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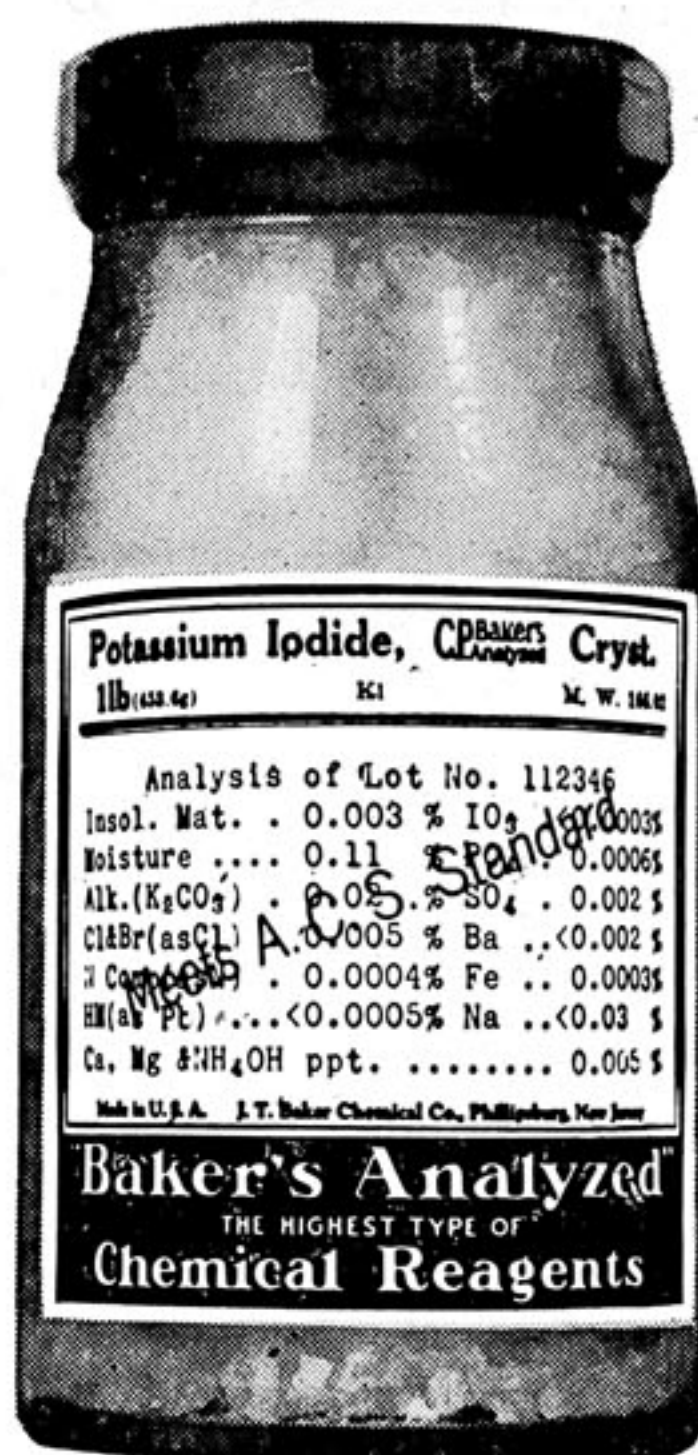
PUGET SOUND CHEMIST

Bulletin of the Puget Sound Section of the American Chemical Society

FEBRUARY 1947

NUMBER 2

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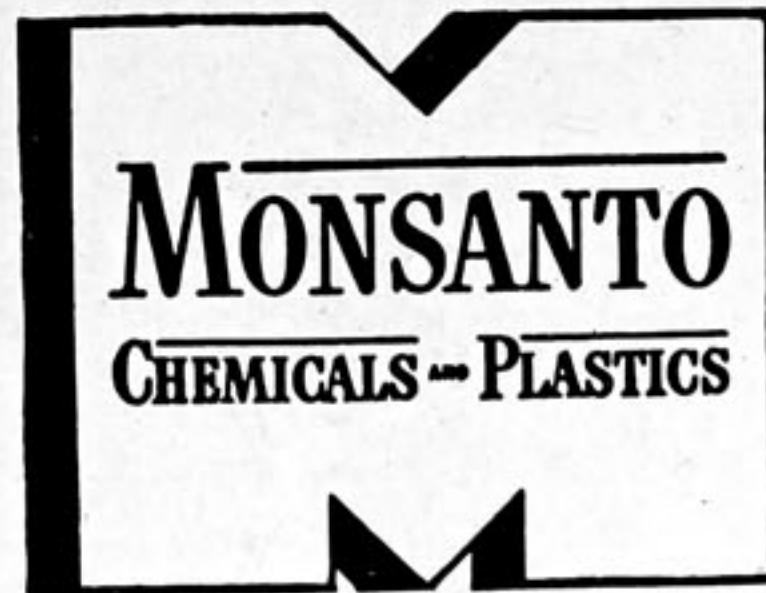


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A. C. S. PRESIDENT NOYES VISITS THE PUGET SOUND SECTION

On January 24, the Puget Sound Section was visited by the President of the American Chemical Society, Dr. W. A. Noyes, Jr., Chairman of the Chemistry Department of Rochester University. He was met at the station by Lester Berger of the Publicity Committee and entertained during the day by John Meiler, who at one time took graduate work under Professor Noyes.

In the afternoon Dr. Noyes gave a seminar talk to the Chemistry faculty and students at the University of Washington on "The Photochemistry of Ketones." In this interesting and inspiring report of some of the work that has been done by Professor Noyes and his students, he described in detail some of the aspects of the study and interpretation of the kinetics of several photochemical decompositions.

At the dinner, held in the Black Room of the Edmond Meany Hotel, Dr. Noyes reported briefly on some of the problems of the Society.

In his evening address, Dr. Noyes beautifully summarized the basic concepts of the photochemistry of organic compounds and indicated the main types of organic photolysis reactions which have been studied.

The Society may well be proud of its President, a man with obvious ability as a research chemist and a lecturer, and with an outstanding personality.

Photochemistry of Ketones

Seminar Address by Dr. W. A. Noyes, Jr.

