VOL. XXXV, No. 8 MAY, 1958

The NUCLEUS

OF THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY

ROBERT BURNS WOODWARD

Theodore William Richards Medalist, 1958

(*For details of the May Meeting of the Analytical and Elastomer and Plastics Groups and the Electrochemical Society, turn to page* 196)

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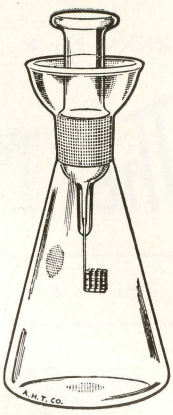
- *For determination of halogens, sulfur, traces of metals, etc., in organic materials*
- *A new, simplified technique for micro and semimicro quantities*
- *End-products free from metallic contaminants*



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For the rapid determination of sulfur, halogens and traces of metals in organic substances by simple combustion in oxygen. No elaborate equipment is required, negligible pressure is produced and the combustion products are free from metallic contaminants.

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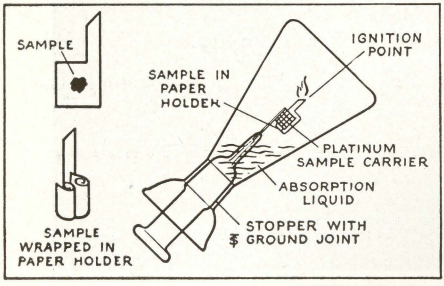
In use, the sample is wrapped and folded in the paper holder. Sample is then placed in the platinum carrier and the flask is charged with a small amount of absorbing liquid as required for the specific reaction and with free-flowing oxygen. The paper tail is then ignited; the stopper with sample is seated in the flask and flask then inverted at an angle. The catalytic combustion proceeds at high temperatures and the combustion products are absorbed in the liquid, which forms a seal around the stopper. After cooling, the inside surfaces of the flask and stopper are thoroughly rinsed. Titrations can then be made directly in the flask. Due to the inherent fragility of glass in the presence of reduced pressure, general safety regulations should be followed, such as the use of shield, goggles, etc.



Results compare favorably, i.e., within ± 0.3%, with conventional combustion or decomposition methods. The method has been used extensively for analysis of the above elements but, because of the low cost, time and space saving features, should find wide use for materials which undergo complete combustion.

See Wolfgang Schöniger, *Mikrochimica Acta, 1955, Heft 1, pp. 123-129,* and ibid., *1956, Heft 1-6, pp. 869-876.*

6470-E. Combustion Apparatus, Thomas - Schöniger (Schöniger Flask) Micro, as above described, 300 ml capacity, for samples up to 10 mg. With No. 34/28 standard taper stopper and platinum wire gauze sample carrier weighing approximately 1.5 grams, 100 Paper Sample Holders and directions for use..... **28.35**

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THE FOUR-HUNDRED AND SIXTY-NINTH MEETING

of the

NORTHEASTERN SECTION A. C. S.

THURSDAY, MAY 8, 1958

At Harvard University
Presentation of the
Theodore William Richards Medal to
ROBERT BURNS WOODWARD
of Harvard

5:45 p.m. Preprandial Hour (please make reservations as usual), Harkness Commons, in the Harvard Graduate Center, 14 Everett Street, Cambridge.

6:30 p.m. Dinner in Honor of the Medalist (please make reservations as usual), Harkness Commons, Harvard Graduate Center, 14 Everett Street, Cambridge.

Price $3.15, tax included

Should you desire a place reserved, mail the enclosed post card, at once, or, call UNiversity 4-6900, Ext. 2961, but not later than 2:30 p.m. Thursday, May 8th.

8:00 p.m. Mallinckrodt Chemical Laboratory, Large Lecture Hall, M-B9., 12 Oxford Street, Cambridge.

"The Theodore William Richards Medal"
by Lockhart B. Rogers
Chairman of the Northeastern Section

"The Scientific work of Robert Burns Woodward"
by Elkan R. Blout
of the Polaroid Corporation
Presentation and Acceptance of the Medal
Address by the Medalist
"Recent Advances in the Chemistry of Natural Products"

9:30 p.m. Reception in Honor of the Medalist in the Foyer of the Mallinckrodt Laboratory. Refreshments.

Signing and mailing the dinner card or telephoning for reservations must be regarded as an obligation.

All interested are invited.

After five-thirty o'clock, the Harkness Commons, 14 Everett Street, Cambridge, will be available for members of the Section planning to attend the dinner.

A Committee will be in charge.

The NUCLEUS

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THE NUCLEUS is distributed to the members of the Northeastern Section of the American Chemical Society, to the secretaries of the Local Sections, and to editors of all local publications.

Forms close for advertising on the 15th of the month and for text on the 12th of the month preceding issue.

Editorial

THE FIFTEENTH RICHARDS MEDAL AWARD

The Northeastern Section of the American Chemical Society can take great pride in awarding the Theodore William Richards Medal to Robert Burns Woodward. It seems only yesterday that he was a young student among us in the Massachusetts Institute of Technology. Today he is teaching all organic chemists, the world over, about the chemistry of natural products as revealed by his researches in this field.

