Announce Changes in Plans for Short Course Plant Trips

BECAUSE of vacation shut-downs announced after arrangements had been made for the industrial tours July 14–18 by John W. McCutcheon, New York consultant, for the 1958 short course on syndets and soaps, the schedule is now as follows: three trips to the Port Ivory plant of Procter and Gamble, Staten Island; four trips to the Eastern Regional Research Laboratory at Philadelphia; four trips to the research laboratories, General Chemical Division, Allied Chemical and Dye Corporation, Morristown, N. J.; two trips to the research laboratories, General Aniline and Film Corporation, Easton, Pa.; and four trips to the Atlantic Refining Company, Philadelphia.

W. G. Spangler
Short Course Committee

The principal coverage of these trips will be general performance and control testing of detergents and emulsifiers; continuous pilot-plant-scale sulfonation and sulfation by means of SO_3; continuous fat hydrolysis; continuous soapmaking from fatty acids; spray drying of soaps and detergents (very general); high-speed packaging of soaps and detergents; recent research developments in the field of detergents and fat chemistry, illustrated by equipment and technique; alkylation of benzene to its dodecyl derivative; and purification of the alkyl aryl product plus its continuous sulfonation and concentration to a final drum-dried product.

There have also been changes in the titles of two talks on Tuesday. F. G. Villaume, American Cyanamid Company, Bound Brook, N. J., will speak on "Optical Bleaches in Soaps and Syndets." F. J. Coughlin, Procter and Gamble Company, Cincinnati, will speak on a "Review of the Soap Association's Research Activities Pertaining to Water Supply and Sewage Treatment."

In addition to the program announced in the March issue of the Journal, the name of another speaker is available. Louis Schwartz, M. D., Washington, D. C., will speak on "Dermatological Aspects of Syndets and Soaps" on Wednesday evening, July 16.

The course will be held at the Princeton Inn, Princeton, N. J., which is an air-conditioned hotel. Assignment to double rooms will be made by the Society office in advance. Students are asked to indicate their choice of room-mate, if any, when registering with the Society office.

Chairman of the course is Foster D. Snell, of the laboratories of the same name, New York; and day chairmen are, respectively, W. A. Peterson, Colgate-Palmolive Company, Jersey City, N. J.; S. D. Gershon, Lever Brothers Company, Edgewater, N. J.; Donald Price, New York consultant; Morris Mattikow, Refining Uninc., New York; and Jay C. Harris, Monsanto Chemical Company, Dayton, O. Names of early registrants (mid-March) are as follows:

R. D. Stayner, Oronite Chemical Company, San Francisco, Calif.
Roger B. Ditzel, Monsanto Chemical Company, St. Louis, Mo.
John L. Leech, Monsanto Chemical Company, St. Louis, Mo.
E. I. Birnbaum, Hart Products Company of Canada, Ltd., Guelph, Ontario
Joseph Czerwinski, General Aniline and Film Corporation, New York
George J. Miller, General Aniline and Film Corporation, New York
John A. Roberts, General Aniline and Film Corporation, New York
Lee R. Schiltz, Swift and Company, Chicago
Herman K. Mohr, Franklin Baker Division, General Foods Corporation, Hoboken, N. J.
R. K. Rigger, Wyandotte Chemicals Division, Wyandotte, Mich.
David I. Quinlan, Seaboard Chemicals Inc., Salem, Mass.

The fee will be $120, payable in advance to the American Oil Chemists' Society, 35 E. Wacker drive, Chicago 1, Ill. This will cover room from Sunday evening through Thursday night and board from Monday morning through Friday noon, also the registration fee.

35 Years Ago

"A convention is a great place to get the associating habit," commented H. S. Bailey, editor, in his editorial for the April 1923 issue of the Chemists' Section of the Cotton Oil Press. "There one meets the biggest men of his profession and rubs elbows and swaps stories with the finest fellows in his line of business. Be a gregarian, put yourself where you will get, not trade secrets, confidential information, and all that bunk, but ideas."

❖

In the Fullers Earth Committee Report, 1922-23, by A. W. Putland, the committee recommended "that a permanent committee be appointed to be known as the Fullers Earth Statistical Committee, the duties of which shall be to collect and compile the necessary information" about obtaining a domestic earth to replace the Society's standard.

