THE CHESAPEAKE CHEMIST

May, 1957

Presented to

Melvin Calvin

on the occasion of his

Remsen Memorial Lecture

sponsored by

The Maryland Section of the American Chemical Society

in memory of

Ira Remsen

Teacher, Investigator, Author, Administrator

June 3, 1957

THE CHESAPEAKE CHEMIST

VOL. 13 MAY, 1957 NUMBER 5

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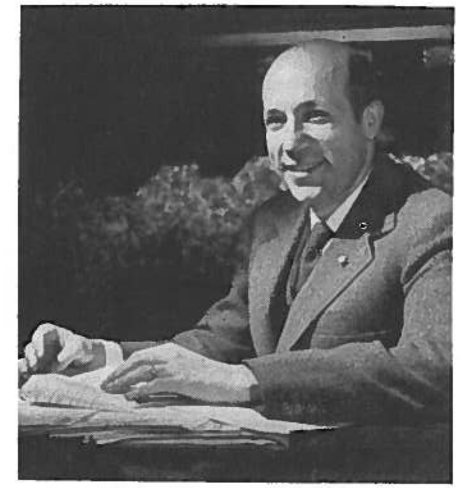
COVER

This month's cover shows the scroll traditionally given to the Remsen lecturer.

THE TWELFTH REMSEN LECTURE



Date:
Monday, June 3, 8:30 P.M.

Place:
Shriver Hall, John Hopkins University

Speaker:
Dr. Melvin Calvin, Professor of Chemistry and Director, Bio-Organic Group, Radiation Laboratory, University of California.

Subject:
Following The Trail of Light

Abstract of the Address—

The early practitioners of what we call 'modern science' were, first of all, scientists before they were specialists. The increasing size and complexity of the body of scientific knowledge is resulting in a fragmentation and specialization such that any activity which overlaps even a small area of science today evokes special comment. The work that I want to describe for you briefly this evening is the result of such an activity. The availablility of large amounts of carbon-14 as a result of the developments of nuclear physics, combined with some techniques of physical chemistry and organic chemistry, were applied to a fundamental biological problem.

The overall problem is that of determining the mechanism employed by autotrophic organisms, of which the green plants are the principal example, in converting solar energy into chemical potential in the form usually of carbohydrate and oxygen. The design of the experiment is straightforward, once the tracer isotope of carbon became available. The green plant is exposed to the marked carbon dioxide for limited periods of time, during which the carbon dioxide enters the plant and begins its travels through the metabolic system to become carbohydrate and other plant material. By stopping this process after suitable intervals and determining where the marked carbon is to be found, it has been possible for us to construct a fairly complete map of the principal early stages by which carbon is transformed from a compound of low potential energy (CO_2) into compounds of higher chemical potential (carbohydrate and oxygen). The principal analytical method employed is that of paper chromatography, which depends upon the differential distribution of various compounds, usually between two liquid phases (or more). At this point, the compounds have to be identified and then their radioactive constitution determined. The variablity of this pattern amongst organisms must also be examined in order to determine what is common and what is not.

From such data at these we were able to devise a sequence of reactions, which turned out to be a cycle, by which all autotrophic organisms absorb carbon dioxide and generate from it reduced carbon in the form of carbohydrate, fat, and protein. Now that the fundamental carbon incorporation scheme is known, we can begin to manipulate some of the subsequent reactions so as to determine the nature, or at least the amounts, of storage products in the plant. For example, we have succeeded in multiplying the rate of synthesis of sucrose in plants by factors of two or three with a judicious choice of chemical agents which could influence certain reations and not others.

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However, the remaining problems of how the initially captured photon is first converted to chemical potential and how the oxygen atom of the water molecule finds its way into molecular oxygen are still very much in the dark. The methods which appear most promising for attack on these two problems involve again the cooperation of fundamental new concepts of physics, or chemistry and of biology. Problems such as these are being attacked with great success by teams of scientists consisting of men, each specializing in one or another of what today have grown to be quite distinct areas of knowledge and inquiry. In fact, such interdisciplinary teamwork is being recognized as an important feature of most scientific work today. One element in the success of such teams is the more or less rapid transformation of the originally highly specialized ideas into more general conceptions, followed by the wide dissemination of these more general conceptions throughout the entire scientific community. This process is probably accomplished in a number of ways. The first, and most obvious, is the mutual stimulation of men working together and by continuous informal discussions gradually evolving, in the group as a whole, new notions and new developments which could hardly be attached to any one individual in the group. This is in contrast to the situation which obtains in work which does not overlap very much into two or more present-day areas of science. Here, the new development is more or less easily attached or recognized as the 'brain child' of a single individual.