Although very recent, his successes in this field give the impression of having been a part of our heritage not for a few brief years but for at least a generation. All of us recall the address on Terramycin at the Student night meeting in December 1952. Two years later we were electrified by the successful synthesis of strychnine. Thus the long and extensive studies, dating back to 1891, on the structure of the system of seven fused rings were brought to their final goal — the synthesis of strychnine. To be sure the correct structure had been deduced by Sir Robert Robinson in England in 1946, by examination of the products of degradation and of the character of the functional groups. The final and convincing proof of the structure of any organic molecule rests on an unequivocal synthesis. The keystone of the strychnine arch was provided in the Harvard laboratories by Dr. Woodward in 1954.

In honoring a particular chemist for his conspicuous achievement in chemistry, the Richards Medal pays tribute to the spirit of fundamental research in general and to the memory of the late Theodore William Richards. His work and devotion contributed much to the appreciation of chemistry in the United States and throughout the world. The same spirit of research which prompted Dr. Richards we see today in the latest recipient of the Medal, Robert Burns Woodward.

The Northeastern Section

MAY SPEAKER
ROBERT BURNS WOODWARD

Robert Burns Woodward, the 1958 recipient of the Theodore William Richards Medal, was born in Boston on April 10, 1917. His secondary education was acquired at the Quincy High School. In the fall of 1933 he entered the Massachusetts Institute of Technology where, even as a freshman he began developing his interest in organic chemistry which had begun in high school. During his prescribed undergraduate courses of study he had completed many requirements for an advanced degree. Only a year after obtaining the S.B. degree (1936) he was able to present his doctoral thesis in June 1937.

During his M.I.T. years he was an assistant in the Department of Biology (in 1935), a teaching assistant in the summer of 1936 and an Austin Research Fellow for his final academic years, 1936-1937.

The summer of 1937 saw him at the University of Illinois as an instructor in chemistry. During the following year he was a research assistant with Professor Elmer P. Kohler at Harvard. From September 1938 through the end of the year 1940, Dr. Woodward was a member of the Harvard Society of Fellows. His career as a teacher at Harvard began in January 1941 when he was made an instructor. In 1944 he was advanced to the grade of an assistant professor, in 1946 to that of an associate professor and in July 1950, to that of a professor. Since 1953 he has been Morris Loeb Professor of Chemistry at Harvard.

Dr. Woodward has held and still holds numerous consultantships. He has been with the Polaroid Corporation since 1942 and the Pfizer and Company, Inc., since 1951. He served on the Committee on Medical Research 1944-1945, on the War Production Board, 1944-1945, with the Eli Lilly Company, 1945-1957, the Mallinckrodt Chemical Works, 1947-1957 and the Monsanto Chemical Company, 1948-1957.

Many honorary degrees have come to him. From Wesleyan University came the D.Sc. in 1946. Thereafter the following degrees were conferred on him, Harvard A.M., 1946, D.Sc., University of Manchester (England) 1954, Bucknell University D.Sc. in 1955, University of New Brunswick (Canada), D.Sc., 1956, Yale University, D.Sc., 1956. Harvard added its D.Sc. in June 1957.

Dr. Woodward has held many honorary lectureships, enumerated here. They began as the American-Swiss Foundation Lecturer in 1948. Thereafter followed Harrison Howe Lecturer (at Rochester, N. Y.) 1950, Centenary Lecturer of the Chemical Society of London, 1951, Stieglitz Lec-

(*Please turn to the next page*)

ROBERT BURNS WOODWARD

(*Continued from previous page*)

turer (Chicago) 1952, National Phi Lambda Upsilon Lecturer, 1953, Section Lecturer of the XIVth International Congress of Pure and Applied Chemistry, 1955 and Ciba Foundation Lecturer, 1956.

The Awards received by Dr. Woodward are numerous, as well. First came the John Scott Medal, 1946. There followed the Baekeland Medal, 1955, the Ledlie Prize, 1955, the Research Corporation Award, 1955, the Nichols Medal, 1956, and the ACS Synthetic Organic Chemistry Award, 1957. To this list the Northeastern Section proudly adds its Theodore William Richards gold medal "for conspicuous achievement in chemistry."

Dr. Woodward is a member of the National Academy of Sciences and of the American Academy of Arts and Sciences. He is an honorary member of the German Chemical Society, an honorary fellow of the Chemical Society of London and a foreign member of the Royal Society of London.

He became a member of the American Chemical Society in 1939. Professor and Mrs. Woodward make their home in Belmont, Massachusetts.

ANALYTICAL GROUP

FRANK O'HALLORAN, President, Water Laboratory, Commonwealth of Massachusetts, Lawrence, Mass. MUrdock 2-5237.
RUSSEL T. WERBY, Secretary-Treasurer, Werby Laboratories. LI 2-0739.

