The PUGET SOUND CHEMIST

BULLETIN OF THE PUGET SOUND SECTION OF THE AMERICAN CHEMICAL SOCIETY

MARCH, 1950

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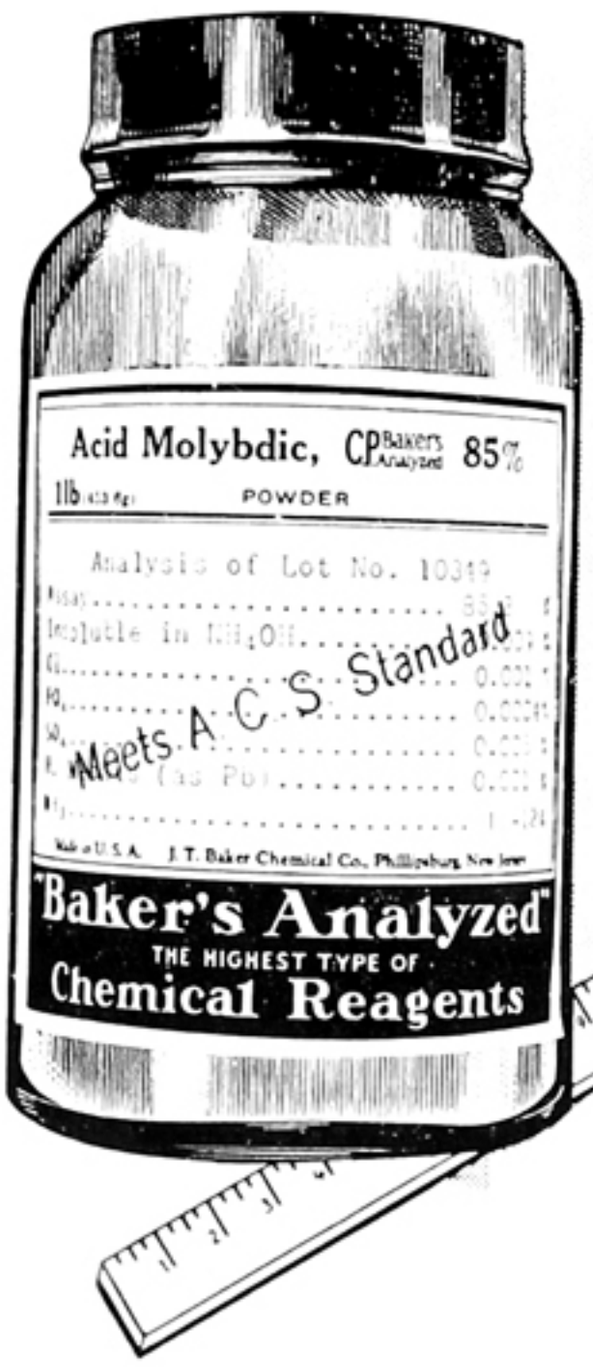

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March Meeting

Puget Sound Section

AMERICAN CHEMICAL SOCIETY

Time

Monday, March 13, 1950, 8:00 p.m.

Place

Seattle, 131 Bagley Hall, University of Washington

Speaker

DR. A. E. FINHOLT, St. Olaf College

Subject

THE COMPLEX HYDRIDES

April Meeting

THURSDAY, 20th

TACOMA

Speaker

DR. J. G. HOOLEY

University of B. C.

GLASS DEVELOPMENTS

Regional Meeting

A.C.S.