Ketones show absorption in the quartz region of the ultraviolet, from somewhat above 3000A to about 2300A, as well as a series of absorption bands in the far ultraviolet. Because of the complexity of the molecules, the absorption spectra show a very large number of lines, and it is often difficult to decide whether a given portion of the spectrum is discrete or continuous. A continuous spectrum indicates dissociation of the molecules, usually into

free radicals. A discrete spectrum may indicate the absence of dissociation or it may merely mean that the excited molecule has an appreciable lifetime, carrying out several periods of vibration and rotation before dissociating. If the substance fluoresces, the molecules cannot be dissociating, since fluorescence is caused by the excited molecules dropping back into lower energy states. The fluorescence of acetone under conditions which lead to its photodecomposition, has led some workers to believe that it must decompose by a molecular mechanism rather than by free radicals. Dr. Noyes believes that all photochemical reactions proceed by way of free radical chains, and has shown that the fluorescence of acetone is not due to the acetone itself but to biacetyl, one of the products of the decomposition.

Dr. Noyes discussed the mechanism proposed by himself and his co-workers and showed how it agrees with all experimental observations.

Of the other ketones which have been investigated, methyl n-butyl ketone is particularly interesting. Under certain conditions, it appears to decompose by two different mechanisms. The first, yielding acetone and propylene, is independent of the temperature, and may be a molecular mechanism. The second, yielding carbon monoxide and hydrocarbons, is temperature-dependent, and is probably a free radical chain mechanism, with the thermal energy of the large number of degrees of freedom assisting in supplying the energy necessary for the primary dissociation. This dual mechanism is not yet amenable to quantitative calculation, but qualitative calculations are in agreement with the experimental observations.

Photochemistry of Organic Compounds

Evening Address by Dr. W. A. Noyes, Jr.

The general features of atomic and molecular emission and absorption spec-

(Continued on page 9)

February Meeting

**PUGET SOUND SECTION OF THE
AMERICAN CHEMICAL SOCIETY**

Tuesday • Feb. 18, 1947

Bagley Hall • Room 140

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



***"The Preparations and Properties of
Fluorine and Fluorocarbons"***

DR. GEORGE H. CADY

University of Washington

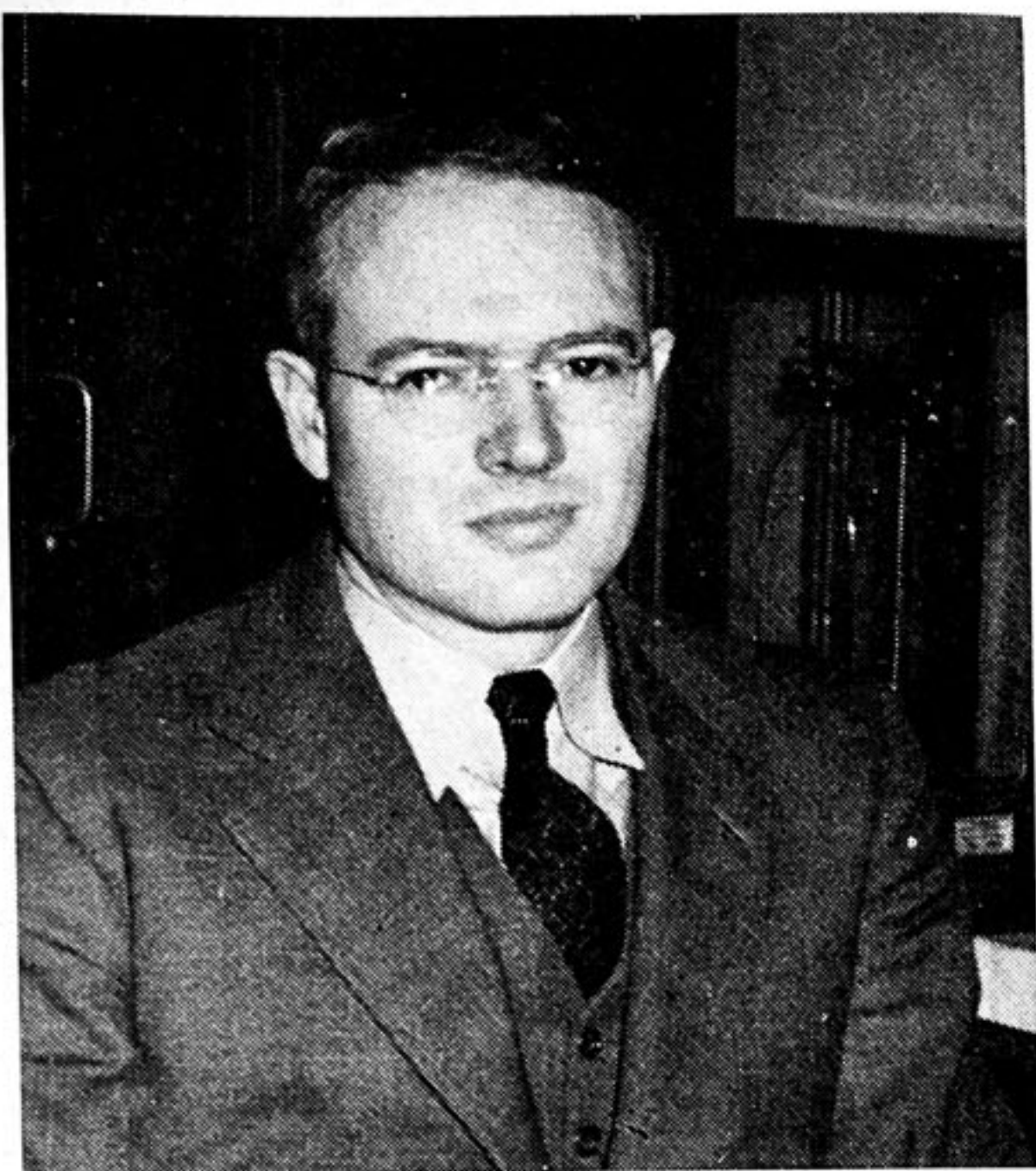


**REFRESHMENTS AND SOCIAL HOUR IMMEDIATELY FOLLOWING
THE MAIN ADDRESS**

February Speaker . . .