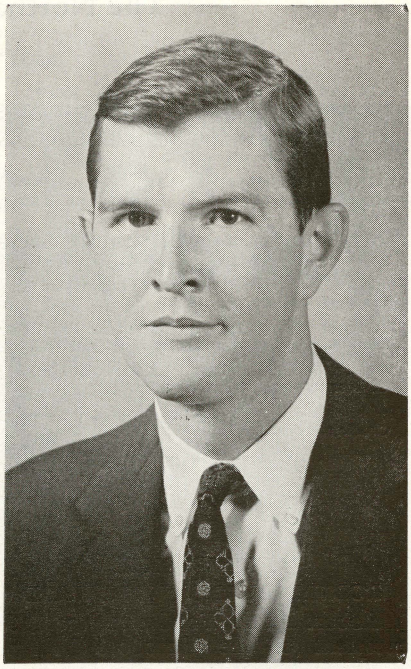
The eighth meeting of the Analytical Group will be held at 8:00 p.m. on Wednesday, May 14, 1958, in Room 2-131, M.I.T.

James W. Ross, Jr., Instructor in Analytical Chemistry at M.I.T., will speak on

"Analytical Applications of the Hanging Drop Electrode"

Prior to the meeting there will be a dinner at 5:45 p.m. in the M.I.T. Faculty Club on the sixth floor of the Sloan Building at 50 Memorial Drive, Cambridge. Reservations may be made by telephoning Mr. Russell T. Werby of the Werby Laboratories, LI 2-0739.

At this meeting the election of officers for 1958-1959 will be held.



JAMES W. ROSS, JR.

ANALYTICAL SPEAKER

James W. Ross, Jr. was born in Fort Lewis, Washington, in 1928. His early education was received in the public schools of California. After graduation from high school in 1945 he studied engineering at Oregon State College and the University of Utah, enrolled in the Army Specialized Training Program. From 1946 to 1948 he served on active duty in the Army at Fort Bliss, Texas, as a member of a group evaluating new radar equipment for anti-aircraft artillery.

Following honorable discharge from the army he entered the University of California at Berkeley where he received the B.A. degree in chemistry in 1951. He then joined the Tide Water Associated Oil Co. where he worked on mass spectrometric and infrared methods for the analysis of petroleum fractions.

In 1954 he enrolled in the graduate school of the University of Wisconsin to work with Dr. Irving Shain on problems of Electrochemical Analysis. He received the Ph.D. in 1957. In September 1957 he joined the staff of the

(*Please turn to page* 198)

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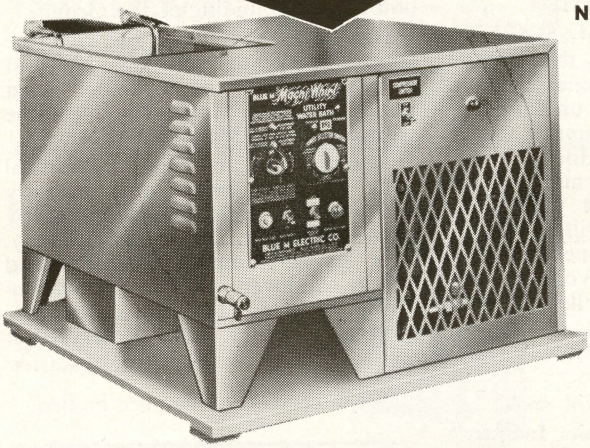

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JOHN W. ROSS, JR.

(*Continued from page* 196)

Chemistry Department of M.I.T. as an instructor in analytical chemistry.

His present research interests are in electroanalytical chemistry and the kinetics and mechanisms of electrode reactions.

BOSTON SECTION OF THE ELECTROCHEMICAL SOCIETY

The fifth meeting of the Boston Section of the Electrochemical Society will be held at 8:00 p.m. on Monday, May 12, 1958, in the Campus Room of the M.I.T. Graduate House. There will be a preprandial hour at 5:30 p.m. with dinner following at 6:30 p.m. The cost of the dinner will be $3.00. Reservations for the dinner may be made by writing to Dr. Worden Waring at 8 Spruce Park, Wellesley Hills, Boston 82, Massachusetts, or by telephoning him during the day at BIgelow 4-7500, Ext. 431.

Dr. Herbert Bandes will speak on

"Chemistry in the Electronics Industry"

Dr. Bandes was born in New York on May 23, 1914. His undergraduate and graduate studies were carried out

(*Please turn to page* 207)

ELASTOMER & PLASTICS GROUP

MAX TAITEL, Chairman, U.B.S. Chemical Corporation, University 4-7300.

J. HORACE FAULL, JR., Chairman-Elect, Consultant, KIrkland 7-8334.

The seventh and last meeting of the year marking the tenth anniversary of the Group, will take place on Tuesday, May 20, 1958. It will be held in the Morse Auditorium of the Museum of Science, Science Park, Charles River Dam, Boston, Massachusetts.

Robert G. Seaman, editor of *Rubber World,* New York, N. Y. will speak on

"The Future of Commercial Synthetic Rubbers"

Mr. Seaman's position, as editor of *Rubber World,* gives him a close-up view of the problems of the types of synthetic rubber. He has been a member of the American Chemical Society since 1942.

