☆ DIRECTORY ISSUE ☆

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CHEMICAL AND SCIENTIFIC PORCELAIN WARE

Basic Equipment OF ALL MODERN TESTING LABORATORIES

COORS PORCELAIN COMPANY

GOLDEN, COLORADO

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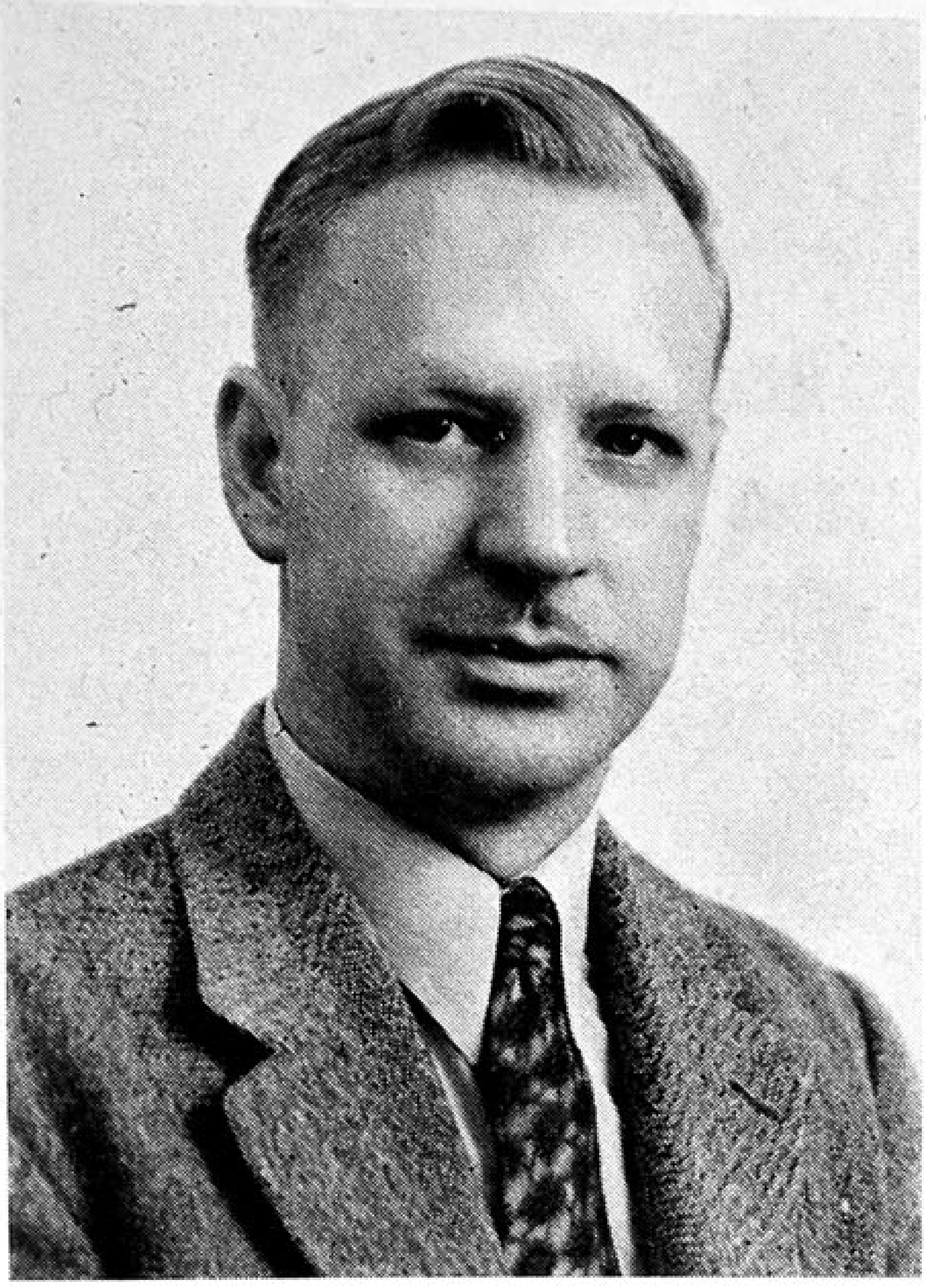
Our 1947 Chairman . . .



HERBERT R. ERICKSON

Herbert R. Erickson, the newly-elected section chairman, was born and raised in Denver, Colorado. He attended the University of Denver and received his B.S. in Chemical Engineering in 1933 and his M.S. in Chemistry in 1937.

Aside from a year spent in teaching, his background has been largely in the industrial field. From 1937 through 1940 he was employed as a research chemist in the research and development division of the Cities Service Oil Co. This included both fundamental and plant process research. In 1940 he moved from Oklahoma to Seattle, where he spent a year in general industrial consulting with the Northwest Testing Laboratories. Since 1941 he has been connected with the Tower Company, Inc., of Seattle, manufacturers of surgical and medical equipment, and at present is vice-president and superintendent of the plastics division of that company.

His recent publications have been largely in the field of applications of plastics to the medical field. Some of these applications have resulted in full scale plant operations here in Seattle, as well as the establishment of a branch plant near Chicago.

CHAIRMAN'S MESSAGE

"An ideal chairman's message should be first, a nicely balanced summary and commendation of the work which has gone on in the past year; second, a comprehensive and intelligent outline of the present plans for this year, and, third, should be a masterpiece of inspiration for future plans. Above all, the message, in addition to covering these subjects, should be short and interesting.