at

RICHLAND

June 8 - 9

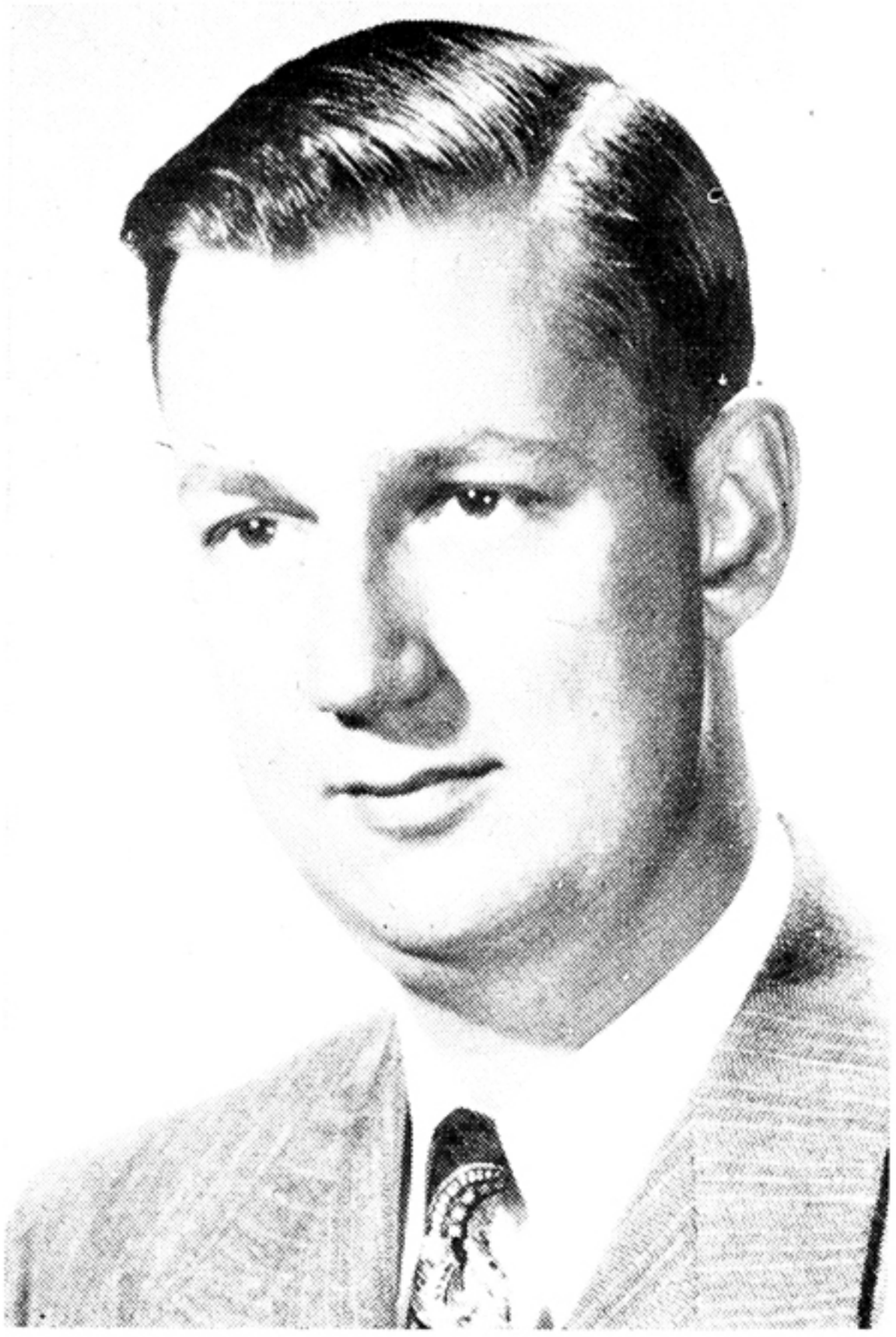
1950

Deadline for Papers

April 15th

c/o VIC SIVERTZ
University of Washington

MARCH SPEAKER



Albert E. Finholt

BIOGRAPHY

Albert E. Finholt was born in Chicago, Illinois, in 1918. He received his A.B. degree at Knox College in 1938, followed by one year of graduate work at Purdue University The next three years were spent with the Sun Chemical Corporation as a research chemist in the field of printing inks.

After a short interlude in the army in 1941, early in 1942 he began work in the field of metal hydrides at the University of Chicago. This research was part of the program of the Manhattan District, the Signal Corps, and the Naval Research Laboratory. He received his Ph.D. in 1946 and joined the staff of the Chemistry Department of the university to become Chief Research Chemist for Metal Hydrides Incorporated. He went in 1949 to St. Olaf College as Associated Professor of Chemistry.

His principal research interest has been in the field of complex hydrides. As a graduate student under Professor H. I. Schlesinger, he aided in synthesis development in the fields of boron hydrides and borohydrides. Later as Associate Director of a Navy project, he became co-inventor with Dr. Schlesinger of the aluminum hydrides and studied their use in both inorganic and organic fields. He has more recently assisted in the commercial production and development of these compounds.

Finholt is a member of the American Chemical Society, Phi Beta Kappa, and Sigma Xi.