BIOGRAPHICAL SKETCH OF GEORGE H. CADY

George H. Cady spent all but the summers of the first 22 years of his life in Lawrence, Kansas, where he received most of his schooling. He grew up in a chemi-



DR. GEORGE H. CADY

cal atmosphere, for his father, H. P. Cady, was the chairman of the chemistry department at the state university. He was granted A.B. and A.M. degrees by the University of Kansas in 1927 and 1928 respectively and a Ph.D. degree by the University of California in 1930. At the latter institution he worked under the guidance of J. H. Hildebrand upon some aspects of the chemistry of fluorine. Before coming to the University of Washington in 1938, where he is now an Associate Professor of Chemistry, he had served in a professional capacity as a chemist or teacher of chemistry in the University of South Dakota, the Massachusetts Institute of Technology, the U. S. Rubber Company, and the Pittsburgh Plate Glass Company. During 1942 and a part of 1943 he served as a section leader in the research group at Columbia University which worked on the develop-

ment of the gaseous diffusion process for separating the isotopes of uranium.

Most of his research experience has been in the field of the chemistry of fluorine and its compounds. He has, however, worked extensively upon methods for the quantitative determination of the rare gases and upon a process, now used industrially, for the manufacture of calcium hypochlorite.

His present work is the teaching of general and inorganic chemistry and the directing of research of graduate students, four of whom are working upon fluorides under a contract made between the University and the Office of Naval Research.

"The Preparation and Properties of Fluorine and of Fluorocarbons"

During the war much research was done in the field of fluorine chemistry because of the apparent usefulness of uranium hexafluoride and fluorocarbons. Cells were developed for the commercial production of elementary fluorine by the electrolysis of molten $KF \cdot 2 HF$ and the free element was prepared in moderate amounts.

Several general methods for the preparation of fluorocarbons were successfully developed and were then used to produce a wide variety of compounds including perfluoroheptane, C_7F_{16} , and perfluorodimethylcyclohexane, C_8F_{16} . Plastics and lubricating oils were also obtained.

Fluorocarbons are characterized by their stability, chemical inertness, and their low intermolecular attraction.

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GLASS

By **RAY NEWBERY**

Technician, University of Washington

It is not definitely known when glass was first made artificially, but certainly it was very early in the cultural history of mankind.

We have progressed far in the art since the "miracle" of glass was first observed by "a group of Phoenician merchants who," according to Pliny, "were preparing their repast on a beach in Syria and, finding no stones on the shore for supporting their cauldron, used pieces of natron which were taken from their ship. When the fire had become quite hot upon the sand of the beach and the pieces of natron, they observed streams of a previously unknown clear liquid flowing from the fire: this, supposedly, was the origin of glass."

Little did those men on the beach that night realize that their "miracle" would one day become a vital force in our civilization. It has penetrated to the very core of our everyday existence. Our very "light" is dependent upon it. We enjoy daylight through it and are protected from the elements by it. With the flick of a switch we have light at night—thanks to the glass bulbs of our incandescent lamps and the glass tubing of our fluorescent lamps. Without it we could not have our modern radio, radar, television and countless other things that we accept as commonplace.

Book after book has been written about glass. Its versatility seems limitless. It alone has made many things possible that a few short years ago were unthought of or considered impossible. Can you imagine modern Chemistry or Physics without glass?

Most glasses are little affected by water or acids, except hydrofluoric acid, whereas most of the ingredients in glass do not share this property.

The invention of the blowpipe about the beginning of the Christian era was truly one of the great discoveries of mankind, for it took glass out of the luxury class and made it a necessity. It made possible the production in quantity of articles of shapes and designs that were previously impossible to produce. The blowpipe is to glassblowing what the potter's wheel is to ceramics. The blowpipe remains in use today and most of our good glassware is still being made "offhand," by the glassblower, using a blowpipe and a "gather" of molten glass taken directly from the furnace.

Glassblowing, as practiced in the laboratory, is also known as "lampworking." The articles are fashioned from glass tubing and rods of assorted sizes, which are heated in the flame of a blast burner before blowing and shaping.

There are many types of glass, all of which are suited to their own particular purpose. In the past much of our bench-blown laboratory glassware was fabricated of soda-lime or soft glass, but today most of it is made of Pyrex No. 774 because of its superior chemical and physical characteristics. Pyrex has a greater resistance to breakage by heat shock as its linear coefficient of expansion is only one-third that of soft glass. It has greater chemical durability and resistance to mechanical shock. These characteristics make it most desirable for chemical laboratory equipment. Pyrex glass differs in composition from soft glass in that it contains less alkalis, more silica and a substantial quantity of boric oxide.

The glassblowing shop in a research organization is constantly beset with new and challenging problems, for seldom is any piece of apparatus made in quantity. It may be a large multiplate fractionating still reaching from floor to ceiling to operate at atmospheric pressure or under vacuum and carefully insulated and differentially heated to insure the proper temperature gradient, with a special type of head for take-off of samples at predetermined intervals, or a small glass-jacketed column with expansion bellows which is silvered and evacuated, with

windows for the observation of reflux rate and designed to operate at minus 60 degrees.

It may be a small micro-methoxyl determination apparatus, or an electrically-operated pressure control device, or it may be a piece of equipment involving a transition joint from Pyrex to soft glass which requires the making of a graded seal consisting of some six intermediate grades of glass, all sealed together and the completed seal not more than an inch in length.

It may be a two-stage mercury diffusion pump, or an oil diffusion pump, a liquid air trap or McLeod vacuum gauge, or an ionization gauge requiring multiple metal to glass seals which must be vacuum tight. It may be a special stopcock with a two centimeter opening through the stopper or a special ground joint with a taper which is not standard.

It may be a viscosimeter with a capillary of three-tenths of a millimeter with a time of 240 seconds, or a conductivity cell of proportions to meet a particular need, or a two litre Dewar flask made from stock flasks to be silvered, baked and evacuated for 24 hours to insure superior results—not to mention the inevitable repair jobs that break into the daily schedule.