"Since such an ideal message seems beyond the grasp of an ordinary chairman, I will confine my efforts to the last desirable point, i. e., to make it short enough to read.

"The year 1946 was truly an outstanding year for the Puget Sound Section. Our membership has grown to a husky 330 plus. Our meetings have been well rounded and attended. The Puget Sound Chemist magazine was established in its present form. It completed the year under its own power from a financial standpoint, thus attaining the double distinction of a financial, as well as a literary success. The above achievements were due to the untiring efforts of a group of members whom I will not attempt to name individually.

"The plans for our activities during this coming year are being shaped up as rapidly as possible. It is necessary in a program of this type that many of the responsibilities be delegated to other members. By referring to the new directory page in this magazine you will find the names of the newly-elected officers, as well as the members who have accepted the chairmanship of various committees. These chairmen, in turn, will be backed by their own committee members so that our working group should be substantial and adequate.

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January Meeting

PUGET SOUND SECTION OF THE AMERICAN CHEMICAL SOCIETY

Friday • Jan. 24, 1946

Bagley Hall • Room 140

7:30 p.m. Business Meeting — 8:00 p.m. Address

★

DR. W. ALBERT NOYES, JR.

Professor of Physical Chemistry
University of Rochester

SUBJECT

"Organic Photo-Chemistry"

★

REFRESHMENTS AND SOCIAL HOUR IMMEDIATELY FOLLOWING THE MAIN ADDRESS

January Speaker . . .

DR. W. ALBERT NOYES, Jr.

W. Albert Noyes, Jr., was born in Terre Haute, Indiana, April 18, 1898. He received an A.B. degree from Grinnell College in 1919 and a D.Sc. degree from the University of Paris in 1920. Grinnell College also awarded him the D.Sc. in 1946.

In 1920-21 Dr. Noyes was a teaching fellow, and in 1921-22 an instructor of chemistry at the University of California. The following year he was an instructor, and from 1923 to 1929 an assistant professor at the University of Chicago. He then went to Brown University as associate professor, 1929-35, and professor, 1935-38. Since 1938 he has been professor of physical chemistry and, since 1939, Chairman of the Department of Chemistry at the University of Rochester.

Noyes was a second lieutenant in the Signal Corps, 1918-19, and Lt. Com., USNR, 1936-41. He has been section chairman and division chief, National Defense Research Committee since 1940, and was on the staff of the Chief of the Chemical Warfare Service, 1941-45.

As a member of the American Chemical Society, Dr. Noyes was a Councilor in 1928; Councilor-at-large, 1939-44; Director, 1944-45, and President-Elect, 1946. He was editor of the "Chemical Bulletin" (Chicago Section) during 1928-29, and assistant editor of CHEMICAL ABSTRACTS from 1929 to 1938. Since 1938 he has been editor of "Chemical Reviews." Dr. Noyes is also a member of the American Association for the Advancement of Science, the American Physical Society, American Academy and National Academy of Sciences.

He has published about 75 articles in Society journals and is co-author of an ACS Monograph on "Photochemistry of Gases." One of his chief interests is photochemistry.

ORGANIC PHOTOCHEMISTRY

A summary will be made of many of the reactions of organic chemistry which can be carried out by the influence of light. Many of these reactions are similar to those which can be carried out by more customary means, although often the products are difficult to identify because of the small amount of reaction.

In general the first effect of light on molecules is to produce disassociation into free radicals, although sometimes it has been suggested that completed molecules are produced in one act. The interpretation of the mechanism of photochemical reactions involves first a determination of which free radicals are produced in the primary process and a study of the subsequent reactions of these free radicals.

As particular examples of the interpretation of photochemical data the aldehydes and ketones will be chosen. The products of these reactions can usually be obtained by splitting off radicals on one side or the other or on both sides of the carbonyl group. Thus from the aldehydes one expects carbon monoxide, hydrogen, hydrocarbons, and diketones and

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SEATTLE GAS COMPANY'S OPERATIONS

In this article specially written for the Puget Sound Chemist, the history and theory of oil gas production is presented. The Seattle Gas Company has a new expansion program under way to meet the rising demands of industry.

By GEORGE THAYER, Supt. Production and Control, Seattle Gas Co.

In order to meet increased load demands the Seattle Gas Company plant, located on the north shore of Lake Union at Wallingford and Northlake Place, is being enlarged to supply over 20,000,000 cubic-feet daily gas loads. The new $1,000,000 expansion program started last spring includes two more oil-gas type machines with the necessary additional product and by-product handling facilities such as scrubbing equipment, tar stills, oil heaters, Dorr Thickener, direct-fired driers, conveyors, pumps, piping, etc.

The new equipment is designed for close control of all operations and greater emphasis will be given to increased recovery of salable by-products. Dependence on automatic control, which is noticeable in all the process industries, is an indication of the growing importance of applied chemistry. Improvements in quality and greater flexibility in operation are expected.

It might be well at this point to review briefly some of the historical background of the gas industry. Quoting from Jerome J. Morgan's *American Gas Practice*:

"The word 'gas' appears to have been used first about 1609 by a Flemish chemist, Von Helmont, who probably derived it from the Flemish word meaning a spirit. The use of combustible gas, however, was known long before this, for the Chinese as early as 900 A.D. piped natural gas through bamboo tubes and used it for lighting. The first record of coal gas is in the writings of Dr. John Clayton, a Yorkshire minister, who between 1660 and 1670 distilled coal. He described the gas and a 'black oil' obtained by heating coal, but made no practical use of his discovery.