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JANUARY SPEAKERS SUMMARY

Prof. Ralph H. Muller

INSTRUMENTATION

To a great extent, chemists have been slow to apply the techniques and tools developed by the electronics industry. This has been particularly true in the field of analytical chemistry. To a large degree, the initiative in the development of new approaches has passed from the academic laboratories to the hands of the biochemists and a few industrial research organizations. This is due, perhaps, to the failure of classical analytical methods to handle many of the complex problems which have appeared, and to the large investments which are often involved.

There are few persons who understand the opportunities presented by modern instrumental techniques and who also appreciate the existence of important chemical problems, the solutions of which are obtainable if one recognizes the possibilities. Dr. Muller is one such person.

Dr. Muller discussed some of the trends in modern instrumentation, considering that theapproach can be divided into four aspects. The first of these involves the use of various transducers, or devices for the primary conversion of the property to be measured into a suitable 'signal'. Methods for changing such properties as light absorption, temperature, and mechanical orientation or stress into electrical quantities were outlined. Thermistors(an element with a high and negative temperature coefficient of resistance) and

strain gages (an arrangement for conversion of mechanical forces into changes of resistance) were described in some detail.

After the primary conversion has been made, some combination of circuit elements is usually necessary for the amplification and/or modification of the signal to a form suitable for recording or control. Counting and trigger circuits were mentioned.

Control over the variable measured may be obtained by the use of servomechanisms. The output from the measurement elements may be caused to apply correcting forces to return the system to the desired state. The technique of feeding back a signal from the restoring force to the detector allows the system to operate on the discrepancy between the input signal and the result obtained in the output. This leads to greater accuracy than usually obtained by the direct amplification of an absolute signal.

Dr. Muller concluded by outlining some of the methods for automatic intercomparison of data, or computation of results from the data obtained. Thus a certain amount of discretion could be exercised by instruments in the control of the processes being followed.

—A. L. Crittenden.

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SEATTLE NEWS

The newly formed organization of the Pacific Fisheries Technologists is attracting wide interest. Inquiries as to membership requirements have been received from as far distant as Honolulu, Hawaii. The inquiry from Hinolulu was made by Mr. Fred Jermann, a fishery technologist at the Hawaiian Tuna Packers, Ltd.

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Washington Laboratories, Inc., organized by George W. Burchard, Jr., in 1940, was featured in the January issue of the "Fish Meal and Oil Industry." The article describes the operations and is accompanied by photographs, two of which show James A. Brown, Chief Chemist, inspecting materials. Also mentioned in the article was the assay system developed at the Seattle Technological Laboratory of the Fish and Wildlife Service.

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Mr. R. W. Harrison of Lyle Branchflower Company recently gave a number of lectures on fishery by-products at the School of Fisheries, University of Washington. Mr. Harrison's lectures were part of a series being given by workers in the field of fishery technology. Other chemists participating in the series are M. E. Stansby, John Dassow, Dr. E. D. Clark, Dr. Soy Clough, Ralph Berglund, and Bruce Sanford.

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OLYMPIA NEWS

The Washington State Department of the Highways has recently been allocated $15,000 for an expansion in the asphalt testing division of the Highway Materials Testing Laboratory at Olympia. This expansion will provide the space necessary for housing additional equipment, which is required for a program of research on asphalt and asphaltic mixtures.

The cement and concrete division of the Laboratory is currently engaged on a long range project for the A.S.T.M. to determine the optimum SO3 content for various uses of cement. Mr. Ward Gooding, Chemical Engineer, cement and concrete, is supervising this project. Mr Bailey Tremper, Research Engineer, is General Director of the Laboratories.

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Mr. Arnold Stokes, a freshman and mathematics major from Walla Walla, Washington, was the winner of the Chemical Rubber Company's award of an engraved *Handbook of Physics and Chemistry* for the highest performance in General Chemistry at St. Martin's College for the first semester. Mr. Stokes is taking a minor in chemistry, and barely nosed out Mr. Arvid Shoblom, of Olympia, chemistry major. Both men are active members of the St. Martin's Chapter of Student Affiliates of the A.C.S.

—Bede Ernsdorff.

SHELTON TECHNICAL MEN HEAR PROFESSOR GERALD

The first of a series of Chemical Engineering Refresher Course lectures was delivered Wednesday, Feb. 1st by Professor C. F. Gerald of the University of Washington before an assembled group of some fifty chemists and engineers residing in the Shelton area. Dr. Gerald's topic was "Fluid Flow" and included a brief review of chemical engineering fundamentals as well as a more detailed discussion of flow rate measurement, friction losses in piping, and fluid flow in beds and towers.