❖

By the verdict of a federal court in Chicago this week the government's internal revenue department discarded its own signed agreement and imposed heavy penalties on an oleomargarine manufacturer for alleged violation of the color regulations under the revenue law. Facts appear to have cut small figure against the historic prejudice against oleomargarine.

New Books . . .

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, by N. Irving Sax, assisted by Leonard J. Goldwater, William B. Harris, John H. Harley, and Joseph J. Fitzgerald, 1st ed. (Reinhold Publishing Corporation, New York, N. Y., 1,467 pp., 1957, $22.50). As stated in its preface, the objective of this book is to afford its readers a more detailed picture of the hazards which accompany the use of the materials of industry and to supply textual data and background information to enable solution of on-the-spot safety problems that arise in day-to-day industrial operations. It is considered that this objective is attained since about 1,049 pages, which cover industrial materials from abietic acid to zirconyl sulphide, include brief but detailed safety information, such as toxic hazard rating, disaster control characteristics, and fire hazard comments, on literally hundreds of compounds and materials both common and uncommon while the other 418 pages are filled with data, discussion, and recommendations pertaining to such important subjects as allergic diseases in industry, atmospheric pollution, and industrial fire protection.

The book is written on good quality, gloss-white paper with cloth binding, and the contents are well organized into 12 sections or chapters, including one of 18 pages in which synonyms for various compounds and materials are indexed. Although the bulk of the text is devoted to specific data and comments on the various industrial compounds and materials presented in a dictionary or hand-book style, a large part of the subject matter is written in a running or text-book style which makes for easy reading and assimilation. The book is not embellished with pictures, but it does have a number of tables, graphs, and drawings better to illustrate certain information.

There are worthwhile suggestions and information in the sections or chapters devoted to ventilation control, personnel protection, atmospheric pollution, allergic disease in industry, storage and handling of hazardous materials, and industrial fire protection; and the book shows the "modern touch" by having two sections or chapters dealing with radiation hazards and reactor safeguards. Therefore, even though the book is intended to cover dangerous properties of industrial materials and is applicable to the broad field of chemical manufacture and handling, it is considered worthwhile for the oil and fat industry from both a health hazard and fire hazard standpoint. This is especially true because of the correlation of specific properties with suggested and recommended handling procedures.

It is considered that this book is worthwhile for inclusion in the libraries of plants and laboratories of the oil and fat industry as a reference source on health hazard and fire hazard problems of both a technical and operational nature. It is especially recommended to chemists, chemical engineers, and superintendents whose work or interests have to do with technical safety matters.

A. ERNEST MACGEE
Skelly Oil Company
Kansas City, Mo.

HIGHER OXO ALCOHOLS, by Lewis F. Hatch (John Wiley and Sons Inc., New York, x + 120 pp., $4.50). The author in the preface states that the purpose of the book is to review the patent literature on the oxo process and to present information about the most important derivatives of the higher oxo alcohols. He has succeeded in writing a book that gives a general survey of the oxo process and of some of the uses of higher oxo alcohols (iso-octyl and above) without becoming involved in the minute details covered in the patent literature.

The first chapter, which comprises about one-fifth of the book, covers the oxo reactions from both the processing and the theoretical aspects. There then follows a chapter which includes isomer distribution of the alcohols, their physical properties, and finally a number of miscellaneous uses. The third major section is on plasticizers. It goes into considerable detail in comparing the plasticizer properties of several esters of higher oxo alcohols. A number of charts and graphs are used quite effectively. A brief chapter, consisting of three pages and four references, describes the use of oxo alcohols in agriculture.

Detergents derived from oxo alcohols receive considerable attention. They are compared in a number of ways with other types of detergents. The author has included laboratory methods for preparing ethylene oxide and sulfate type of detergents from oxo alcohols. Almost as an afterthought, the book is concluded by a one-page chapter on the applications of oxo alcohols to lubrication problems.

This book is an easily read introduction to the higher oxo alcohols. A long bibliography is included. In certain areas it is a satisfactory guide book for research. In others, the value of the bibliography as a reference source would be improved by a more complete listing of the literature.

HOWARD HICKMAN
Archer-Daniels-Midland Company
Minneapolis, Minn.

ORGANIC REACTIONS, vol. IX, by Roger Adams (John Wiley and Sons Inc., New York, 468 pp., 1957, $12.) In general, the physical format of Volume IX is similar to the others which have been published. Unquestionably the quality of the information contained in this volume maintains the same level as previous volumes. However the print is smaller and more difficult to read. This change was probably done in an effort to lower the cost of the book. This volume is the same price as Volume VIII but has 31 more pages.