Preceding the address by Mr. Seaman a tenth anniversary, commemorative ceremony will be observed. Mr. Elmer E. Ross, Jr., of T. C. Ashley and Company will be the chairman for this part of the program. The charter members of the Group will be introduced. Howard H. Reynolds of the Cryovac Company of Cambridge, will pay tribute to the memory of the late Ernst A. Hauser who was the inspiration for the founding of the Group.

Preceding the meeting there will be a preprandial hour at 6:00 p.m. (cost $1.00), followed by a dinner (cost $3.00) at 6:45 p.m. in honor of the speaker, in the Morse Auditorium.

Reservations for the preprandial hour and the dinner are necessary and may be made in writing or by phone with Mr. Henry S. Anthony, Tyer Rubber Company, 10 Railroad Street, Andover, Mass. (phone Andover 3090) no later than 10:00 a.m. Monday, May 19, 1958. Reservations are binding.

All interested persons are invited.

LIABILITY INSURANCE FOR THE NORTHEASTERN SECTION

A report by Treasurer Lloyd H. Perry to the Directors, April 8, 1958.

After further study of liability insurance with John T. Blake and Henry A. Hill it seemed advisable to go ahead with the Aetna Casualty and Surety policy that was described at the March 1958 Directors Meeting.

Briefly, the policy is for $25,000 and $50,000 liability plus a $1000 medical expense. The cost is $62.50. It will be purchased on a one year basis. The coverage extends to any function of the Section.

The principal reason for having the policy is to protect the Northeastern Section in case of suit by individuals who may be injured during section activities. There is very little chance that the Section can be successfully sued, but just the legal expenses of defending ourselves could be very high. With our present insurance all such costs would be borne by Aetna Casualty and Surety Company.

(*Please turn to page* 201)

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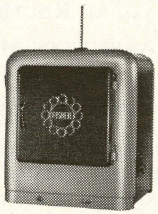

A superior, gravity-convection oven for sample drying, moisture determination, ageing, sterilizing, etc. Maintains temperature constant within ± 0.5° C in range from 35° to 200° C, uniform to ± 1° C throughout the 12″ x 12″ x 12½″ chamber. 3 removable shelves with 430 sq. in. total area.

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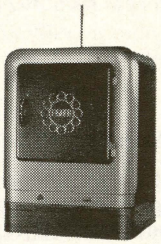

All the features of the standard Isotemp — plus the advantages of forced air circulation. Motor-operated blower dries samples two to three times faster. Operating range 35° to 175° C, ± 0.5° C control. 3 removable shelves give 400 sq. in. area in the 10¾″ x 12″ x 12½″ chamber.

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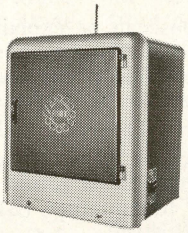

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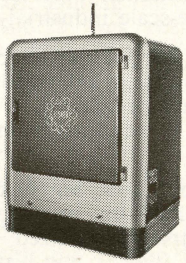

The Senior Forced Draft Isotemp processes more samples, faster. Blower, housed in lower section, passes heated air up one side, across samples, down opposite side and back into blower for recirculation. 4 removable shelves (960 sq. in. area), 16″ x 18″ x 15″ chamber.

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INDUCED REACTIONS

By Izaak M. Kolthoff

of the University of Minnesota

Summary of an address before the Northeastern Section April 10, 1958

It is well known that some reactions, which take place very slowly or to a negligible extent spontaneously, may be greatly accelerated by the simultaneous presence of other reactions. An example is the reaction between thiocyanate ion and oxygen, which is unmeasurably slow by itself but which takes place to a noticeable extent when the thiocyanate is titrated with permanganate. The oxygen reaction is said to be *induced* by the rapid oxidation of thiocyanate with permanganate. It can be seen that the phenomenon is related to catalysis, but induced reactions must be distinguished from ordinary catalytic reactions in that there is no catalyst in the usual sense, still remaining in the same concentration and form at the end of the reaction as at the beginning. Although induced reactions have been studied chiefly in connection with quantitative analytical reactions, in which they produce annoying deviations from expected stoichiometry, the phenomenon is a quite general one and may affect even large-scale industrial oxidation reactions.