Dr. Joseph McCarthy of the University of Washington will lecture on "Heat Transfer" at the next meeting of the group. The Refresher Course will include four or more lectures and is sponsored by the Oregon-Washington Section of the American Institute of Chemical Engineers. H. L. Crosby is in charge of arrangements.

—Dean W. Balkema.

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OREGON NEWS

The Oregon section of American Chemical Society met on the Willamette University campus, Saturday evening, January 28th, to see and to hear discussed a large number of slides on "Instrumentation." Dr. Ralph Muller of New York University presented the subject in an authoritative and masterly way. A dinner was held on the campus, and attendance at both the dinner and talk was good, in spite of unfavorable travelling conditions.

—C. H. Johnson.

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CHEMICALS INDUSTRY FOR 1950 LOOKS UP

The chemicals industry can look forward to good business during 1950, the U. S. Department of Commerce recently announced.

The Department's January "Chemicals and Drugs" Industry Report states that while demand for industrial chemicals and chemical products are not expected to approach the peaks of late 1948, output of the industry during the coming year should compare favorably with that of 1949. The report reviews recent and anticipated supply-demand situations, by types of products.

Generally, present chemical facilities are adequate to take care of anticipated demands for basic chemicals, and construction activity in the industry is expected to be less during the coming year than in 1949.

With the expected continuing high demand for chlorine, electrolytic caustic soda will, as previously provide the major part of the caustic soda supply, with the slack to be taken up by lime soda caustic production. Demand for chlorine during 1949 was at a record level and taxed even expanded production facilities.

In 1950, capacity of phosphorus furnaces will reach a new high, as plants now under construction come into operation. If the trend established during the past year continues, production of phosphoric acid from phosphorus may reach 1.5 million tons in 1950. Production of chrome chemicals stabilized during the last quarter of 1949, and it is now anticiated that 1950 production will parallel the rate of output in that period Sulfuric acid production increased in 1949, and should increase further in 1950.

Methanol production in 1950 may approximate or may be somewhat lower than the quantity in 1949. Continuing heavy demand for coal-tar dyes in 1950 should keep the volume of output near or above the present level. There probably will be little increase in production of coal chemicals in 1950 over that in 1949.

The industrial alcohol market should remain at present levels of supply, demand and price throughout most of 1950. Additional synthetic production of around 5 million gallons as a by-product of the Fischer Tropsch process plant, due in 1950, will intensify the competitive situation between the fermentation and synthetic processes. It is expected that the 1950 consumption of

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rubber processing chemicals may decline slightly below that for 1949.

Soap is expected to continue to be the major detergent, although the synthetic detergents are increasing in importance, both in household and industrial applications.

Consumption of synthetic organic insecticides is expected to continue at a high rate in 1950. It is anticipated that benzene hexachloride, toxaphene, chlordane, DDT, and methyoxychlor, now well established agricultural insecticide chemicals used in large volumes in 1949, will again be in demand in 1950, with the actual quantity consumed dependent primarily on the degree of infestation. Aerosol sales, which dominated the household insecticide market in 1949, could double in 1950.

The outlook for the paint industry during 1950 is excellent, with sales of products expected to exceed the volume of 1949. Production of chemical pigments may reach a greater volume, with large quantities of the metals available. Carbon black production should continue in large volume with domestic sales increasing though foreign demand possibly will decline.

During 1949 the plastics industry continued to grow and consumption of plastics is expected to move upward with newer products, processes and materials during 1950.

The outlook for the drug industry in 1950 apears to be highly promising. Production of penicillin may reach 150 trillion Oxford units, and of streptomycin, 100 million grams. Several of the newer antibiotics—aureomycin, chloromycetin, bacitracin, and tyrothricin are receiving broader acceptance and should add greatly to the over-all production of the antibiotics group during this year. Production of sulfa drugs staged a come-back in 1949 with the largest output since 1943.

—U. S. Department of

Commerce Bulletin.

PLANS FOR SIXTH NATIONAL CHEMICAL EXPOSITION

The Sixth National Chemical Exposition, by the Chicago Section of the American Chemical Society, will be held in the Chicago Coliseum September 5 through 9, 1950. Since the announcement of the dates was made by Dr. M. C. Rogers, director of research for R. R. Donnelley & Sons Co., who is chairman of the Exposition Committee, a large amount of interest has been shown by prospective exhibitors. Success of the show is assured and detailed plans are now being made.