The chapters and their authors are as follows: The Cleavage of Nonenolizable Ketones with Sodium Amide, by K. E. Hamlin and Arthur W. Weston; The Gattermann Synthesis of Aldehydes, by William E. Truce; The Baeyer-Villiger Oxidation of Aldehydes and Ketones, by C. H. Hassall; The Alkylation of Esters and Nitriles, by Arthur C. Cope, H. L. Holmes, and Herbert O. House; The Reaction of Halogens with Silver Salts of Carboxylic Acids, by C. V. Wilson; The Synthesis of β-Lactams, by John C. Sheehan and Elias J. Corey; and The Pschorr Synthesis and Related Diazonium Ring Closure Reactions, by DeLos F. DeTar.

For the organic chemist who has an interest in any of the above reactions, this book is a must since it very carefully and critically reviews the literature on these subjects and represents the distillation of valuable information from more than 1,800 references. Of particular interest to organic chemists associated with fat chemistry are the chapters on the oxidation of aldehyde and ketones with peroxides, the alkylation of esters and nitriles, and the reaction of halogens with silver salts of carboxylic acids. Each chapter contains a part on mechanism, scope and limitations, experimental procedures, and tabular survey of the reaction except the chapter on β-lactams. This departure from the standard practice is probably justified since the synthesis of β-lactams has only been extensively studied since 1945. Sheehan and Corey cover mechanism, scope and limitations, and experimental procedures briefly under each of six different methods reviewed.

The authors and editors of this volume of organic reactions are to be congratulated on this splendid contribution to the permanent literature of organic chemistry.

J. C. COWAN
Northern Utilization Research
and Development Division
Peoria, Ill.

LABORATORIUMSBUCH FÜR DEN LEBENSMITTELCHEMIKER—A. Beythien, 7th edition revised by W. Diemair (Theodor Steinkopff, Dresden, 723 pp., 1957, DM 40–50). The first edition of this book was published in 1931 by A. Beythien as a practical laboratory manual for food analysts. It was condensed from the author's larger and more expensive "Handbuch." In this seventh edition Diemair has attempted to present to analysts a book of methods which would find use in small as well as large laboratories. He has eliminated many details and literature references from older editions and tried to include the newest methods and those for new food products.

In the opening section (89 pp.) general chemical methods for moisture, ash, various types of nitrogen, carbohydrates, etc., are described. In each method, the headings of Principle, Reagents, and Procedure are used. A short section (14 pp.) follows on physical methods such as density, viscosity, polarimetry, chromatography, and similar procedures.

The main portion of the book (482 pp.) offers methods for the analysis of a wide variety of foods and beverages. Twenty-nine sections are devoted to meat, milk products, cereal products, fruit juices, confectionery, beer, spices, coffee, and other types. The longest of these sections is on edible fats and oils (67 pp.). Under the heading of edible fats and oils are subheadings on the following: physical methods, qualitative tests, quantitative determination of main and minor constituents, chemical indices (acid number, iodine number, etc.), testing for deterioration, testing for preservatives, dyes and foreign additives, butter, margarine, lard, other animal fats, imitation lard, cocoa butter, edible oils, and synthetic fats.

The final two sections are on necessary accessories (36 pp.) and poisons (37 pp). The first has methods for lead, zinc, alloys, enamels, paints on toys, papers, glues and sizes, inks, textiles and yarns, cosmetics, and detergents as well as matches. Under poisons, volatile materials, alkaloids and special methods for DDT, tricresyl phosphate, and similar materials are considered. In an appendix are tables useful in measuring fat, sugar, and alcohol by various methods.

A combination of the methods of the A.O.A.C., A.O.C.S. and A.A.C.C. would be required to cover the ground of this book. The particular methods given reflect however the author's judgment and are sketchily presented. References to the literature (German) are quite complete, and the index is complete. This might be a useful source to consult when confronted with an unusual or out-of-the-way analysis.

Reid T. Milner
University of Illinois
Urbana, Ill.

Organic Syntheses, vol. 57, J. Cason, editor (John Wiley and Sons Inc., New York; Chapman and Hall Ltd., London, 107 pp., 1957, $4). This is another one of the useful compilations of organic synthetic methods in the same excellent format of previous issues. Of the 29 preparations described, three are directly related to fatty acids, and several others are indirectly of interest to workers in the fatty acid field.