"It remained for William Murdock, a Scotch engineer, to make practical application of these discoveries. In 1792 he distilled coal in an iron retort and using some 70 feet of copper and tin pipes lighted his home in Cornwall with coal gas. Murdock was employed by James Watt, the inventor of the steam engine, and lighted the Soho foundry of the firm with gas. A public exhibition here of the new light in April, 1802, at the time of the signing of the peace of Amiens, attracted wide attention. Murdock, however, did not patent his invention, and does not seem to have derived much financial reward from it.

"In France the great chemist Lavoisier paved the way for the practical use of gas by the invention in 1781 of the water-sealed gas holder. Here also Minckelers, a professor in the University of Louvain, in 1784 lighted gas distilled from coal in a demonstration to his class. Finally in 1799 Phillipe Lebon in Paris obtained a patent for making gas from the distillation of coal or wood, and in 1801 he lighted his home and gardens with gas.

"These men were all scientists and engineers. To have a gas company it was necessary to have a promoter. The first promoter in the gas business was Frederick Albert Winsor, a German. He learned what he could from Lebon, then went to London and in 1804 obtained the first English patents for the manufacture of gas. By his lectures and demonstrations he did much to overcome prejudice and in 1807 he lighted Pall Mall in London with coal gas. This was the first public street lighting. The charter for the first gas company, the London and Westminster Gaslight and Coke Company, was granted to Winsor and others in April, 1812. A year later Westminster Bridge was lighted with gas and from that time the use of the new light gradually spread. Many of the early developments in coal-gas manufacture were due to Samuel

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OUR COVER PHOTO

Courtesy of

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"SENTINELS"

"This month's cover is truly a triumph of camera technique, depicting in their wind-swept beauty the stately, snow-stung firs against the storm-tossed sky—a prelude to winter and the skier's paradise."

FEBRUARY MEETING

February 18, 1947

SPEAKER

DR. GEORGE H. CADY

University of Washington

SUBJECT

"Preparation and Properties of Fluorine and of Fluorocarbons"

SEATTLE GAS COMPANY

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Clegg, an engineer associated with Winsor, but Winsor was the man with the first vision of the future of the gas industry.

"There are claims of early experiments with gas lighting at Philadelphia in 1796 and at Richmond in 1803. It is generally conceded, however, that gas was really introduced into this country by David Melville who lighted his home at Newport, R. I., with gas in 1806. The first gas company in the United States was organized in Baltimore by Rembrant Peale in 1816. In Boston gas lighting began in 1822, and in New York a year later."

We will leave the early history of the gas industry and quoting again from the same source review the development of the Pacific Coast Oil-Gas process:

"The first patent on a method for the manufacture of a gas 'from vegetable or animal oil, fat, bitumen or resin' was obtained by John Taylor in England during 1815. Taylor's process was very crude. The oil was vaporized in one chamber and the vapors fixed in another heated chamber or retort, the gas then passing to a holder. During the next few years oil-gas was a competitor of coal gas for lighting purposes, which was the sole use of gas at that time. In 1824, however, oil-gas received a legislative setback from Parliament. This practically stopped all progress in its manufacture, no new plants were built and some of the plants already in operation were abandoned.

"The next important step in the development of oil-gas manufacture was the Pintsch process which was invented in 1873. In this process the oil is gasified in the upper of two connected horizontal cast-iron retorts. The lower retort serves as a fixing chamber for the oil-gas.

"Another and more scientific process was that of Young and Bell. In this the oil was gasified in slightly inclined circular iron retorts which were set in a bench usually back to back with a horizontal coal gas bench and which were heated by the waste gases from the coal gas bench. The gas was used for enrich-

ing coal gas where a high illuminating power was desired. It was scrubbed with the incoming oil in the stand pipe, condensed in an air-cooled run of pipe and then passed through oil in a 'hydraulic' main. It contained more than 40 per cent of unsaturated hydrocarbons.

"The basic step in the evolution of the present method of making oil-gas was the patent obtained in 1889 by L. P. Lowe, son of the inventor of the Lowe water-gas apparatus, for an 'Apparatus for the Manufacture of Hydrocarbon Gas.' This apparatus consisted of 'chambers lined with refractory material and each having an open work of refractory material.' The invention, however, was in advance of its usefulness by about 10 years for the first crude oil water-gas works in California was built in 1899 and it was not until 1902 that the first installation for large scale lighting was commenced at Oakland, California.

"The Pacific Coast Oil-Gas process is based upon the gasification of oil and steam in a chamber containing hot checker brick."

The heating of the checker brick is accomplished by passing a blast of air through them, the deposited carbon from the previous cracking of the oil supplying fuel for heating. At times a small amount of "heat oil" is added to maintain temperatures. The process is a cyclic one consisting of alternate heating periods and gas-making periods.

The heating period in the oil-gas cycle serves to burn off most of the deposited carbon and supplies the necessary heat, which is stored in the checker brick, for the subsequent "make" period. The products of combustion are vented to the air and in best modern design are first passed through regenerative-type checkered heat exchangers where a large portion of their heat is later recovered by the incoming blast air.