The Exposition will run concurrently with the 118th national meeting of the ACS in Chicago, and attendance will undoubtedly be well over 40,000. Popular features of previous shows, including the Chemical Trail Blazers and industrial movie programs, will be repeated, and several new attractions are being considered.

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The manufacture of a new product known as the Protecto-Grid has just been announced by The U. S. Stoneware Co., Akron 9, Ohio.

The Protecto-Grid is just a simple thing but a new idea that will be of great interest to any user of laboratory equipment. It fits in the bottom of the sink or on the drainboard and acts as a "cushion" between the sink and the glassware, cutting costs by protecting fragile laboratory glassware from possible breakage.

The Protecto-Grid is an expanded piece of metal completely covered with Tygoflex, a member of the Tygon family. Tygoflex is tough, resilient, and resistant to acids and alkalies but not chlorinated hydro-carbons, ketones or esters.

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JENTOFT Ralph E., 3615 N. Orchard St., Tacoma 7, Wash.

MUHS, Merrill A., 144 Baker Hall, Univ. of Wash., Seattle 5, Wash.

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WHEELER, John B., Jr., c/o Stauffer Chemical Co., 2545 Lincoln St., Tacoma, Wash.

◆ ◆

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THE RESPONSIBILITIES OF THE COMMUNITY TO ITS CHEMISTS

By Otto Eisenschiml

For many years past you and I have been listening to papers on "The Responsibilities of the Chemist to His Community." Such addresses have been given by industrialists, teachers, supervisory chemists and others. Let me say that I, for one, am getting a bit tired of this theme, and I hope you will bear with me when I shift into reverse, and speak about "The Responsibilities of the Community to Its Chemists."

Some time ago a Chicago newspaper featured a front-page story about a newsboy who, at the age of fifty, was retiring with savings of $50,000. His erstwhile customers tendered him a banquet, and toasts were drunk to his continued welfare and prosperity. No doubt the community felt that it had a responsibility toward this exnewsboy. Maybe so. I wish, though, I could recollect a banquet given in honor of a chemist who was able to retire at that age, with or without $50,000.

Now, what had this paper vender done to earn the gratitude of the commonwealth? He had stood at a downtown corner, crying out his "Extra," probably adding the traditional "Alll about the murder on the South Side." To me there seems little of public service in this; but perhaps newsboys, in the very nature of their calling, are so close to literary culture that they deserve special consideration. You may have heard of the old lady who saw a little boy carrying a stack of papers across the street.

"Don't these papers make you tired?" she asked.

"No, ma'm," was the reply. "I only carry these papers, I don't have to read them."

Which illuminates the cultural aspect of the newsboy problem.

Can it be that without the shouts of that man who had made it his life's career to fill a boy's job, his customer's would not have bought papers at all, and that this made him so impotrant? What other justification was there for the distinction bestowed on him?

Let me select another and more recent news item. When Ethel Barrymore celebrated her 70th birthday, she, too, was feted at a banquet. Congratulatory telegrams were showered on her, many of them from high-placed personages. in substance they said that all Americans owed the celebrated actress a debt of gratitude for having provided them with much worthwhile entertainment.

Far be it from me to begrudge Miss Barrymore her bouquets. I hope she lives to be a hundred and continues to delight her audiences. But do we ever hear of public celebrations for chemists, just because they have reached the age of three-score and ten? When Dr. Alexander Fleming, the discoverer of penicillin, visited Chicago a few years ago, he was given only a short notice on the back page of our papers. Hundreds of thousands have been benefited by his work and, while not exactly being entertained, they owed him their lives or those of relatives or friends. What is more precious, an hour of pleasant relaxation or human life? And to whom does the community owe the greater appreciation?