The three syntheses directly related to fatty acids are those of *trans*-2-dodecenoic acid, p. 29; oleoyl chloride, p. 66; and stearolic acid, p. 77.

The descriptions of the preparations are generally quite adequate. In the preparation of oleoyl chloride the description of the operation of the tangential apparatus might be more useful if some indication were given as to how to control the amount of heat applied to the column and particularly to the lower leg K for the stripping of excess thionyl chloride.

In this same preparation an oleic acid from Emery Industries is referred to as Emerson 233 whereas it should be Emersol 233.

In Note 3 of this preparation the statement is made that palmitic acid usually contains a little stearic acid, which does not affect the melting point.

Other preparations in this volume which might be of indirect interest to fat and oil chemists are, 4-ethyl-2-methyl-2-octenoic acid (p. 37); ethyl α-nitrobutyrate (p. 44); glutaric acid and glutarimide (p. 47); n-heptamide (p. 50); and 3-n-heptyl-5-cyanocytosine (p. 52).

D. W. Wheeler
General Mills Inc.
Minneapolis, Minn.

The Terpenes, by Sir John Simonsen and W. C. J. Ross, vol. V, Cambridge University Press, New York, 1958, 662 pp., $15.50). This book is of the same format and is written in the same style as the other four volumes of this series. Volume V concludes Dr. Simonsen's and his collaborator's monumental work on the terpenes and with Volume IV deals with the triterpenes. The present volume is divided into five chapters and an addendum to Volume III. Chapter I discusses the hydroxy acids, Chapter II the hydroxy lactones, Chapter III the hydroxy aldehydo acids, Chapter IV the hydroxyketo acids, and Chapter V the stereochemistry of the triterpenes. The addendum discusses recent work on the sesquiterpenes and diterpenes.

The present volume is a worthy addition to the preceding ones and is especially valuable since, with Volume IV, it is the only extensive compilation written in English of the chemistry of the triterpenes.

Volume I discusses acyclic and monocyclic compounds, Volume II the dicyclic compounds, and Volume III the sesqui- and diterpenes. The triterpenes are complex C_{30} compounds and occur in saps and resins, also in fish oils and animal body fats. They are closely related to the sterols, and it may soon be possible to use them in the synthetic preparation of vitamins and steroid hormones.

The mono- and diterpenes have been extensively investigated in this country, but the investigation of the chemistry of the triterpenes, largely carried out during the past two decades, has mainly been confined to England and Switzerland. It is possible that the last two volumes of Sir John Simonsen's work will stimulate interest in the triterpenes in the United States. Volume V is worthy of study by organic chemists as the structure and stereochemistry of the triterpenes is rather complex, and, in determining these structures, full use has been made of the newer techniques of infrared spectral analysis and X-ray crystallographic analysis. The results have been confirmed by synthesis involving many of the new reagents. The methods of synthesis and the intermediates formed have been extensively described.

The 114-page addendum to Volume III (Second Edition 1952) which discusses the sesqui- and diterpenes, including the resin acids, records the latest investigations in this field.

The volume has an extensive bibliography and is well indexed.

Burt L. Hampton
The Glidden Company
Southern Chemical Division
Port St. Joe, Fla.

Complexometric Titration, by Gerold Schwarzenback, translated and revised in collaboration with the author by Harry Irving (Methuen and Company Ltd., London; Interscience Publishers Inc., New York, 132 pp., $3.75). The first five chapters deal with the theory, compounds employed, indicators, titration of mixtures, and solutions used. The sixth chapter, representing about half of the book, gives details of the procedures for the various applications of complexometric titrations. After each procedure are some remarks covering conditions and pertinent points on the analysis together with explanations of difficulties that may be encountered and further applications. The chapter on procedures is followed by an excellent bibliography.

This is an excellent book, with the theory and procedures presented in a very readable and understandable manner. It should be of particular interest to those desiring titration procedures for metal ions and a few negative radicals but will be of limited interest to those concerned with analysis of organic materials.

W. D. Pohle
Swift and Company
Chicago, Ill.

Atomic Energy in Agriculture, by W. E. Dick (Philosophical Library Inc., New York, 1957, 150 pp., $6). This little book is another one surveying some fields covered by the 1955 Geneva Conference on the Peaceful Uses of

Atomic Energy. In this volume the author has selected for review "material likely to interest the *general* scientific reader." The material chosen was enthusiastically reviewed in the press at the time of the Conference.