In general induced reactions can be explained in terms of rapid reaction of transient intermediates in the inducing reaction with the components of the induced reaction. A typical example is the induced oxidation of manganous ion by chromate in the presence of arsenite. The direct oxidation (1)

$$\text{Cr (VI)} + 3\ \text{Mn (II)} \rightarrow \text{Cr (III)} + 3\ \text{Mn (III)} \qquad (1)$$

is very slow, but in the presence of arsenite and a suitable buffered, complexing medium, one mole of manganese is found to be oxidized for each mole of arsenic oxidized according to equation (2)

$$2\ \text{Cr (VI)} + 3\ \text{As (III)} \rightarrow 2\ \text{Cr (III)} + 3\ \text{As (V)} \qquad (2)$$

A possible mechanism for this process is

$$\text{Cr (VI)} + \text{As (III)} \rightarrow \text{As (V)} + \text{Cr (IV)} \quad \text{(rapid)} \qquad (3)$$

$$2\ \text{Cr (IV)} + \text{As (III)} \rightarrow \text{As (V)} + 2\ \text{Cr (III)} \quad \text{(slow)} \qquad (4)$$

$$\text{Cr (IV)} + \text{Mn (II)} \rightarrow \text{Mn (III)} + \text{Cr (III)} \quad \text{(rapid)} \qquad (5)$$

The net result of these reactions is the observed stoichiometry of the overall reaction.

$$\text{Cr (VI)} + \text{As (III)} + \text{Mn (II)} \rightarrow \text{As (V)} + \text{Mn (III)} + \text{Cr (III)} \qquad (6)$$

Similar analysis can be used to explain the well known induced oxidation of chloride with permanganate which is observed whenever ferrous ion is titrated with permanganate in the presence of hydrochloric acid.

Much work has been done recently on the oxidation of organic compounds by hydrogen peroxide, a process which is strongly induced by ferrous iron. For ethanol, in aqueous solutions, a chain reaction involving hydroxyl radicals appears to be involved.

$$H_2O_2 + Fe^{++} \rightarrow Fe^{+++} + OH^- + OH\cdot$$

$$OH\cdot + C_2H_5OH \rightarrow H_2O + CH_3\dot{C}HOH$$

$$CH_3\dot{C}HOH + H_2O_2 \rightarrow CH_3CHO + H_2O + OH\cdot$$

$$OH\cdot + Fe^{++} \rightarrow Fe^{+++} + OH^-$$

It is found that six or more moles of ethanol may be oxidized per mole of iron under favorable conditions. Reactions of a similar nature are involved in persulfate activated polymerization of styrene.

LIABILITY INSURANCE

(*Continued from page* 198)

The medical portion of the policy is in addition to the liability. This permits the Northeastern Section to cover any medical expenses from injuries incurred during section activities. John T. Blake, Henry A. Hill and your treasurer agreed that this would be very desirable to have.

The policy does not cover property damage nor does it cover troubles we might get into as a result of information that is passed out by members of the Section. A good example of possible trouble we might get into is in connection with our attempts to steer rocket chemistry experiments. Insurance to cover this sort of thing is prohibitive so our best protection is to use extreme care in our activities along any such line.

When received, the policy will be stored in the safety deposit vault used by the Board of Trustees.

MEETING OF THE DIRECTORS OF THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY

The April meeting of the Directors of the Northeastern Section was held in Room 6-219 at M.I.T. at 4:40 p.m. Tuesday April 8, 1958, chairman Rogers presided. This meeting, at a date one week later than normal, was called by the chairman in accordance with Article VI, Section 6 of the Constitution which reads, "The meetings of the Board of Directors shall ordinarily be held monthly from October through May and may be held at the call of its presiding officer or of three Directors."

The following members were present, Avery A. Ashdown, Edward R. Atkinson, Ernest C. Crocker, Robert D. Eddy, Austin W. Fisher, Jr., Lawrence J. Heidt, Arno H. A. Heyn, David M. Howell, Lloyd H. Perry, Arnet L. Powell and Howard H. Reynolds. Fred W. McLafferty, chairman of the Fund Raising Campaign Committee, was present by invitation of Chairman Rogers. Secretary Ridgley G. Shepherd, Jr., was unavoidably absent. Avery A. Ashdown was designated secretary pro tem.

The minutes of the March meeting were accepted as distributed.

Chairman Rogers reported that George R. Thomas, Assistant Chief of the Chemical and Plastics Division, Quartermaster Corps, Natick, Massachusetts, has accepted the chairmanship of the Civilian Defense Committee of the Northeastern Section. Among his many duties at the Quartermaster Corps, Dr. Thomas handles Defense problems similar in nature to those designated by the state for Civilian Defense.

In his treasurer's report, Lloyd H. Perry stated from March 1, 1958 to April 1, 1958, the expenses of the section were $1,078.07. During this period income of $66.75 was realized from new member fees ($58.75) and associate members, $8.00. The balance now stands at $3,597.60.

Howard H. Reynolds reported that the program committee had arrived at the following schedule for the year, 1958 to 1959.

October 9, 1958 — A meeting to be held jointly with the Boston Section of the American Institute of Chemists.

November 13, 1958 — Joint meeting with the Analytical Group.

December 11, 1958 — The Annual Student Night of the Northeastern Section. No symposium.

January 8, 1959 — Biochemistry.

February 12, 1959 — The Chemistry of Communications with a symposium on Semi-conductors.

March 12, 1959 — Joint meeting with the Elastomer and Plastics Group.

April 9, 1959 — This date coincides with the National Meeting of the American Chemical Society scheduled for Boston. The Northeastern Section will cooperate in every way with this meeting of the A.C.S.

May 7, 1959 — The James Flack Norris Award for outstanding achievement in the teaching of chemistry.