Human nature being what it is, the community will pay homage to those who clamor for it, and withhold it from those who do not. During the late war, I happened to be lecturing in Nebraska, and a judge out there maintained that it was the lawyers of America who were winning the war, because they were drawing up the rules for our war industries. Then, shortly after V-J day, the advertising men of America held a convention, and the messages they received conveyed the thought that it was their slogans which had really done the trick. The chemists were neither active

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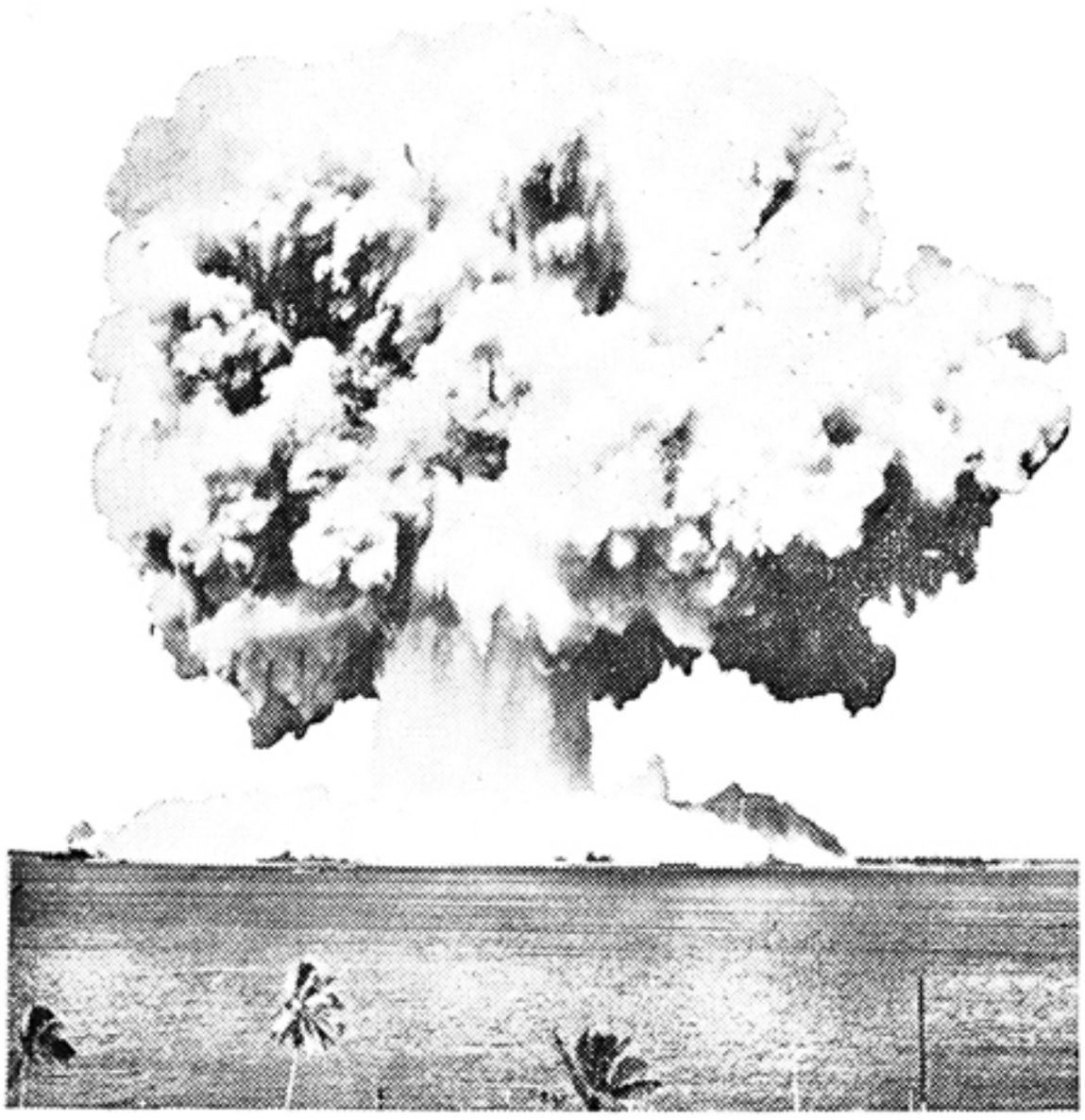

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in presenting their claims, nor successful in having them recognized. Perhaps they believed it to be common knowledge that they had produced the octane gasoline which helped give us air supremacy, overcame the fatal rubber shortage, developed the incendiary bombs which ate into the vitals of our enemies, and that they had conquered a thousand and one other war problems which called for immediate and correct solutions. In spite of all this, the community passed the chemists by, adjudged them non-essential, and drafted them as rifle bearers, not only during the war, but even long after the firing had ceased