The reactions which take place during the gas-making period when steam and oil are both brought into contact with the hot checker brick are very complex and many of them are unknown. The oils

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SEATTLE GAS COMPANY

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used are heavy asphaltic base oils high in naphthalenes and olefins. Along with the cracking reactions of the oil to form hydrogen, hydrocarbons, sulfur compounds and free carbon are the reactions of the steam both with the free carbon and with the hydrocarbons.

The net results of the combined reactions yield a gas the following analysis of which is typical:

CO_2	— 3.0	per cent by volume
Illuminants	— 6.0	per cent by volume
O_2	— 0.6	per cent by volume
H_2	— 50.8	per cent by volume
CO	— 8.6	per cent by volume
CH_4	— 26.7	per cent by volume
N_2	— 4.3	per cent by volume
BTU	—593.0	per cent by volume
Sp. Gr.	— 0.434	per cent by volume

The Seattle Gas Company plant at present makes a manufactured-gas mixture consisting of approximately 50 per cent oil-gas from two existing oil-gas machines and 50 per cent carbureted water-gas from six existing water-gas machines. Peak loads are supplemented by propane-air gas from three existing generators. The two new oil-gas machines will replace the existing water-gas machines and give an all oil-gas production except during the transition period in starting up the new machines and except for peak loads which may still require use of propane-air gas. Economic considerations have dictated the choice of oil-gas machines to replace water-gas operation, the lower recovery of salable by-products for the solid-fuel water-gas operation being largely responsible for the difference.

Design and construction of the new equipment for the Seattle Gas Company has been handled by Ebasco Services, Inc., a New York concern engaged in engineering and construction throughout the country in various industries. They broke ground for the actual construction December of last year and have been in close contact with the Seattle Gas Company management through all phases of the undertaking. It is expected that the new equipment will be ready to operate some time during December of this year, material shortages and outside interferences having delayed the expected starting date of November 1st by an as yet undetermined period.

Essentially the new equipment consists of two double generator-type 20 feet diameter by 35 feet, vertical, fire-brick lined, checkered vessels with necessary piping controls, and auxiliary equipment. In operation the air flow will be in series through both generators, first through one then the other and reversed on the next cycle. The gas from the generators in parallel flow will next pass through two cone-bottom wash boxes 11 feet by 10 feet where circulating water will remove substantially all of the lampblack from the gas. This lampblack is carried as a water slurry through seal pots to a Dorr thickener about which more will be said later.

The gas next passes in countercurrent flow through an umbrella-type primary scrubber where most of the tar is removed by means of circulating water in line with existing practice on present machines, later to be replaced by circulating creosote oil. This operation will be discussed later.

The gas next passes through a packed-type secondary scrubber in counter-current flow where the remaining tar and considerable naphthalene is removed by circulating water in line with existing practice on present machines, later to be replaced by circulating creosote oil as mentioned for the primary scrubber. This operation will also be discussed later.

The gas is next collected in a "relief" holder which is really only a wide place in the line to take care of surges and afford some overall storage. Gas from here is drawn continuously by exhausters which boost the pressure to that necessary to put it through the treating and stripping plants. This pressure varies with the load, usually between 30 inches and 50 inches of water.

Before going to the treating plant for H_2S removal, the gas is cleaned in Cottrell precipitators to remove last traces of tar and solids, put through a water cooler

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PUGET SOUND SECTION RESEARCH CONFERENCE—December 20, 1946—*Space does not permit us to print abstracts of conference papers all in one issue, therefore, these papers will be published throughout the year.*

FORMALDEHYDE FOR MANUFACTURE AND IN USE

W. R. Moffitt — K. W. Gerstmann — R. L. Brewster

Formaldehyde, the simplest of the aldehydes, is produced in large volumes and sold as a 37% by weight solution stabilized against polymerization with various proportions of methanol. It also appears commercially as paraformaldehyde and hexamethylenetetramine, both of which break down under the conditions of use to form formaldehyde.

Historically, formaldehyde was first prepared by Butlerov in 1859. Its production in this country has grown from 8 million pounds in 1914 to well over 500 million pounds in 1945. Commercial formaldehyde manufacture in the Northwest was initiated by the Casein Company of America of Springfield, Oregon, in March, 1946, the plant now having a rated capacity of 6-10 million pounds a year. The principal uses of formaldehyde include the manufacture of thermosetting resins, plastics, dye intermediates, disinfectants and pharmaceuticals.

The chemical properties of formaldehyde include most of those common to the aldehyde group together with the Cannizzaro reaction which is common to aldehydes devoid of alpha hydrogens. Of particular importance in the applications of formaldehyde are its marked polymerizing tendency, its immediate hydration to methylene glycal upon solution in water, its reaction with compounds of phenolic and amine nature to give resinous compounds, and its substitution reactions with nitrogen compounds.

Formaldehyde may be prepared by dehydrogenation or oxidation of methanol by hydrolysis of methylene halides or by dry distillation of calcium acetate. Commercially it is prepared by the direct oxidation of C_1 to C_5 hydrocarbons in the presence of an excess of air and under the influence of contact catalysts. The Cities Service Oil Company and the Celanese Corporation are producing formaldehyde by this type of process. By far the largest proportion of commercial formaldehyde production is effected by the catalytic oxidation of methanol by air in the presence of metallic catalysts at temperatures in excess of 300° F.