In the absence of P. Calvin Mayberry, Arnet L. Powell and Lloyd H. Perry reported that openings for summer employment of teachers had been indicated by 15 to 20 companies. The series of lectures on the Chemistry of

(*Please turn to next page*)

DIRECTORS

(*Continued from previous page*)

Rockets, held at the Science Museum of Boston saw attendance of about 70 at the March seventh meeting, only about 20 on March 15th, about 35 on March 20th. The final meeting on March 29th showed a further rise to about 45. The whole series was judged as successful, informative and stimulating.

Arnet L. Powell, in reporting for the Public Relations Committee stated that Vata W. Torrey, Director of Television at M.I.T., associated with WBZ-TV, Channel 4, aided in the program for Chemical Progress Week. Professor David N. Hume of M.I.T. appeared on the T.V. program for Sunday morning April 6, 1958. His topic was "New Techniques in Analytical Chemistry."

Arno H. A. Heyn, reporting for the Membership Committee said that on April 1, 1958 the Northeastern Section numbered 2,464 members.

The committee on how to handle changes in councillors reported informally, in the absence of its chairman, that progress was being made on its problem of greater continuity of service of the National Councillors. This subject was placed in the hands of the Committee on Amendments to the Constitution and By-Laws by the Directors at its February meeting. Thomas R. P. Gibb, Jr. is the Chairman.

David M. Howell reported that the Hospitality Committee had been able to meet all of its obligations successfully.

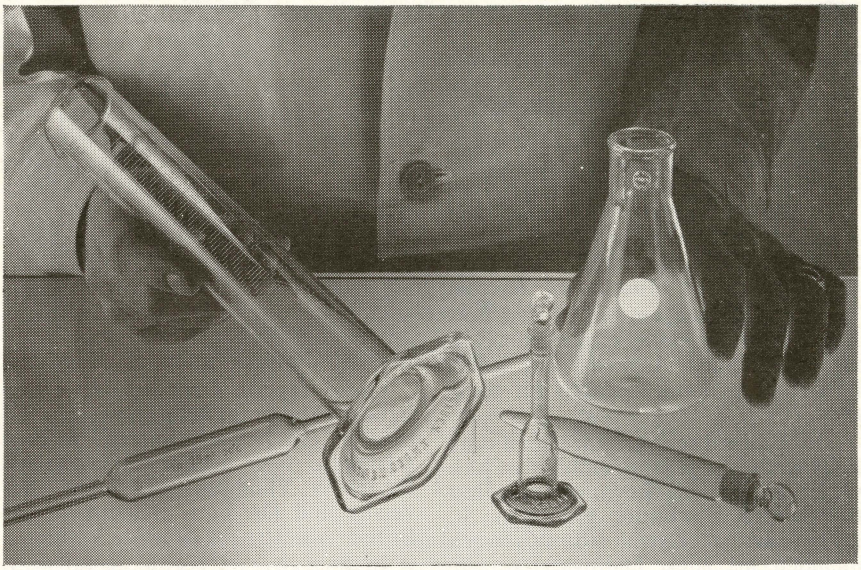
Under old business, Avery A. Ashdown reported that the details for awarding the Theodore William Richards Medal are nearing completion. As has been the custom the award will be made at Harvard. The dinner and preprandial hour will be served in the Harkness Commons of the Harvard Graduate Center at 14 Everett Street, Cambridge. Prime ribs of beef will be served at the dinner. The presentation of the award and the address of the medalist will take place in the Mallinckrodt Chemical Laboratories at 12 Oxford Street, Cambridge. The members of the committee on arrangements for the award are Eugene G. Rochow and Ronald E. Vanelli of Harvard and Avery A. Ashdown of M.I.T.

In accordance with the vote of the directors at its March meeting, Lloyd H. Perry reported that a policy covering Liability Insurance has been worked out with Aetna Casualty and Surety Company of Boston. Details will appear in the NUCLEUS.

Fred W. McLafferty reported $25,000 or 54% of the goal for the Northeastern Section, had been pledged for the new national home for the A.C.S. in Washington. About 74% of the pledge cards have been returned. He expressed thanks to each of the 250 volunteer workers who had done the work of soliciting.

The motion to adjourn came at 5:45 p.m.

Respectfully submitted,
AVERY A. ASHDOWN
Secretary pro tem



(Left to right) Transfer Pipette, Large tip opening for viscous liquids (#7101); Graduated Cylinder, A.S.T.M. specifications for distilling equipment (#3023); Volumetric Flask, micro, with hex base (#5630); Centrifuge Tube, Plain, $ Pennyhead Stopper (#8062); Erlenmeyer Flask, Heavybeaded rim, white enamel markings (#4981).

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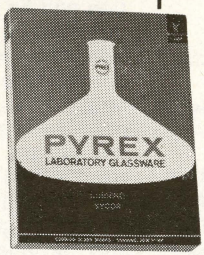

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Bird & Son, Inc., East Walpole, Mass.