It is my feeling, however, that the synthesis of a really new conception which involves contributions from two or more distinct disciplines of science requires some sort of union in one mind of the pertinent aspects of the two disciplines. The more of the various aspects of science which this mind can and does truly encompass, the more likely is a new synthesis to be achieved. In order for this to take place, it is necessary that individuals be not afraid to undertake absorption of the knowledge in areas other than the one in which they were first trained. This must be followed by its active use, even to the point of original contribution, to specialized areas which would be considered definitely outside the region of his original scientific birthright. In this day, when the cry is for more scientists and engineers to man our increasingly complex environment, I would ask that the fundamental nature of scientific inquiry (the study of the nature of all things around us and in us) be not overlooked. I do not speak of science for the sake of liberal education, which is a subject in its own right. I speak of active absorption of and participation in more than one of the present-day fields of science. Ultimately, we may thus create new classifications and expose new relationships.

In order to foster this, it seems to me our methods of educating scientists must be carefully examined. This education must be such as to enable the young scientist to explore deeply and well some particular area of natural phenomena. There is no substitute for this sort of concentrated activity and concentration of thought. However, it must be accompanied by the conviction that he is free to follow, and, in fact, has the duty to follow, the exploration of any natural phenomena into whatever area the light may lead him. In this way will the creation of new horizons overlapping existing subdivisions be encouraged. Without it, we will be limited to the classifications and subdivision of science developed during the 19th and early 20th centuries, and our thoughts, conceptions and even practical developments will be circumscribed by the very words and modes of expression which each subdivision of today tends to use.

The Speaker:

Dr. Calvin was born in St. Paul, Minnesota. He graduated from Michigan College of Mining and Technology at Houghton in 1931 and received the Ph.D. degree in 1935 from the University of Minnesota. In 1955 he was given the D.Sc.. honorary degree from Michigan.

From 1935 to 1937 Dr. Calvin carried out post-doctoral research at the University of Manchester, England. He became an instructor at the University of California in 1937 where he received promotions to assistant professor and associate professor. Since 1946 he has been Director of the Bio-Organic Group at the Radiation Laboratory. In 1947 he became Professor of Chemistry.

Dr. Calvin has written three books and over two hundred papers in the fields of organic chemistry, physical-organic chemistry, biochemistry and photosynthesis. He is a member of numerous scientific societies including the American Chemical Society (councilor since 1944), British Chemical Society, National Academy of Sciences and Radiation Research Society.

Dr. Calvin has been the recipient of many honors. Among these are: Harrison Howe Lecturer, Rochester Section,

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ACS, 1952; Flintoff Medal and Prize, British Chemical Society, 1953; Edgar Fahs Smith Memorial Lecturer, University of Pennsylvania and Philadelphia Section, ACS, 1955; Donegani Foundation Lecturer, Italian National Academy of Science, Rome, Italy, 1955; and the T. W. Richards Medal, Northeastern Section, ACS 1956.

DR. ALBERT L. LEHNINGER

Dr. Albert L. Lehninger, De Lamar Professor of Physiological Chemistry and Director of the Department, School of Medicine, Johns Hopkins University, will introduce Dr. Calvin.

Dr. Lehninger is a native of Connecticut. He graduated from Wesleyan College in 1939 and entered the University of Wisconsin for postgraduate study where in 1942 he received the Ph.D. degree. Dr. Lehninger taught physiological chemistry at Wisconsin, first as instructor and later as assistant professor. In 1945 he joined the faculty at the University of Chicago where he taught biochemistry, first as associate professor and later as professor.

He came to Johns Hopkins University in 1952.

In 1951 Dr. Lehninger was an exchange professor at Frankfurt University, Germany, and during 1951-52 he was a Guggenheim fellow and Fulbright scholar at Cambridge University. He was with the Office of Scientific Research and Development in 1944. Dr. Lehninger received the Paul-Lewis Award in Biochemistry in 1948.

Dinner:

The lecture will be preceded by a reception and dinner in honor of Dr. Calvin which will be held at the Johns Hopkins Club on the Homewood Campus at 6:30 P.M. (D.S.T.) and will be open to members of the Maryland Section and their guests. Formal dress is optional. Since space in the dining room is limited, only the first fifty reservations can be accepted. Reservations should be made by Monday, May 27, with Dr. Raymond M. Burgison, University of Maryland, School of Medicine, 29 South Greene St., Baltimore 1, Md., telephone PLaza 2-1100, and must be accompanied by a remittance of $3.25 for each dinner.