Formaldehyde in aqueous solution is unstable at lower temperatures, the minimum temperature for stability depending upon the formaldehyde concentration and the methanol content. Data are presented on the stability of various types of formaldehyde and their behavior during polymerization.

In the analysis of formaldehyde solutions the formaldehyde content is commonly determined by the peroxide, sulfite, or bisulfite methods. These methods all give approximately one part per thousand accuracy. They frequently give results which differ from each other by as much as one part per hundred. Methanol is ordinarily determined by the chromic acid method of Blank and Finkbiner or by specific gravity measurements after correction for the formaldehyde content. Data are presented for introductory study of the analysis of methylal. Iron, copper, and aluminum may be present in concentrations below about three parts per million and are determined after suitable separation by chlorimetric methods.

Specific gravity data are presented to show that densities in the temperature range of 20-40° C. may be satisfactorily calculated for industrial purposes by the simplest form of the thermal expansion equation:

$$S_2 = S_0 (1 + Ct) \text{ where t is °C.}$$

Formaldehyde storage units for commercial installation may be stainless steel, rubber lined, aluminum, or plain steel tanks with suitable plastic coatings.

From a health and safety standpoint proper precautions must be taken to prevent contact with the skin as dermatitis

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SEATTLE GAS COMPANY

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in countercurrent flow and into a packed-type treating tower in countercurrent flow for removal of most of the H_2S. This unit will be described later.

Next the gas is put through the conventional "dry-box string" for final H_2S removal by iron oxide impregnated wood chips, then through another water scrubber and through the packed-type light-oil absorber in countercurrent flow to circulating absorber oil.

The stripped gas from the light-oil absorber is then metered to a storage holder for distribution. The addition of gum-formation inhibitors at this point in the gas flow is common but current shortages of such material have stopped its usage in the Seattle plant for the time being. There is an interesting field in the use of inhibitors and much could be done along this line. Gum formation and the resultant troubles are one of the many distribution headaches common to all manufactured gases.

Going back to the outlet of the generators where the gas passes through the wash boxes for lampblack removal, we will follow the flow of the lampblack from this point.

The lampblack-water slurry is overflowed continuously from two seal pots on the sides of the water-wash boxes into a launder or trough system where it commingles with similar material from the other machines and discharges to a Dorr thickener for concentration and discharge of both the floating lampblack material and that which sinks, into a slurry pit. The slurry at this point contains about 85 per cent water and is pumped through piping to Oliver continuous vacuum filters for additional dewatering. The lampblack free overflow water from the Dorr is recirculated by pumps back through the wash boxes.

The Oliver filters discharge a lampblack cake of about 35 to 40 per cent water content into a scraper-conveyor and belt-conveyor system which carries the lampblack to the driers. The new equipment adds two direct-fired driers

and a Blaw-Knox smoke-scrubbing system to the existing steam-heated driers. The lampblack, which contains about 10 per cent volatile matter including light-oils, creosote, naphthalene and tar, on a dry basis will give off most of this except the heavier tars, which later act as binder, during the drying. The recirculating creosote in the smoke scrubber will pick up the volatile matter for later processing and recovery.

The dried lampblack is discharged to a conveyor system and fed through a binder mixer for addition of extra binder if needed. From here it is fed to a briqueting press and formed into fuel briquets. At present almost the entire production of briquets is used in gas production on the existing water-gas machines. Eventual production, about 50,000 tons per year, will go principally to the domestic solid-fuel market.

The water from the Oliver Filter operation is pumped from the vacuum system on into the wash-box circulating system along with the water from the Dorr thickeners.

The primary scrubbers through which the gas passes after leaving the wash boxes are as mentioned being presently operated on circulating water. This water is continuously cooled in surface coolers by lake water. The eventual operation of these units will be with circulating creosote-tar mix. Continuous or regular periodic withdrawals of the mix for subsequent fractionation will be made and fresh creosote diluent or absorbent added back. Outside cooling of the circulating mix will be necessary.

The secondary scrubbers through which the gas passes are quite similar in operation to the primary scrubbers. These operate at a lower temperature and, whereas the primary scrubbers take out heavy tar principally, the secondary scrubbers recover more of the naphthalene and creosote fractions.

The several water scrubbers and coolers through which the gas passes remove traces of material which have passed through the primary and secondary scrubbers. Changing over to creosote-tar scrub-