Yes, with a stock of glass tubing and flasks, some good fires, a lot of experience, along with a bit of resourcefulness and imagination, there's no limit to the possibilities of the "miracles" of glass.

NOYES VISITS . . .

(Continued from page 5)

tra were outlined, followed by a brief discussion of the nature of photochemical reactions. Dr. Noyes then summarized the various types of organic photo-reactions by discussing a series of examples.

Of particular interest were the photochemical chlorination of benzene and the polymerization of acetylene and of benzene. In the photochemical chlorination of benzene, the first product is benzene hexachloride, $C_6H_6Cl_6$, followed by substitution of hydrogen by chlorine up to dodecachlorocyclohexane, C_6Cl_{12} .

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RADIO FREQUENCY CONFERENCE

A conference on radio frequency and its application in wood gluing was held at the University of Washington, at Anderson Hall, January 16 and 17, to pool available knowledge in the rapidly growing industry.

The rapid growth of the wood utilization field has led to new and better ways of applying and using resins. One of the many problems encountered has been a method of applying heat to glue lines in laminated structures to polymerize adhesives in place. A second problem has been the drying of wood to low moisture content in short cycles.

Attendance was surprisingly large with 230 representatives from the wood working industry, which included many chemists and engineers from industrial, academic and research organizations throughout the West. At least 20 registered from British Columbia and probably 20 or more from California.

Several facts were established. The West is far ahead of the rest of the country in the use of high frequency for gluing wood products, except in the manufacture of molded plywood. A second fact indicated much research should be done on adhesives in application to the radio frequency field as the present radio frequency adhesives all have shortcomings. As the volume and quality of the wood deteriorate, the industry trends toward better utilization. Wood by-products, formerly thrown away for fuel, are now being glued up into valuable consumer goods, it was pointed out.

College of forestry, University of Washington, has well-equipped laboratories for the study of radio frequency gluing processes, and since it has taken a leading part in basic research, its sponsorship of the conference was a logical and timely development. Acting as chairman for the conference was Dr. O. Harry Schrader, Jr., who, with Dr. B. L. Grondal and David E. Thomas on the faculty, have guided research work in this new field.

Exhibited during the conference was a 15 KW commercial generator, purchased by the engineering experiment station of the University, and a half KW portable type generator, donated to the college for research purposes. Since work started at the University last May, a practical method for edge-gluing veneer has been worked out and put into commercial operation. Other studies under Ray Horne, a full-time research man, with the cooperation of graduate forestry students and faculty members, is under way, Dr. Schrader said.

The discussions on wood technology brought out the extreme need for close control of lumber stock from the standpoint of uniformity of moisture content, selection for density, proper surfacing, and also pointed out difficulties occasioned by resin contents of some of the pines.

Radio frequency gluing, it was pointed out, requires closer control of these factors than hot or cold press gluing because of the dielectric properties of the wood. Dr. B. L. Grondal, professor of forest products at the University of Washington, showed some slides indicating the exact characteristics of a planed wood surface that showed the need for control assembly times and pressure to obtain an intimate contact during the gluing operations.

Others contributing to this discussion were A. C. Knauss, wood technologist, and Dr. Alfred J. Hall, director, Pacific Northwest Forest Experiment Station, Portland, Oregon.

Don Redfern, Adhesive Products, Seattle, was chairman of a glue panel that held a lively discussion on the use of R-F with resin and other adhesives.

Charles E. Rozema, Resinous Products Company, Portland, pointed out the dangers of over-curing ureas in the radio-frequency fields. He also indicated that a proper cure is determined by the attainment of a glueline temperature of 180° to 200° F. But there is a limit to the speed

at which this temperature is reached, he warned.

Most practical method of measuring this degree of cure is the balance of the generator during the curing period, he said. Urea glue should be given an opportunity to flow under pressure before being subjected to the electronic field.

A. L. Golick, I. F. Laucks (Monsanto Chemical Company), Seattle, pointed out the necessity for cooperation between the glue manufacturer and the user, so new glues could be tested under operating conditions and formulated to meet specified needs.

H. B. Bruce, chemist, U. S. Forest Products Laboratories, Madison, Wis., discussed the arcing propensities of different types of glues when cured by R-F. He proposed this classification of glues subject to arcing: 1. Very bad—alkaline hot press phenol formaldehyde. 2. Bad—intermediate temperature setting phenol formaldehyde. 3. Good—urea formaldehyde, resorcinal formaldehyde. 4. Very good—melamine formaldehyde and cer-

tain acid catalyzed phenol formaldehydes.

Bruce's findings were confirmed by David Thompson, who reported that last fall an investigation of arcing was started at the University.

Others participating in this discussion were M. M. Stover, Casein Company of America, Seattle, and James Hamilton, Perkins Glue Company, Lansdale, Penn.

In spirited discussions on radio frequency equipment, nearly everyone agreed that use of radio frequency in wood gluing had to be engineered to every job. Variable factors are design of electrodes, operating cycles, and required power outlet.

One fact was stressed many times—that the measure of work to be done was the number of B.T.U.'s required, which is the same with any type of heating apparatus. The test for use of R-F equipment, the experts said, is economy, speed, adaptability of R-F equipment to curved and non-uniform sections, and whether R-F lends itself to continuous type operations. *(Continued on page 17)*

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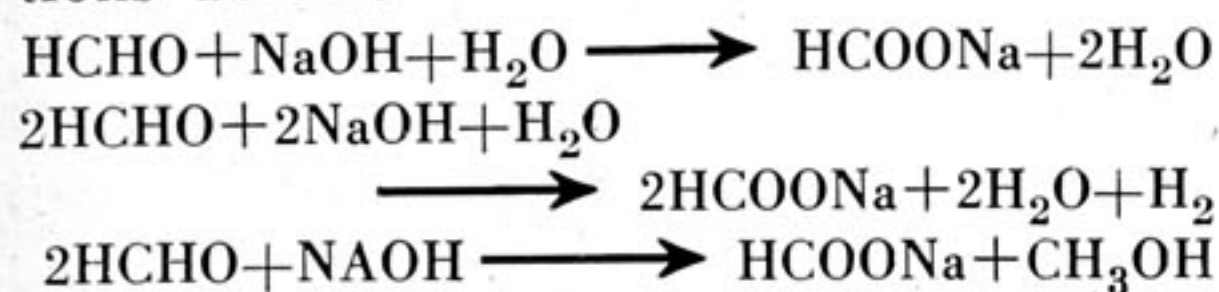
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A COMPARISON OF CONTROL METHODS FOR THE ANALYSIS OF FORMALDEHYDE

