzyme-DFP complex has demonstrated that the DFP phosphorus is firmly bound to an OH-group of one of the serine moieties present in the enzyme.

Dialkylaminoalkyl Half-esters of Dicarboxylic Acids as Hypotensive Agents — Leonard M. Rice

The synthesis of a series of compounds obtained by condensing dialkylaminoalkanols with cyclic dicarboxylic acids and their use in experimental hypertension will be discussed. These compounds cause an appreciable and prolonged fall in blood pressure in experimental animals.

Studies on Systems Containing Ferromesoporphyrin-IX and Proteins
Lawson L. Rosenberg and W. M. Clark

Most proteins in alkaline solution react with ferroporphyrins to give the so-called "hemochromogen" absorption spectrum. An attempt has been made, with the spectrophotometric method, to determine the stoichiometry of the reaction of ferromesoporphyrin (mesoheme) with each of several proteins in alkaline solution and to correlate the stoichiometry with the amino acid composition of the proteins.

### Industrial and Engineering Chemistry

Silica Gel in Static and Dynamic Drying Applications — Stephen Hubard

The use and performance of silica gel as a drying agent will be discussed. An attempt will be made to clear up certain misconceptions regarding the properties of silica gel.

Ceramic Coatings — George H. Spencer-Strong and E. G. Porst

The field of ceramic coatings is both old and new and very broad. The coating of metals--gold, silver, stainless steel alloys and nickel alloys--for all types of clay bodies is a field little known except by those particularly interested in the work. Today, producers of the final object purchase many of the materials used for coatings from specialists in the field of ceramic coatings.

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## Inorganic and Physical Chemistry

The Hydrogen Bond in Alcohols — Lester P. Kuhn

The OH bands of a number of dihydroxy compounds have been measured in the 3 micron region. The presence of an intramolecular hydrogen bond was detected by the appearance of two OH bands. The separation of these bands is a measure of the length of the hydrogen bond. The effects of substituents and structural changes upon this separation is explained on the basis of changes in the geometry of the molecule. The values of intra- and intermolecular hydrogen bonds are discussed.

The Thermal Decomposition of Nitrous Oxide — Frederick Kaufman

The thermal decomposition of nitrous oxide has been studied extensively by Hinshelwood, Volmer, Briner and others. The question remains whether the initial cleavage of the nitrous oxide molecule is entirely rate-determining or whether a more complex scheme is indicated involving the small amounts of nitric oxide which are known to be formed during the decomposition. In order to clarify this point, experiments are being run in which the amount of nitric oxide formed is accurately determined as a function of time and per cent decomposition of nitrous oxide.

The Entropy of Aqueous Ions — Walter A. Patrick

The general methods used for estimating and measuring the entropies of aqueous ions will be briefly summarized, followed by an exposition of the measurements conducted in the Chemical Laboratory of The Johns Hopkins University during the past three years. The importance of the entropy concept will be emphasized, and the close relations between ion hydration and the fluctuation of the magnitude of the ion entropy with changes of concentration and the nature of the ion will be illustrated. It is believed that the continued study of this subject will lead more surely to a rational theory of strong electrolytes than any other method.

Solubility and Melting Point of Chromic Nitrate — R. W. McQuaid

The above properties of chromic nitrate have not been correctly reported by previous workers because the chemical behavior of this salt presents unforeseen difficulties. This paper lists a melting point and solubilities which are believed correct, and methods necessary for establishing these values.

## ABSTRACTS OF PAPERS PRESENTED IN THE EVENING SESSIONS

## Analytical Chemistry

Chromogens Produced by Certain Steroids with the Anthrone Reagent — Morris M. Graff, John T. McElroy and Albert L. Mooney

Spectrophotometric data are presented on the chromogens evolved by a reaction of alcoholic solutions of various steroids with the anthrone reagent. Data are presented for the quantitative estimation of 11-desoxycorticosterone with the anthrone reagent. This reaction may serve to characterize and estimate certain urinary steroids.

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The Macrodetermination of Compounds Containing $C_1$ to $C_4$ Alkoxy Groups — Samuel Sass and Nathan Beitsch

This paper describes how ordinary macro laboratory apparatus can be used to determine $C_1$ to $C_4$ alkoxy compounds with an accuracy of 0.1%.