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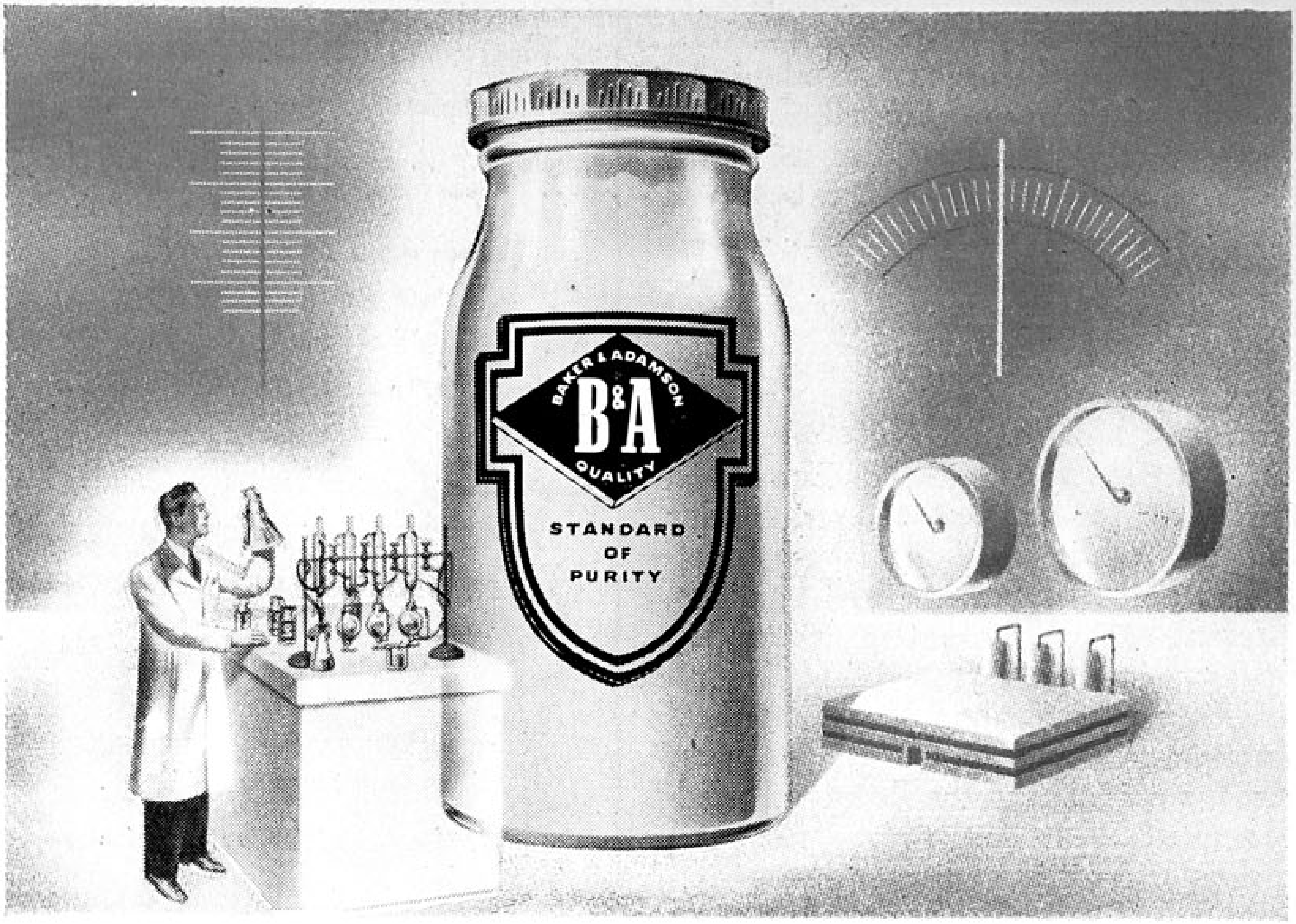
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SEATTLE GAS COMPANY

(Continued from page 15)

bing should do much to clean up these operations and some of the subsequent water scrubbing will probably not be necessary.

The liquid treating tower or purification system for H_2S removal uses the Koppers Company's "Thylox" solution process. This is a regenerative system the chemistry of which can be shown by the following equations:

$$H_2S + Na_4\,As_2\,S_5\,O_2 \longrightarrow Na_4\,As_2\,S_6\,O + H_2O$$
$$O_2 + 2Na_4\,As_2\,S_6O \longrightarrow 2Na_4\,As_2\,S_5\,O_2 + 2S$$

These two equations do not necessarily constitute the only reactions involved but indicate approximately what takes place. The first reaction covers the removal of the H_2S from the gas and the second shows the reactification of the solution by oxygen in aeration of the fouled solution. The elemental sulfur formed is colloidal in form and is recovered by filtration.

The dry-box purification system removes the last traces of H_2S by reaction with iron oxide as shown in the following equation:

$$3H_2S + Fe_2\,O_3 \longrightarrow Fe_2\,S_3 + 3H_2O$$

Recovery of light oils by stripping the gas in the light-oil absorber is really a whole process in itself and can only be briefly described here. The absorber tower has two circulating absorber medium systems both using the same medium, but the bottom portion of the absorber medium is circulated principally only through the tower while the top portion is returned continuously to the light-oil recovery system for stripping. A series of distillations and crystallization of naphthalene denude the "fat oil" from the absorber into "lean oil" and yield a light oil containing benzol, toluene, xylene, heavy ends and light ends. These products are further separated, purified and treated for commercial sales.

Operation of the various processes which make up a gas plant call for close control and skill in handling the many pieces of equipment. There is a constant challenge for even better operation and the possibilities for increased efficiency and better service to the public through applied chemistry and engineering keep an alert organization ever busy.

ORGANIC CHEMISTRY

(Continued from page 7)

from the ketones similar products with the exception of hydrogen.

By varying the light intensity, the pressure, and the temperature it is possible to obtain indications as to the rates of the various free radical reactions and whether or not they take place on the walls or in the gas phase.

A large amount of information concerning organic photochemical reactions is available in the literature but no systematic attempt has been made to arrive at generalizations. Some indications of the types of reactions which can be expected with complex molecules will be given.