By GENE BAXTER of Adhesive Products Company

During the past few years, the laboratory of the Adhesive Products Company has been carrying on an investigation of the various analytical methods for formaldehyde. The purpose has been to try to determine the best routine control method for commercial 37% formaldehyde solution. The requirements for such a method are, of course, that it be accurate and at the same time rapid, reliable and economical. Many of the analytical methods described in the literature were found to be suitable only for special purposes and unsatisfactory as control methods by one or more of these criteria. However, there were a number of methods which had no serious drawbacks, apparently, and it has been toward a critical comparison of these procedures that the work has been directed.

One of these is the peroxide method, which is the procedure prescribed by the U. S. Pharmacopeia. It is based on the oxidation of formaldehyde to formic acid in the presence of a known excess quantity of sodium hydroxide, and subsequent titration of the unreacted base. The oxidation of the formaldehyde, probably proceeds in two ways simultaneously, as shown by the first two equations below:



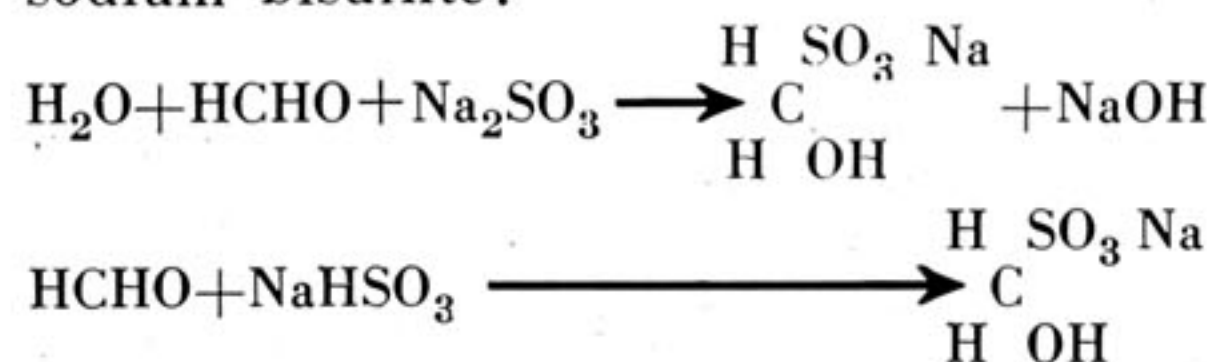
The third equation shows the Canizzaro reaction, which may take place if the determination is not conducted properly. Some of the early experimenters with the peroxide method found that their results occasionally came out to be too low, and eventually proved that this reaction was taking place, due to the fact that they were mixing the formaldehyde

and standard normal sodium hydroxide before adding the peroxide. The net result would have been the same except that when the Canizzaro reaction took place, one mole of NaOH was equivalent to two moles of formaldehyde instead of one. This is the reason that the standard base and the peroxide are always mixed before the sample is added.

The peroxide, being somewhat acid, must be neutralized. Also, a separate titration of the formaldehyde with standard 0.1N. NaOH is necessary so that a correction may be applied for formic acid initially present. The proportion of NaOH needed for neutralization is so small that here there is virtually no possibility of its reacting with the formaldehyde.

It was found that it is possible to obtain very close agreement between successive determinations by the peroxide method. The chief objection to the method is that it consumes more time than is desirable, due to the necessity of heating the samples on a steam bath to give complete oxidation.

Another typical aldehyde reaction is the basis for another analytical method, of which there are several variations. That is the formation of an aldehyde-bisulfite addition product. This may take place either with sodium sulfite or sodium bisulfite:



In the sodium sulfite procedure, an excess of the neutralized salt is merely added and the free NaOH formed is titrated. This method is easy to conduct

(Continued on page 14)

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ANALYSIS OF FORMALDEHYDE

(Continued from page 13)

and is widely used industrially. However, in this work it has not been possible to obtain very good agreement between successive samples with this method.

In the sodium bisulfite method, the only reaction product is a neutral salt. The formaldehyde can actually be titrated with the bisulfite solution. This is done as follows: About a 19% sodium bisulfite solution is prepared and just enough sodium hydroxide added to bring the pH up to 5.2. As this solution is run into the flask containing the formaldehyde, the bisulfite ions are removed from solution and the pH rises to about 10 because of the sodium hydroxide which is present in the bisulfite solution. After all the formaldehyde has reacted, another drop or two of acidic bisulfite solution neutralizes the weak alkaline mixture and gives an indicator color change.

The bisulfite solution must be standardized against formaldehyde of known concentration, which means that the method is not complete in itself but dependent upon another method. This is rather inconvenient in some respects. Also, the accuracy can be no greater than that of the method used for standardization. The advantage of the method is that once the standard solution is made up, the only necessary operations are measuring out the sample, neutralizing it with a few drops 0.1 N. NaOH, and titrating. It has been possible to get very good duplication of results with the bisulfite method. For standardizing the solution, the peroxide method is used.

The following table may serve to give a conception of the kind of precision given by each of the methods just described.

| <i>Method</i> | <i>Samples per set</i> | <i>Mean deviation in % HCHO</i> |
|-----------------|------------------------|---------------------------------|
| Peroxide | 3 | .02 |
| Bisulfite | 3 | .04 |
| Sulfite | 3 | .90 |

Another industrial method which is quite widely employed is the hydroxylamine hydrochloride procedure. This is based on the reaction between formalde-

THE PUGET SOUND CHEMIST

hyde and hydroxylamine hydrochloride to form formaldoxime and hydrochloric acid. The free hydrochloric acid formed is titrated with standard base. As before, the sample must be neutralized before the reagent is added. Also, it is necessary to run a blank determination on the reagent.