The Critical Orifice--An Automatic Device for Metering and Regulating Airflows — George B. Wilson and Stuart S. Cruikshank

This paper describes a simple automatic device for metering and regulating airflows. Its operation depends on a well-known physical principle which states that the flow of air through an orifice is essentially constant when the pressure differential across the orifice exceeds a certain critical value.

The Detection of Drugs in Urine and Saliva of Horses — John A. Herculson

A brief description of the application of the Beckman DU spectrophotometer in the detection of drugs in the saliva and urine of racing animals will be presented. Some of the difficulties encountered will be described.

## Industrial and Engineering Chemistry

Testing of Petroleum Cracking Catalysts for Activity and Selectivity — A. T. Blackwell

This paper will deal with the following points: determination of the relative gasoline-, gas- and carbon-producing tendencies of the catalysts; description of the empirical test design equipment and correlation of these tests to a commercial unit; description of the Davison activity test method modified by the "Jersey D and L"; the effect of temperature, pressure, space velocity, change stock and distillation endpoint with respect to operating conditions.

Notes on the Progress of Aircraft Gas Turbines and Turbojet Engines — R. W. Bonner and Regis Raab

This paper presents a brief history of the aircraft jet engine and a comparison with the reciprocating engine. Design problems, the method of operating and the future of the jet engines are discussed. Interesting problems of thermal shock, expansion vibration, fatigue of materials of construction, performance, thermodynamic design and engine controls are considered.

Determination of Particle Size Distribution of Fluid Cracking Catalysts — F. Emerson Ivey, Jr. and A. T. Blackwell

This paper will describe the difficulties involved in measuring particle sizes below 10 microns and the difficulties of establishing an absolute standard since particles are not perfect spheres. It will discuss the advantages and disadvantages of microscopic examination and particle count, screening, sedimentation, and air limitations. It will present a statistical evaluation of the Davison C. A. E. method and screen method. (to page 8

## Organic Chemistry

The Action of Lithium Aluminum Hydride on Nitrate and Nitrite Esters

Louis Soffer

A study of the reduction of various organic nitrate and nitrite esters will be described. Essentially quantitative yields of the parent alcohols were obtained, along with nitrous oxide, ammonia, and hydrogen. Cellulose nitrates were completely denitrated.

The Synthesis of Xanthine Derivatives

John B. Harmon

The synthesis of xanthines substituted in the 7- and 8-positions will be described. The application of these syntheses in preparation of two new compounds will be reported.

Monobromination of 3-Methyl-4-carbethoxypyrrole

Alsoph H. Corwin and George G. Kleinspehn

The discussion will concern itself with the preparation and proof of structure of 2-bromo-3-methyl-4-carbethoxypyrrole, a key intermediate for the investigation of a proposed new synthetic route to chlorophyll-type porphyrins.

Model Reactions with Phosphorus-containing Enzyme Inactivators

T. Wagner-Jauregg

Reactions of diisopropylfluorophosphate and diisopropylchlorophosphate with amines, amino acid derivatives, phenols and polyphenols will be discussed.

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## NEWS OF MARYLAND CHEMISTS

The old Bureau of Chemistry of the Maryland State Board of Health has been undergoing metamorphosis. Dr. William Reindollar, Chief of the former Bureau of Chemistry, is now Chief of the Division of Industrial Health and Air Pollution. This Division will remain in the Charles Street building of the Board of Health and will continue those phases of the old Bureau's work indicated by the new Division name. The remaining functions of the old Bureau, such as food, drug, water and trade waste analyses, have been combined with those of the old Bureau of Bacteriology and assigned to the Division of Laboratories. Dr. C. A. Perry is Chief of this Division. There has been no change in personnel or equipment within the laboratories, but as soon as possible the Division of Laboratories will be transferred entirely to Bennett Hall West, the Board of Health Building at 23rd and St. Paul Sts. in Baltimore.

Dr. W. Rowland Taylor, formerly at the Universities of Wisconsin and Illinois, has been appointed instructor in the Department of Physiological Chemistry at the Johns Hopkins Medical School. Dr. Charles I. Smith has received an appointment as Instructor in the same department, and will do full time research in the field of cellular metabolism under a grant from the National Cancer Institute.