CHAIRMAN'S MESSAGE

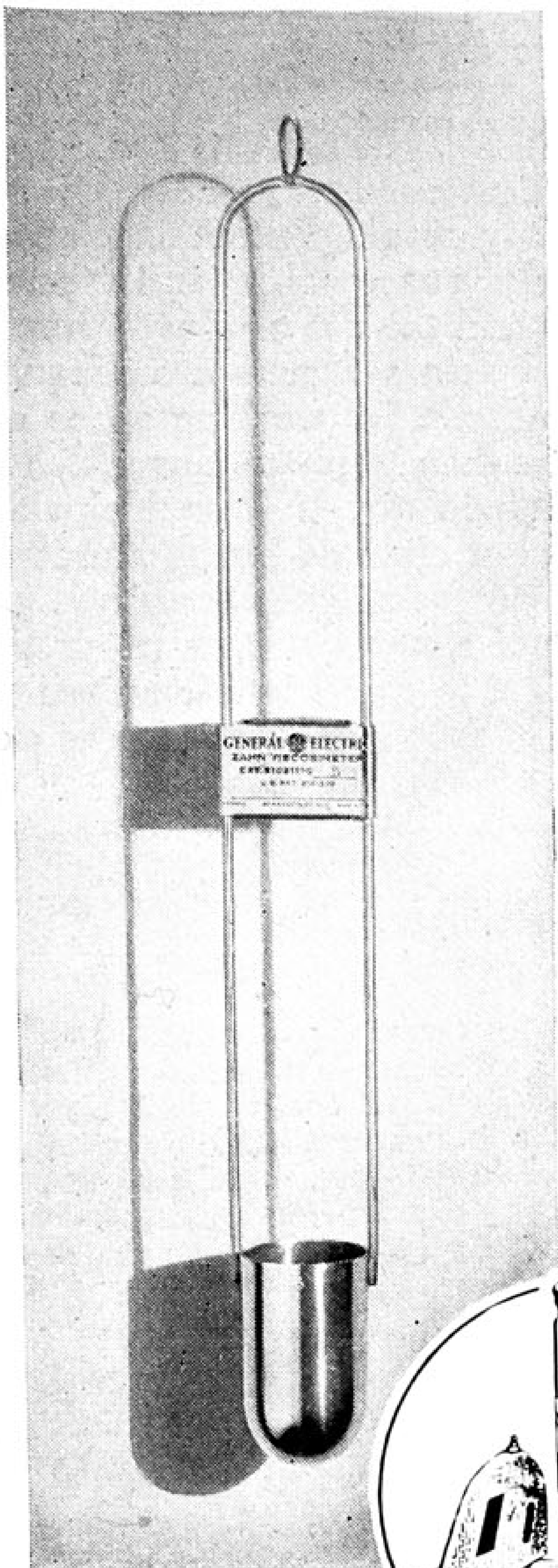
(Continued from page 5)

"In the last analysis, the caliber of the program of activities which this section will carry on this coming year depends upon the contributions which will be made by the individual members. If each member will accept and carry to completion whatever chore that may be tossed his way, the quality of our activities will rise. If you, as individual members, sidestep these small responsibilities a heavier load will be placed upon the shoulders of a few — and the few are probably already much busier than you.

"Let's work together!"

G-E ZAHN VISCOSIMETER

For Quick and Accurate Viscosities of Oils & Paints

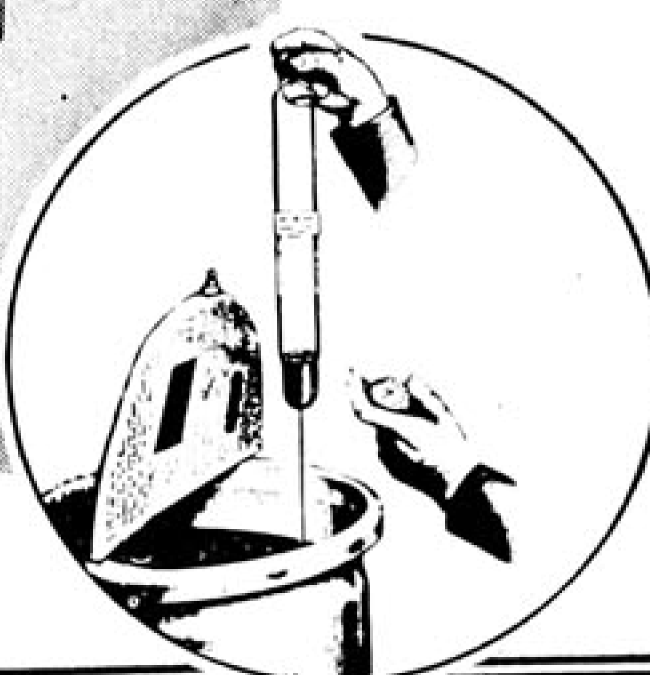


Accurate control of the viscosity of finishing materials, such as paint, varnish, lacquers, or japan, is the principal use for which No. 27134 G-E Zahn Viscosimeter is designed.

Paint manufacturers find it convenient in controlling processes, and in standardizing finished products. Users, too, can control the viscosity of finishing materials in order to obtain uniform results and minimize rejects due to imperfect finish. It is easy to manipulate, durable and inexpensive and permits control of viscosity right on the production line.