NEW SECTION MEMBERS

New Members

Donald R. Hall	Aberdeen Proving Grounds, Md.
Robert J. Peterson	Fort Detrick, Md.
Louis J. Sellmayer	Fine Organic Chemicals Division Food Machinery and Chemical Corp.
Robert H. Weaver	Graduate School University of Maryland

Transfers		**From**
Fred C. Blanck	Retired	Pittsburgh
Ralph Seefeld	Army Chemical Center, Maryland	Seattle, Wash.
2nd Lt. Robert D. Stolow	Operations Research Group Army Chemical Center, Md.	Northern Alabama
Pvt. Freeman Young	Fort Detrick, Md.	Minnesota

THE REMSEN MEMORIAL LECTURE, 1946 – 1957

In May, 1946, the Maryland Section of the American Chemical Society inaugurated a series of annual lectures in honor of Ira Remsen, first Professor of Chemistry and second President of The Johns Hopkins University. The first Remsen Memorial Lecture was part of the centennial celebration of Remsen's birth. It was the intention of the Maryland Section that Remsen Memorial Lecturers should be chemists of outstanding ability, as exemplified by Ira Remsen's long and devoted career as an exponent of the highest standards in teaching and reserach in chemistry. That the intentions of the Section have been fulfilled is attested by the great honor and esteem that have become associated with the receipt of the Remsen Memorial Lectureship.

Ira Remsen was born in New York City on February 10, 1846. He studied at the Free Academy—now the College of The City of New York—and later earned his M.D. at the Columbia College of Physicians and Surgeons in 1867. Remsen's interest in chemistry eclipsed his interst in medicine, however, and in the same year he went to Germany to study chemistry and prepare for a career in chemical research. During his five year stay in Germany, he worked under Volhard at Munich and Fittig at Göttingen, earning his Ph.D. from the latter institution in 1870. After two years postdoctoral work with Fittig, he returned to the United States in 1872. He served as Professor of Chemistry and Physics at Williams College, Williamstown, Massachusetts, until 1876, when he accepted the chair of chemistry at the newly-founded Johns Hopkins University. He filled this position with distinction for twenty five years, until 1901, when he succeeded Dr. Gilman as President of the University. Dr. Remsen served as President until his retirement in 1913. During his long and active career a steady stream of papers and articles emanated from his laboratory, and no less than 156 papers, mostly in organic chemistry, appeared under his name. He also wrote eight textbooks which were widely used and went through many editions in English and many foreign translations. Hundreds of Remsen's students went forth to become leaders in research and teaching and to pass on to later generations the inspiration imparted to them by their great teacher. It has been said that as a teacher, research worker, and writer, Remsen is more directly responsible for the development of chemistry in the United States than any other man. Until his death in 1927, Dr. Remsen remained keenly interested in chemistry, and he served at various times as President of the American Chemical Society, the American Association for the Advancement of Science and the National Academy of Sciences. Numerous honorary degrees and awards were bestowed upon him during his long and illustrious career.

The Remsen Memorial Lecture, delivered each spring, is the highlight of the year's activities for the Maryland Section. The Remsen Lecturer is chosen by a special committee who meet early in the year to consider possible candidates for the honor. A reception and dinner in honor of the recipient of the award is held at the Johns Hopkins Club and is attended by Officials of The Johns Hopkins University, the American Chemical Society and many members of the Maryland Section. The Lecturer is introduced by a distinguished colleague, and after his address, he is presented with the engraved Remsen Memorial Scroll and an honorarium from the chemists of the Maryland Section.

The following is a list of past Remsen Memorial Lecturers and the titles of their talks:

1946—Prof. Roger Adams, University of Illinois
"Chemical Research in the War and Postwar Period"

1947—Prof. Samuel C. Lind, University of Minnesota
"Fifty Years of Atomic Research"

1948—Prof. Emeritus Elmer V. McCollum, The Johns Hopkins University
"Vitamins and Public Health"

1949—Prof. Joel H. Hildebrand, University of California
"A Philosophy of Teaching"

1950—Dr. Edward C. Kendall, The Mayo Foundation
"Studies Related to the Adrenal Cortex"

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1951—Prof. Hugh S. Taylor, Princeton University
"Solid State Physics and Catalysis"

1952—Prof. W. Mansfield Clark, The Johns Hopkins University
"Some Reflections on the Coupling of Chemical Processes and Biochemical Implications"

1933—Prof. Edward L. Tatum, Stanford University
"Contribution of Biochemical Genetics and Microorganisms to Biochemistry"

1954—Prof. Vincent du Vigneaud, Cornell University
"The Hormones of the Posterior Pituitary Gland"

1955—Dr. Willard F. Libby, U.S. Atomic Energy Commission
"Tritium in Nature"

1956—Prof. Farrington Daniels, University of Wisconsin
"Solar Energy Utilization"

From the above list it can be seen that the high standards of the original Remsen Memorial Lecture Committee have been consistently adhered to and the men chosen over the years for the award have been among the outstanding leaders in American chemistry.