There is one obvious objection to all these methods. That is that the reactions on which they are based are not specific for formaldehyde and, therefore, other aldehydes, and sometimes ketones and other compounds will interfere. Ordinarily this is not too significant because most formaldehyde is manufactured from methanol and contains essentially only methanol and formic acid as impurities. However, formaldehyde made from natural gas or petroleum hydrocarbons, which is being produced on an increasingly larger scale, contains various types of impurities, including aldehydes. For this reason it is important to have a highly selective analytical method

for formaldehyde. The reaction of formaldehyde with potassium cyanide to form cyanohydrin is well suited for this purpose. In the determination, an excess of standard potassium cyanide is added to the sample and the unreacted cyanide is then determined. The procedure requires a somewhat longer time to conduct than the others described.

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A Spectrophotometric Study of Nitrosolignin

W. G. WESTOVER and H. K. BENSON

Abstract: The color production resulting from the action of nitrous acid upon ligneous solutions is studied. Color development is confirmed to be in compliance with Beer's law. Sodium lignosulfonate is subjected to alkaline cleavage and four fractions are isolated from the cleavage product. The extinction coefficient of these fractions is found to be greater than the original material and is seen to be a function of the activity of the phenolic groupings of the lignin molecule. The nitrosolignin reaction is proposed as a possible method of measuring the activity of a lignin resin ion exchanger or as a measure of the degree of completion of a condensation reaction involving lignin.

Characterization of a Purified Lignin Sulfonic Acid by Free Diffusion Analysis

DERROL PENNINGTON and D. M. RITTER

Abstract: Free diffusion over successive intervals has been employed to obtain a sequence of average integral diffusion coefficients descriptive of the heterodisperse and polymeric nature of the lignin sulfonic acids. Analytical data on total solids, methoxyl and sulfur content and periodic acid reducing power of the diffusate have been used to calculate average integral diffusion coefficients of ammonium lignin sulfonate in sulfite waste liquor, for which values in cm^2/day have been found covering the ranges 0.26-0.17, 0.16-0.12, 0.32-0.18 and 0.36-0.24, respectively. Molecular weights have been calculated by application of the Sutherland-Einstein equation using the experimentally determined average integral diffusion coefficients for methoxyl transfer. The values obtained show sixty per cent of the ligneous material to have molecular weights of 10,000 or over with a minor fraction as low as 3,000.

A fractionation procedure consisting of fractional precipitation of barium salts with acetone followed by an extraction

into quinoline and precipitation of lignin sulfonic acids with ether has been applied to sulfite waste liquor. This process yields a high-methoxyl fraction representing 60% of the original methoxyl. Application of the diffusion technique indicates this material is fairly homogeneous both chemically and physically. Diffusion coefficients for methoxyl-bearing material are 0.11-0.093 cm^2/day and for total solids 0.12-0.10 cm^2/day .

A Preliminary Study on Yellow Fin Tuna Pepsin

E. R. NORRIS and JAMES C. MATHIES

Abstract: The first proteolytic enzyme to be crystallized was swine pepsin, isolated by Northrop in 1930. Since then many proteolytic enzymes have been purified and crystallized. The gastric enzymes of two fish were prepared in this laboratory: salmon by Elam and halibut by Erickson. In carrying further the study and characterization of proteolytic enzymes the gastric proteinase of the yellow fin tuna has been investigated and is here reported.

The distribution of the enzyme in the "blind bag" stomach of this fish is such that the closed end is the most active. Purification was accomplished by salting out and autolysis. Needle-like crystals were obtained by employing a favorable temperature coefficient of solubility. Heat inactivation of the enzyme is slow up to 50° C. and practically quantitative at 65° C. The enzyme is quite stable over the pH range 2.4-5.3. Alkali inactivation appears at pH 7 and is complete at pH 8. The % sat. of $(\text{NH}_4)_2\text{SO}_4$ required for salting out is unusually low. Optimal activity occurs at pH 2.5 and the isoelectric point is around pH 3.

The Preparation of Fluorine Perchlorate From Fluorine and Perchloric Acid

GILSON H. ROHRBACK and GEORGE H. CADY

Abstract: The reaction of fluorine with concentrated perchloric acid produces fluorine perchlorate (ClO_4F) as well as the other gaseous substances, oxygen and

(Continued on page 18)

WESTERN METAL CONGRESS AND EXPOSITION

A six-day exposition is being held at Oakland, California, beginning March 22, 1947. More than 40,000 metals scientists, engineers and executives are expected to attend the 5th Western Metal Congress and Exposition which will be held in the two Oakland Civic Auditoriums in the San Francisco-Oakland Golden Gate area for six days beginning March 22, 1947.

W. H. Eisenman, Managing Director of the Exposition and also national secretary of the American Society for Metals, stated that the estimate is based upon attendance figures of the last previous Western Metals Congress and Exposition held in Los Angeles in 1941.

"Current interest in the progress made in metal alloys, metals manufacturing and fabricating equipment and other phases of the metals industries is at a high point," Mr. Eisenman said. "Never before have we seen much a manifestation of interest in the field. Attendance at the recently-held National Metals Congress and Exposition at Atlantic City showed without question that general interest in achievements of the field is at an all-time high."

It was pointed out that further evidence of interest is the fact that more manufacturers of metals industries products are showing in 1947 than ever before in a Western Metal Show. Too, the technical programs already completed show more than 75 technical papers, lecture courses and 'round table discussions, also a new high for this event.

Sixteen western divisions of technical societies are actively cooperating in program and other activities of the Western Metal Congress and Exposition. The list includes the American Society for Metals, sponsors of the event; The American Chemical Society; the American Foundrymen's Association; The American Industrial Radium and X-Ray Society; The American Institute of Mining and Metallurgical Engineers; The American Institute of Electrical Engineers; The American Society for Testing Materials; The

American Society of Tool Engineers, Inc.; The American Welding Society; The Mining Association of California; The Northwest Electric Light and Power Association; The Pacific Coast Electric Association; The Purchasing Agents Association of California, Inc.; Society of Automotive Engineers; Western Oil and Gas Association and the American Petroleum Institute.

RADIO CONFERENCE . . .