No. 27134 G-E Zahn Viscosimeter consists of a bullet-shaped cup, made of steel, with a capacity of approximately 44 cubic centimeters. It is suspended by a twelve-inch looped handle in the liquid to be measured. A small ring at the top end of the looped handle allows the operator to hold the cup in an exact vertical position when the cup is withdrawn from the liquid for a reading. The cup is drawn from a single piece of steel, over a die of hardened tool steel. It is annealed several times during the drawing process to remove any spring or strain that might later cause inaccuracy. The orifice is drilled slightly undersize and later reamed to the precise size. The size of the orifice is then tested by measuring the viscosity of oils specially prepared for the purpose. The cup is plated with copper, nickle, and chromium to make it resistant to corrosion.

These viscosimeters are made in five orifice sizes to measure the viscosity of a wide variety of liquids.



No. 27134A is designed for solvents, thin oil or thin mixtures; 27134B, for ordinary oil, mixed paints and lacquers; 27134C, for heavy oil and heavy mixed paints; 27134D, for extra heavy mixtures; and 27134E, for the heaviest mixtures.

Price .... $10.95 each

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Student Activities . . .

Ammonii Socii

Because of final exam week and the Christmas vacation. Ammonii Socii had but one meeting during December. No social functions were held but the organization is all primed for the all University Mixer scheduled for January 24th. This will be sponsored by Ammonii Socii and held in the women's gym, but due to limited space, will be restricted to A.S.U.W. card holders. It is expected to be the major function of Ammonii Socii for the year.

Iota Sigma Pi

Dr. Pauline Beery Mack, the National President of Iota Sigma Pi, was the honored guest at a luncheon meeting recently. In addition to telling us of the activities of other chapters she told us of her interest in scientific crime detection. She has followed this as a hobby for several years after being asked for assistance by the Pennsylvania State Troopers. She does much of her analytical work on blood stains, hair and microphotography. Oxygen chapter is planning its initiation banquet for late in January.

A. I. Ch. E. Student Chapter University of Washington

Prior to the termination of the fall quarter members of the student chapter were given an interesting and practical talk on the opportunities afforded the graduating chemical engineer. Mr. G. M. Thayer, who is connected with the Seattle Gas Company, included in his discussion some of the general problems which confront college graduates entering industry.

At the next meeting of the Chapter Dr. E. R. Guthrie, Dean of the Graduate School, is scheduled to discuss "Industrial Psychology."

FORMALDEHYDE

(Continued from page 13)

will probably result. Except in cases of particularly susceptible individuals, cleanliness and the use of gloves, barrier creams, and skin softeners are adequate. A.S.A. standards for working space call for not more than 10 p.p.m. formaldehyde concentration in air. If formaldehyde is to be stored at elevated temperatures because of high formaldehyde content and low methanol content, proper precaution must be taken to avoid ignition since the flash point of formaldehyde is in the general range of 135-180° F.

FINANCIAL STATEMENT

Puget Sound Chemist — 1946

The Puget Sound Chemist started as a printed publication in April, 1946, with no capital. The cost of publishing eight issues in 1946 was $2,093.88 or an average of $261.73 per issue. The cost of publishing rose in November but we still expect to be able to operate in the black.

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CREDITS

Cash Received	$2,200.02
Accounts Receivable	450.51
	$2,620.53

•

DEBITS

Publishing and Mailing Cost	$2,003.88
Accounts Payable	422.06
	$2,515.94
Net Profit	104.59
	$2,620.53

•

STATEMENT OF NET PROFIT

Bank Balance December 30	$ 106.14
Accounts Payable	422.06
Accounts Receivable	420.51
Current Deficit	$ 1.55
Net Profit	$ 104.53

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1947 OFFICERS PUGET SOUND SECTION

The election of 1947 officers for the Puget Sound Section of the American Chemical Society was held in November and the following men will assist in making 1947 a greater year for the Puget Sound Section.

HERBERT R. ERICKSON, *Chairman*, whose message on page 5 all should read.

DR. J. L. McCARTHY, *Vice-Chairman*. Dr. McCarthy received his degree in Chemical Engineering at the University of Washington and his Ph.D. at McGill University. Dr. McCarthy is now assistant professor of Chemical Engineering at the University of Washington.

COLLIS W. BRYAN, *Secretary*. Mr. Bryan received his degree of M.S. at the University of Washington and is now working for the I. F. Laucks division of Monsanto Chemical Company.

DR. Q. P. PENISTON, *Treasurer*, received his degree at McGill University in 1939 and is working at the University of Washington on the Pulp Mills Research Project.

DR. D. M. RITTER, *Program Chairman*. Dr. Ritter received his degree from the University of Chicago in 1936 and is now doing research at the University of Washington on the Pulp Mills Research Project.

DR. JOHN MEILER, *Finance Committee Chairman*. Dr. Meiler is now at the Douglas Fir Plywood Corporation in Tacoma.

LESTOR D. BERGER, *Publicity Chairman*. Mr. Berger received his degree of A.B. at Harvard University and is now District Sales Manager of Carbide and Carbon Chemicals Corporation in Seattle.

R. C. SCOTT, *Membership Committee*, who so ably produced new members last year, will continue his good work. Mr. Scott, a Chemical Engineer from University of Washington is with Adhesive Products.

H. DAUBEN, *Library Committee*.

JOHN SCOTT, *Social Committee*.

W. R. MOFFIT, *Professional Practice and Legislation*.

JOHN STEPHAN, *Employment Committee*.

R. P. ERWIN and FRANK WEST, Representatives to the *Puget Sound Engineering Council*.

DR. GEORGE CADY, R. W. HARRISON, T. S. HODGINS and A. J. NORTON, *Councilors for 1947*.