In choosing Professor Calvin as the 1957 Remsen Memorial Lecturer, the Maryland Section of the American Chemical Society has continued the noble tradition of selecting men whose devotion to teaching or research follow the outstanding example set by Ira Remsen in his life-long devotion to the discovery and dissemination of chemical knowledge.

Raymond M. Burgison

Raymond M. Burgison

Recent Meetings

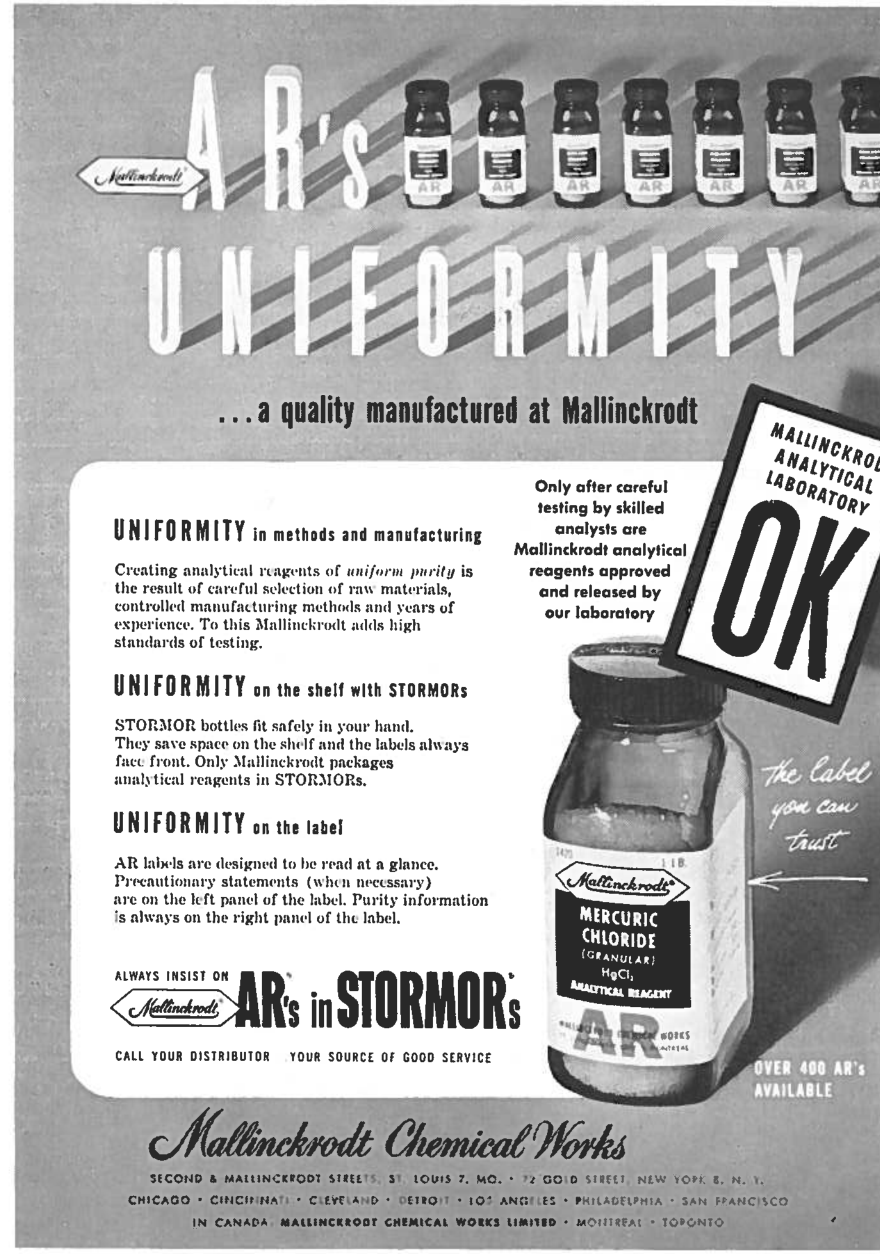
The February meeting of the Maryland Section of the American Chemical Society was held February 15 in Remsen Hall, The Johns Hopkins University. The speaker was Dr. Alfred Burger of the University of Virginia, who addressed the Section on "The Present State of the Chemotherapy of Neuroplastic Diseases." In a field chemically as obscure as cancer, the most rational approach for chemotherapy is to influence some of the small but significant biochemical differences between communal and neoplastic cells. The lecture discussed the biochemically-based line of chemotherapeutic research. Some very interesting speculation about new angles of approach was presented.