(Continued from page 11)

Glue squeeze-out, causes and prevention of arcing, electrode and lead design, and advantages of automatic tuning were discussed in detail.

Matt E. Dunlap, U. S. Forest Products Laboratory, Madison, Wis., discussed temperature measurements and heat distribution in assemblies cured in a R-F field.

Julius W. Mann, vice-president, Northwest Syndicate, Inc., Tacoma, Wash., described the method of calculating required generator capacities.

Other speakers included Jack B. Cunningham, Short Wave Plastic Forming Company, Los Angeles; E. S. Winlund, Radio Corporation of America, Los Angeles, and Dr. R. A. Nielson, Westinghouse Electric Corporation. Speaking at a banquet meeting, W. U. Dent, a Westinghouse representative, pointed out that the Federal Communications Commission was ready to limit industrial radio frequency operations to three narrow bands on the radio frequency spectrum, which he said means that industrial operators will either have to shield their apparatus or put in frequency stabilizers.

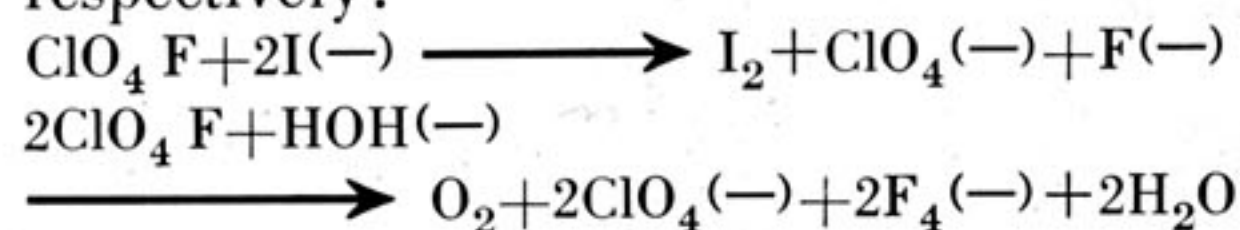
G. Otto Orth, Jr., and Arthur J. Norton presented a paper on the training of young men for hi-frequency. The paper pointed to a need for a closer cooperation between R-F and adhesive manufacturers and indicated the need for a cooperative research project on F-F gluing.

Preparation of Fluorine Perchlorate

(Continued from page 16)

oxygen difluoride. The relative proportions of the gases produced is dependent on the material used in the construction of the reaction vessel.

The compound fluorine perchlorate is an explosive gas which boils at -15.9°C . at 755.5 mm. and freezes at -167.3°C . Equations for its reactions with potassium iodide and sodium hydroxide are respectively:



X-Ray Crystallograph Studies of Organic Sulfonates III. The Monohydrates of Certain Sodium 1-Alkane-Sulfonates

E. C. LINGAFELTER and L. H. JENSEN

Abstract: Crystals of the monohydrates of sodium 1-hexane-, 1-octane-, and 1-decanesulfonate have been grown from mixtures of 1, 4-dioxane and water by slow cooling of the saturated solutions. The amount of hydration was determined from the weight loss during vacuum drying.

The habit is similar to that previously described for the other hydrates of these salts, thin tabular parallel to $\{001\}$ elongated parallel to the a-axis. The tablet is outlined by $\{11^{\perp}\}$ and $\{01^{\perp}\}$

X-ray diffraction patterns were taken with single crystals of sodium 1-hexanesulfonate and 1-octanesulfonate monohydrate. The crystals of the sodium 1-decanesulfonate monohydrate were too unstable for investigation.

The constants of the triclinic unit cells are given in Table I.

Densities were determined by the flotation method using mixtures of 1,4-dioxane and carbon tetrachloride. The unit cell contains four molecules of the sodium

1-alkanesulfonate monohydrate.

From the size and shape of the unit cells and the symmetry of the diffraction phenomena the following conclusions may be reached:

- the chains are extended at an angle of 42° from the c-axis.
- successive layers of chains along the b-axis are displaced by $a_0/2$.
- the effective cross-section of the molecules, normal to their length, is 22.98 kX^2 , which is considerably larger than the values found for other paraffin-chain compounds.

On the Structure of the Antibiotic Citrinin

R. D. SPRENGER and P. M. RUOFF

Abstract: Further evidence is presented which questions the suitability of the structure proposed by Coyne, Raistrick and Robinson¹ for citrinin, a metabolic product of the mold *Penicillium citrinum*.

Among the degradation products of citrinin these investigators isolated a dihydric phenol to which they assigned the structure, 2-ethyl-4-methylresorcinol. From an investigation of this compound and further degradation studies a structure was proposed for citrinin itself.

Recent studies² have indicated that the structures proposed for some of these further degradation products are untenable.

A further investigation³ has shown that the phenolic degradation product assumed to be 2-ethyl-4-methylresorcinol can be coupled with diazotized 5-nitro-o-anisidine to give a disazo derivative. Since such a structure with only one free position available for coupling would not be expected to form a disazo compound, synthetic 2-ethyl-4-methylresorcinol was prepared by reliable methods and coupled with diazotized 5-nitro-o-anisidine under the same conditions. The synthetic

(Continued on page 22)

TABLE I

| Chain Length | a_0, kX | b_0, kX | c_0, kX | X | B | V | Densities | |
|--------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------|-------|
| | | | | | | | obs. | calc. |
| C_6 | 5.88 | 10.55 | 18.12 | $97^{\circ}40'$ | $98^{\circ}2'$ | $96^{\circ}25'$ | 1.226 | 1.239 |
| C_8 | 5.87 | 10.47 | 21.63 | $92^{\circ}27'$ | $94^{\circ}35'$ | $91^{\circ}47'$ | 1.175 | 1.168 |

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JANUARY EXECUTIVE BOARD MEETING

Chairman: HERBERT R. ERICKSON

The executive board of the Puget Sound Section of the American Chemical Society met January 15, 1947, to get together the members to acquaint them with their duties. Chairman Herbert R. Erickson opened the meeting by having the members introduce themselves.

Various policies of the section and its problems were discussed for the coming year and "greater activity" was the theme of each divisional chairman.