A Bird & Son chemist whose specialty is asphalt was one of the featured speakers on Tuesday evening April 15, 1958 before the Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society at Boston's Museum of Science.

James W. Jackson, Jr., of Old Post Road, East Walpole, spoke on "Elastomer Modified Asphalts" on which he has been doing research for some time.

He and Bird research director Frank P. Reynolds are joint authors of this paper, which Mr. Reynolds gave last fall before a plastics group in St. Louis. Mr. Jackson's talk this week included his latest findings.

There were three other speakers besides Mr. Jackson addressing the ACS's Elastomer & Plastics Group at this, their seventh annual "short talks symposium". They were Donald D. Wright of B. F. Goodrich, Eli M. Dannenberg of Godfrey L. Cabot and August C. Walker, Jr., of MIT's Plastics Research Laboratory.

NATIONAL POLYCHEMICALS

National Polychemicals, Inc., Eames Street, Wilmington, Mass., announces the appointment of Robert F. Gosselin as Purchasing Agent. Mr. Gosselin, a graduate of the University of New Hampshire, has been with the company since June, 1957, serving as administrative assistant.

National Polychemicals manufactures chemicals for the rubber, plastics and related industries.

AN INFRARED SPECTROSCOPY COURSE

An intensive two-part program in Infrared Spectroscopy will be given from August 4 to August 15 during the 1958 Summer Session at the Massachusetts Institute of Technology.

The program, to be offered jointly by the Institute's Spectroscopy Laboratory and Department of Chemistry, is designed for those who wish an introduction to infrared instrumentation and laboratory methods and for those interested in the use of infrared spectra in the solution of chemical problems. It will consist of two integrated one-week courses, one on the Technique of Infrared Spectroscopy and the other on the Applications of Infrared Spectroscopy.

Both courses are to be under the direction of Dr. Richard C. Lord, Director of the M.I.T. Spectroscopy Laboratory, assisted by Professor E. R. Lippincott of the Department of Chemistry at the University of Maryland.

Guest experts from academic and industrial laboratories who will participate in the presentation of material related to their special fields include Dr. H. W. Thompson of Oxford University and Dr. L. J. Bellamy of the British Ministry of Supply, London.

In the course on Technique of Infrared Spectroscopy (August 4-8), lectures will be devoted to the elementary theory of infrared spectra, a survey of infrared instrumentation, and discussion of techniques for measurement of spectra. Afternoon laboratory exercises will be carried out by small groups with a variety of infrared instruments and related equipment. This work will be supervised by experienced academic personnel from the Spectroscopy Laboratory and by technical personnel from manufacturers of infrared equipment.

The course on Applications of Infrared Spectroscopy (August 11-15) will cover the theory of infrared absorption by molecules, the interpretation of infrared absorption spectra, and the relation between spectra and molecular structure. Particular attention will be paid to hydrocarbons, high polymers, natural products, and other substances whose infrared spectra have proved especially valuable. Afternoon hours will be devoted to supervised practice in the interpretation of infrared spectra of complex molecules. Instruction in the use of the generally available catalogues of infrared spectra and in punched-card methods will also be given.

All facilities of the Institute will be open to members of these courses in

(*Please turn to page* 207)

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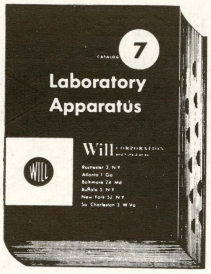

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INFRARED

(*Continued from page* 204)

Infrared Spectroscopy. Lecture, laboratory, and library facilities used in the courses are air-conditioned. Registrants may reserve rooms in the Institute's dormitories during the program.

Application forms and full information may be obtained from Dr. James M. Austin, Director of the Summer Session, Room 7-103, Massachusetts Institute of Technology, Cambridge 39, Massachusetts.

COLLOID AND SURFACE CHEMISTRY

The 1958 contest in colloid and surface chemistry among college undergraduates was announced today by the University of Southern California. The contest is sponsored by the Continental Oil Co. of Houston, Texas, and Ponca City, Oklahoma, and is now in its second year.

Students of chemistry and chemical engineering in all accredited colleges and universities in the United States and Canada are eligible if they are full-time undergraduates on April 1.

A 5000-word report on research conducted by the contestant in the fields of colloid or surface chemistry or an essay on "Radioactive Isotopes in Colloid and Surface Chemistry" may be submitted for a $500 first prize, $200 second prize, $100 third prize, or honorable mention prizes of $50. In addition an excellence prize of $500 may also be awarded to the best entry if it satisfies exceptionally high standards.

Entry blanks may be obtained from Prof. K. J. Mysels at the University of Southern California, Los Angeles 7. Awards will be announced and distributed by anonymous judges by Sept. 2, 1958.

As contest chairman, Dr. Mysels is being assisted by an advisory committee composed of P. H. Emmett, Johns Hopkins University; J. W. Williams, University of Wisconsin; and W. A. Zisman, Naval Research Laboratory.