The meeting was preceded by a dinner in honor of Dr. Burger at the Johns Hopkins Club.

The customary social hour followed the meeting. The attendance at the dinner was 17, and at the meeting was 62.

CORRECTION

Carl Webster was erroneously reported in February to have joined Olin Mathieson Chemical Corporation. He is with the Baltimore and Ohio Railroad Company and engaged in research and development on industrial cleaners and sanitizers.



MARYLAND SECTION NEWS

INDUSTRIAL

DAVISON CHEMICAL COMPANY

A new Davison Chemical Research Laboratory is nearing completion approximately midway between Baltimore and Washington on Route 32, 2½ miles southeast of Clarksville in Howard County. The modern three-story, fireproof, steel and brick, air-conditioned building is situated on a wooded knoll in a 148 acre tract. The site has been chosen to provide accessibility to downtown Baltimore, to Davison's Curtis Bay plant, and to desirable residential areas.

Versatility has been the keynote in the planning of the laboratory in order to provide for a wide range of chemical research. Analytical facilities include X-ray diffraction equipment, an emission spectrograph, a mass spectrometer, and an electron microscope. The value of these and other instruments is about $200,000. In addition to laboratories there are administration offices, a library with provision for ten thousand volumes, and a cafeteria.

Davison's Research and Development staff, presently located at Curtis Bay, has increased several fold in recent years, and will nearly fill the new building.

WESTINGHOUSE AIR ARM DIVISION

F. T. Parr, chemist in the Materials and Process Group, recently presented a paper at the First Technical Forum of the Society of Plastics Engineers held at the Naval Ordnance Lab, White Oaks, Maryland. The paper discussed the use of silicone rubber resins and laminates as electrical insulation at temperatures ranging from 200°C to 300°C.

Arthur L. Barry, Jr. who holds a B.S. in Chemical Engineering from Catholic University, Washington, D. C., has recently joined the Materials and Process group. Art comes to us from the U.S. Rubber Company, Naugatuck, Connecticut, where he was employed as a development chemist on sponge rubber products and rubber footwear. At Air Arm, he will be responsible for problems dealing with adhesives, silicone rubber, natural and synthetic rubber.

ARMCO STEEL CORPORATION

George E. Linnert, head of the welding group at the Armco Research Laboratories, was a principal speaker at sessions of the American Welding Society during the 10th Western Metal Congress which was held recently in Los Angeles. Mr. Linnert spoke on welding problems in Precipitation Hardened Stainless Steels. PH Stainless Steels, an Armco developed alloy, have found a variety of applications—from carpenter handsaws to supersonic aircraft and missiles.

CRIPPEN & ERLICH LABS., INC.

Subsidiary of Foster D. Snell, Inc.

Raymond C. Crippen, Director of Crippen & Erlich Labs., Inc., was recently elected vice president of the Maryland Section of the American Institute of chemists. **Father Hauber,** of Loyola College, was elected president and **Miss Dorothy Rice** was elected secretary-treasurer.

The Crippen & Erlich Labs., Inc., announce the acquisition of a 1.5 meter grating spectrograph complete with the spectrographic laboratory and dark room. The instrument is being calibrated for both ferrous metals and non-ferrous metals. A complete set of standards was obtained with the instrument. The instrument is also being calibrated for use with various rare earths and rare metals. The laboratory will supplement its usual work in metals with this new instrument. Graduate spectrographers will assist on the instrument.

AMERICAN BIO-CHEMICAL LABORATORY

American Bio-Chemical Laboratory announces that **Mr. J. J. Broening** has joined its staff and will head its Industrial Testing Service division. Mr. Broening brings to this organization a wealth of diversified experience which will permit its further expansion along the lines of metals assays, insecticide testing and general inorganic analyses.

The Chesapeake Chemist
6 West Fayette Street
Baltimore 1, Maryland

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American Chemical Society
MARYLAND SECTION

If you plan to attend the
RECEPTION AND DINNER IN HONOR OF DR. CALVIN
preceding the
REMSEN MEMORIAL LECTURE

Please sign this card and indicate the number of plates to be reserved in your name.

Mail card and check to: Dr. Raymond M. Burgison
University of Md., School of Medicine
29 S. Greene Street, Baltimore 1, Md.
before May 27, 1957.

Name ....
....
....

Please reserve..........plates at $3.25 each. Amount enclosed $..........

Make check payable to: Maryland Section, ACS. The price includes gratuities.