Chapter I is a very satisfactory presentation of material on irradiation genetics. The general reader will find the background material which precedes the review of the Geneva papers particularly helpful. It is of interest to note that this author maintains a better perspective of the contribution of radiation genetics than do many writers. He points out that the major contribution lies in building up material to go into the pool of breeding characteristics. Chapter II is devoted to photosynthesis, tracing the path of carbon. Chapter III is devoted to the path of other elements in plants. Chapter IV deals with the use of radioactive materials in the fight against insect pests. The applications presented range from tagging operations for habit studies through insect physiology and insecticidal action to deinvestation by radiation. Chapter V, the least satisfactory chapter, deals with essentially a single application of radioactive techniques to forestry while Chapter VI reviews the widely publicized field of atomic radiation and food preservation.

The material is well presented and will undoubtedly stimulate interest in the reader. This reviewer feels that specific reference to the papers considered and to related publications would have been a very desirable addition. From the standpoint of the reader with the background of training in science, the inclusion of greater detail and specific data might have been desirable. The volume, "Nuclear Radiation in Food and Agriculture," by W. Ralph Singleton might be considered as an example of a presentation directed to those with greater background of training.

MERRILL E. JEFFERSON
Radiological Safety Officer
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Md.

Morris to Boost Linseed Use

THE NATIONAL FLAXSEED PROCESSORS ASSOCIATION, initiating an industry program to boost use of linseed oil, has named Charles E. Morris of Chicago to a newly-created post of director of research and development. Mr. Morris, a chemist with 28 years in fats and oils, was appointed by N.F.P.A. President Fred M. Seed, vice president of Cargill Inc., Minneapolis, in charge of the vegetable oil division. He will work with industry laboratories and with the U. S. Department of Agriculture to coordinate exchange of information and to help develop additional research programs. His first action will be to meet with a group of N.F.P.A. technical advisors to lay out the Association's research programs. When completed, the programs will be presented to the U.S.D.A. as formal research proposals. The U.S.D.A. recently formulated N.F.P.A. program to promote linseed oil consumption will also be activated by Mr. Morris. One project is for use of linseed oil meal as cattle feed.

C. E. Morris

Morris worked 28 years with Armour and Company in a variety of posts: analytical chemist, research chemist in nutrition, sanitary engineering and fats and oils, refinery superintendent, and production manager of the company's refinery division.

He is a past president of the American Oil Chemists' Society, member of the Midwest Fats and Oils Club, and the International Society for Fat Research. He holds bachelor's and master's degrees in chemical engineering from the Illinois Institute of Technology, did graduate work at the University of Chicago, and was special lecturer on fatty oil technology at a University of Illinois Short Course.

Offers Course on Box Method

A THREE-DAY COURSE in Methodology for Response Surface Exploration, sometimes called the Box Method, will be held at Roosevelt University, Chicago, Ill., June 11–13, 1958, under the sponsorship of the chemical division of the American Society for Quality Control.

The Box Method provides a systematic procedure for determining quantitatively the influence of operating conditions upon a process and for arriving quickly at a set of optimum conditions with a minimum of experimentation. It has had particular appeal to chemists and engineers for whom the more usual methods of statistical experimentation have often had little application. Developed several years ago by G. E. P. Box and his associates at Imperial Chemical Industries Ltd., it has been made available to industry through the course to be presented in Chicago.

The same course has been given at Harvard University, Massachusetts Institute of Technology, and other universities in the east and midwest. J. Stuart Hunter, of Princeton University, who is in charge of the instruction, studied under Dr. Box at North Carolina State College and has had varied experience with the use of the techniques at the College and at the American Cyanamid Company.

Enrollment in the course at Chicago will be limited to 40, and tuition will be $75. Further information may be obtained from H. P. Andrews, research laboratories, Swift and Company, Chicago 9, who is chairman of the education committee of the American Society for Quality Control.

Problem Corner . . .

February 6, 1958

Question

We would appreciate any information you could give us on a Micropenetration test.

FROM PHILADELPHIA

Answer

This is not a standard method although it is used in some laboratories. It is applicable only to fat which has been solidified specifically for the test and is not satisfactory for use on finished commercial shortenings. You will find all the information you need about the equipment and method by referring to an article by R. O. Feuge and A. E. Bailey, which appeared in the March 1944 issue of Oil and Soap.