One of the problems discussed was the mailing list and directory for 1947-48. We are lacking complete information on all of our members and a complete list would be desirable for our next directory. It was suggested that cards be sent to members to be filled out. This would bring our information up-to-date. Rodney Willis, Collis Bryan and Robert Scott were elected to compile an improved directory list.

Out-of-town meetings were discussed

and it was recommended that we have a joint Vancouver, British Columbia — Seattle, Washington, meeting, possibly at Bellingham, Washington. A greater contact with the Shelton area was proposed and it was recommended that we have a meeting in Tacoma or somewhere nearer our southern border.

A recommendation was also made to the employment committee to compile and keep information about possible employers and employees.

Our new publicity chairman, Lester Berger, is interested in developing more publicity for our incoming speakers and improving our relationship with local newspapers.

Those present at the meeting were: Chairman, Herbert R. Erickson; Vice-Chairman, Dr. J. L. McCarthy; Secretary, Collis C. Bryan; Treasurer, Dr. Q. P. Peniston; Councilors, George Cady, Roger Harrison; Committee Members, Dr. David Ritter, Lester Berger, Dr. John Meiler, H. Dauben, John Scott, Dr. Vic Sivertz, Fred Armbruster, Rodney Willis and Dr. Edwin Lingenfelter.

Student Activities . . .

Ammonii Socii

Ammonii Socii started the quarter with a meeting, January 14, where plans for the big Mixer were completed and checked. Dick Brooks is chairman of the committee, with Kermit Bengtson, Don Bartholomew, John Mason, Jim Leeds, Spencer Hogg, Bill Rundall and Boyd Snyder assisting him. With Ward Cole furnishing the music, and Brooks and Dan Pastell the entertainment, the dance should be a big success.

It was decided that the possibilities of a ski trip should be investigated, with Dave Whyte appointed to look into the matter.

The general opinion of the group being that a field trip to some local plant specializing in fermentation and distillation combined with fluid flow, in order to determine optimum throughput and absorption conditions there existing, was desirable; Al Wilcox and Bob Keet were appointed to make arrangements.

Iota Sigma Pi

Members of Iota Sigma Pi are busy planning their annual initiation banquet to be held at the Seattle Tennis Club early in February. Chairman of the banquet, Margaret Gano, has announced that the entertainment for the evening will be provided by the pledges being initiated.

Radio

A radio department has been organized by the ACS News Service. Its first program was on WEVD on December 28. This department stands ready to help local sections make effective use of radio for dissemination of news of chemistry and about chemists. Write to James T.

NOTICE: *The Puget Sound Chemist* is anxious to hear more from our neighbors in Shelton, Bellingham, etc. Please contact your editor before the 25th of each month.

Grady, Managing Editor, ACS News Service, 60 East 42nd Street, New York 17, New York.

The Big 12

The twelve largest sections are as follows, the figures in parentheses being the percentage increase: New York, 4,717 (15); Chicago, 3,132 (19); North Jersey, 3,118 (10); Philadelphia, 2,222 (12); Northeastern, 1,698 (23); California, 1,553 (8); Southern California, 1,403 (11); Pittsburgh, 1,316 (11); Delaware, 1,139 (11); Washington, 1,125 (-7); Detroit, 1,010 (10); and Western New York, 923 (5). After being the second largest section for two years, North Jersey was passed by Chicago, which regains the relative position which it held for a long time. The Northeastern and California Sections swapped places, as they did in 1944. The Washington Section dropped from eighth to tenth, and Pittsburgh and Delaware each moved up one spot. The Southern California Section held its position in spite of giving 102 members to the new Mohave Desert Section.

MARCH MEETING

March 14, 1947

SPEAKER

DR. HENRY EYRING

**Dean of Graduate School
University of Utah**

SUBJECT

**"Structure and Mechanical
Properties of Natural and
Manmade Fibres"**



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PROCTER AND GAMBLE INTERVIEWS

Twenty-five years ago a young fellow from Wallace, Idaho, graduated from the University of Washington as a Clinical Engineer. Dr. Tartar remembers him as one of the quietest and most brilliant students to go through the department. After graduation he went to work for the Procter and Gamble Company of Cincinnati, Ohio.

On January 23-24, this young fellow, Mr. T. E. Hall, now Associate Director of the Chemical Division of the Procter and Gamble Company and an authority on the technology of fats, returned to his alma mater to interview a number of graduating chemists and chemical engineers, with the hope of finding several who will fit into the research and development organization of his company.

The Northwest can point with pride to this man and many others who have risen to high places in the chemical world.

Structure Antibiotic Citrinin

(Continued from page 18)

product was found to give only the mono-azo derivative as expected.

Further comparisons between the reported properties of the natural phenolic degradation product and synthetic 2-ethyl-4-methylresorcinol indicate that they do not have the same chemical structure.

1. Coyne, Raistrick and Robinson, *Phil. Trans. Roy. Soc.*, 220, 297 (1931).
2. Sprenger and Ruoff, *J. Org. Chem.* 11. (2) 189 (1946).
3. Gore, Panse, Venkataraman, *Nature*, 333 (1946).

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WESTERN DIVISION OF ACCL FORMED

The formation of the Western Division of the American Council of Commercial Laboratories was announced recently by officials of Laucks Laboratories, Inc., Washington members of the ACCL.

The new division, formed January 18, 1947, in San Francisco, is composed of the following western laboratories:

Abbot A. Hanks, Inc. (San Francisco)
Arizona Testing Laboratories (Phoenix)
California Testing Laboratories (Los Angeles)
Charlton Laboratories (Portland)
Laucks Laboratories, Inc. (Seattle)
Smith-Emery Company (Los Angeles)
The Twining Laboratories (Fresno)
Truesdale Laboratories (Los Angeles)

According to Francis P. Owens, Laucks' representative at the San Francisco meeting, the purpose of the new division is to promote closer relations between the western members of the ACCL. The need for such an alliance has been felt for several years, but until recently there has not been a sufficient number of ACCL-approved western laboratories to warrant the necessary action.

Laucks officials pointed out that the newly inaugurated Western Division will have, as a group, a much greater voice in council proceedings, which are held in eastern cities and attended primarily by representatives of eastern laboratories.

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