ELECTROCHEMICAL SOCIETY

(*Continued from page* 198)

in the University of Michigan where he received the doctorate in electrochemistry in 1938. He became a member of the American Chemical Society in 1936. His first position was that of a research chemist with the Alrose Chemical Company in Rhode Island. He served as a physicist, Brooklyn Naval Shipyard, Bureau of Ordnance, U.S.N., 1940 to 1943. He then was employed as an electrochemist with the Kellex Corporation of New York. After a year he joined the Sylvania Electric Products Company, Inc.

Dr. Bandes has carried out research on the kinetics of electrode reactions, the mechanism of electrodeposition and the application of the ocilligraph to the study of hydrogen overvoltage.

NUCLEAR ENERGY INSTITUTES SUMMER OF 1958

Nine Institutes on Nuclear Energy for engineering educators will be held throughout the nation this summer under the sponsorship of the Atomic Energy Commission and the American Society for Engineering Education.

The purpose of the institutes is to provide special training in the fields of nuclear energy and the nature of nuclear reactor problems so the teachers can incorporate this material in their teaching programs.

The 1958 institutes will include four basic courses for teachers with no special background in nuclear energy, four advanced-level courses and one new basic course for teachers in technical institutes.

This program reflects a substantial increase in offerings since the courses were first offered in the summer of 1956. The first year, only two institutes were held, with an attendance of 90. In 1957, four were given, with 80 participants. The nine 1958 institutes will provide instructional capacity for more than 225 teachers who will be preparing themselves to participate in nuclear education programs for engineering students.

(*Please turn to page* 209)

NUCLEAR ENERGY INSTITUTES

(*Continued from page* 207)

The AEC is investing approximately $400,000 in the operation. Applicants will be selected by sub-committees of the ASEE Nuclear Committee on the basis of the candidate's experience and the instructional use to be made of the training.

Participants will receive a minimum of two month's pay in addition to their regular salary for the academic year. For an applicant to be considered, the educational institution will be required to contribute to him a minimum of one month's salary. The AEC grant will match this contribution to a maximum of $750. plus round-trip railroad fare.

Applications for appointment may be obtained from the deans of engineering or from ASEE headquarters. They should be sent to Prof. W. Leighton Collins, Secretary of the ASEE, University of Illinois, Urbana, Ill.

Each of the basic institutes will be combined programs of a university and a national laboratory, with a quota of from 25 to 30 participants at each location. The dates for all are June 23 - August 15 and the locations are: North Carolina State College, Raleigh, with Oak Ridge National Laboratory; Cornell University, Ithaca, with Brookhaven National Laboratory; Purdue University, Lafayette, Indiana with Argonne National Laboratory; and University of California at Berkeley with Radiation Laboratory at Livermore.

The advanced institutes with quotas of from 20 to 25 participants will be as follows: Reactor Theory, University of Michigan, June 23 to August 15; Reactor Instrumentation and Control, Argonne National Laboratory, June 23 to August 15; Chemical Processing, Hanford Laboratories, June 22 to August 15; and Nuclear Metallurgy, Ames Laboratory, June 30 to August 22.

The course for teachers in technical institutes, with a quota of 25 participants, will be held at Pennsylvania State University from June 30 to August 8 and at Argonne National Laboratory from August 11 to August 22.

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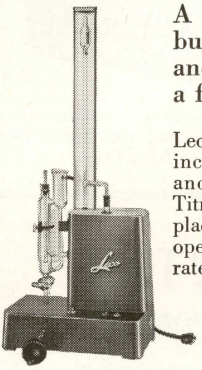

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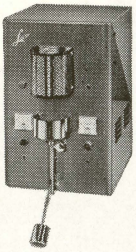

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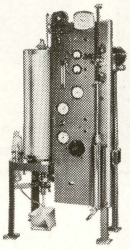

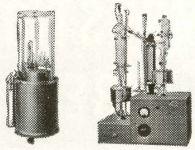

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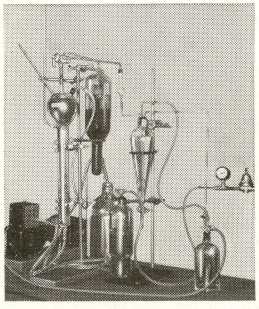

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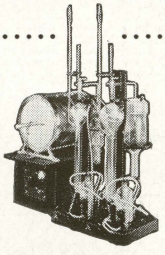

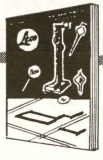

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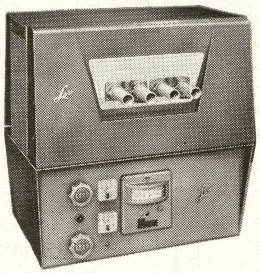

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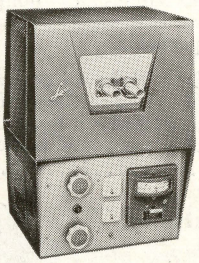

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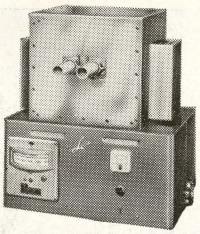

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