February 12, 1958

Question

We are interested in any information you can give us on the refining and deodorization of linseed oil for edible purposes. Also, can you refer us to any books on the subject?

FROM BRAZIL

Answer

The only edible grade of linseed oil made in the United States is a small quantity used for medicinal purposes and prepared by cold pressing selected flax seed. Ordinary raw linseed oil is used in considerable quantities in some European countries, notably Russia, for edible purposes. We believe that no special refinement is given.

Several other vegetable oils are refined and deodorized in large quantities for edible uses. These techniques could undoubtedly be applied to linseed oil; in fact, some of the refining techniques are commonly used on linseed oils intended for various industrial purposes. It is also technically possible to hydrogenate linseed oil to a hard fat for margarine or shortening purposes. In this country such processes are not economically attractive with linseed oil as flavor reversion would be a serious problem.

There are several good books which describe the refining and deodorization processes commonly used for edible oils. Among them are "Industrial Oil and Fat Products" by A. E. Bailey, published by Interscience Publishers, New York, and "Continuous Processing of Fats" by M. K. Schwitzer, published by Leonard Hall Ltd., London. A review of "The Technical Literature of the Edible Oil Industry" by Richard Nicholsen, which was published in Volume 10 of the "Advances in Chemistry Series" of the American Chemical Society, might be of use to you.

TECHNICAL CORRESPONDENT

George F. Clark Dies

George Foote Clark (1915), president of the Bennett-Clark Company, Nacogdoches, Tex., died March 5, 1958, at the age of 72 after an illness of three months. He was a native of Albert Lea, Minn., and was reared in Fort Worth, where he was a refinery superintendent before founding his own firm in 1924. He went to Nacogdoches from San Antonio in 1935. He is survived by his wife; his son, George F. Clark Jr., vice president and sales manager of the firm; and two grandsons.

Bennett-Clark is the supplier of the official natural bleaching earth sold by the American Oil Chemists' Society for use by the oil and fat industry.

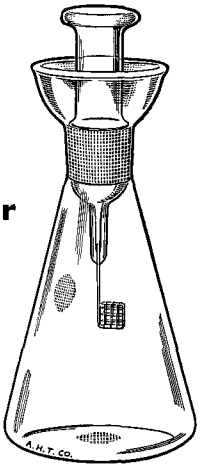
Appoints K. E. Holt

Kenneth E. Holt of Archer-Daniels-Midland Company, Minneapolis, has been appointed to the Uniform Methods Committee of the American Oil Chemists' Society by J.T.R. Andrews, chairman, with the approval of the president, H. C. Black.

A new, simplified technique for catalytic combustion of organic materials in oxygen

Thomas — Schöniger

MICRO COMBUSTION APPARATUS



6470-G.

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.

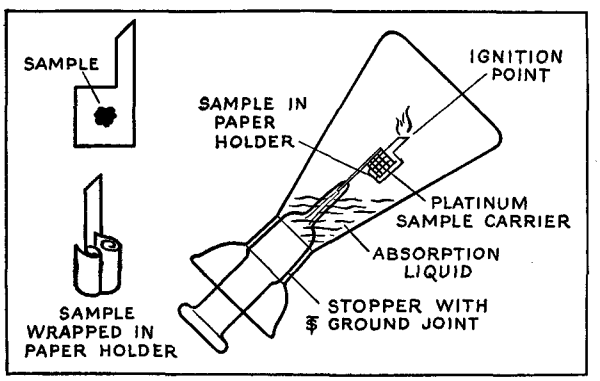
The procedure simply converts organic materials into soluble combustion products which are then analyzed for chlorine, bromine, iodine, fluorine and sulfur by usual inorganic gravimetric or volumetric methods.

Consisting of a heavy wall, conical flask, of borosilicate glass, with flaring lip and elongated stopper with attached platinum wire gauze sample carrier and unsized low ash paper sheets which serve as holders for the sample.

In use, the sample is wrapped and folded in the paper. Sample is placed in the platinum carrier and the flask is charged with a small amount of absorbing liquid and with free-flowing oxygen. The paper tail is ignited; the stopper with sample is seated in the flask and flask inverted at an angle. Catalytic combustion proceeds at high temperatures and the combustion products are absorbed in the liquid. Titrations can 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.

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**

6470-G. Ditto, Semimicro, as above but with 500 ml flask for samples up to 100 mg..... **29.00**



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