Let us not blame the community for its ignorance regarding our profession. What we call the public mind is a complex structure made up of millions of personal opinions. It cannot be expected to function properly unless it is properly informed. It is our fault, your fault and mine, that this information has never been successfully formulated and distributed. We constantly talk about chemistry, but we rarely talk about chemists. The public has been well educated to the fact that chemistry is a useful science, in war as well as in peace, but chemistry as such can no more be understood than the movie industry can as a mere industry. What people understand are, first of all, human beings, stars such as Clark Gable, Ginger Rogers, Van Johnson; next, they can understand the drama of events. This may explain why the moving picture industry occupies such a high rank in the public mind. Other professions profit by the same factors. After an operation, do you hear a patient say that his appendix was removed by medical science? Of course not. He mentions his doctor by name, and then describes his operation. In contrast, we chemists, who can supply interesting people and fascinating dramas wholesale, keep on singing the trite and tuneless song called chemistry. Chemistry, we say, has furnished the world with another wonder drug, or from the laboratories of this company licious nature threw into their path, and has come another great discovery. No one can visualize chemistry, and a laboratory is nothing but a pile of bricks with some equipment in it. No wonder the lay public thinks making chemical discoveries is neither more intriguing nor difficult than making hamburgers. You buy a sausage grinder, fill it with meat, and after a few minutes you have a hamburger. Similarly, a man goes to college, graduates, spends some time at a bench, and out comes a discovery. No one cares about the obscure human being called chemist, who sweats and worries, tosses sleeplessly at night, suffers set-back after set-back and finally, through ingenuity and persistence, may or may not emerge with a finished laboratory product. But the road ahead is still full of holes. His process must be put through a pilot plant, where new disappointments await him; and after the pilot plant has confirmed his findings, large-scale production follows with more problems and more grief. At last victory is in sight, and what happens? The papers announce in three or four lines that the So-and-so Company has developed a new product; that is all. The chemist's name is rarely, if ever mentioned, nor is it missed. The epic of what has happened backstage to make the new product possible remains unwritten.

No one will deny that chemists have made and are making history; but how can history be interesting unless we cite names and events? Eliminate Caesar, Hannibal, Napoleon or Washington from our books, and who will read them? Aside from wanting to hear all we can about their personality we want to know what plans they evolved in their minds, how or why they triumphed and, if defeat was their fate, how and why they went down with their cause.

If we want to make chemistry intelligible and interesting, we must stop dealing in generalities. We should portray each chemical advance with its full, colorful background; we should introduce the active participants as individuals, picture the obstacles which a ma-

the process of reasoning and experimenting by which these obstacles were overcome.

The mere statement that Pasteur was the father of bacteriology would carry no punch. But if you study his life, or see the moving picture of which he was the hero, you get an idea of what a great chemist has to go through before he wins out. Admittedly, not all chemical discoveries are world-shaking like Pasteur's, but many of them are important, and even the lowliest of them is an interestiig story which needs be told, if we want to give the public a realization of our work.

Let me use some illustrations. If I should ask you, ladies, what the name Wallace H. Carothers conveys to you, would you know? Well, Carothers was the chemist to whom you owe your nylon stockings. Ask your enlightened friends who discovered the aniline dyes which beautify your dresses or the vitamins of which you hear so much, or even the common, every-day aspirin. When Grant rode to meet Lee at Appomattox C.H., he had such a headache that he hardly managed to stay in the saddle, but at that time all you could do with a headache was to take it to bed with you and sleep it off. Today we swallow a couple of tablets, and the headache is gone; but the discovcrers of aspirin have been forgotten, if ever they were known. And that also goes for vitamins, stainless steel, artificial leather, ethyl gas, and hundreds of other inventions which have sprung from the minds of chemists and are constantly contributing to our health, wealth and comforts of life.

The seasickness drug Dramamine, which was invented by the Chicago chemist John W. Cusic, was given wide publicity by newspapers and magazines, and the physicians who tried it out were prominently mentioned. Even the patients, on whom the new drug was used, saw their names in print. Yet nothing was said about the chemist whose inventive genius had made this echievement possible.

What was one of the principal reasons why the British Spitfires won the Battle of England? They outflew the German Messerschmitts. And why did they outfly them? Because the American chemists V. N. Ipatieff and Herman Pines had developed the 100 octane aviation gasoline. Yet, mention their names to a layman, and he will ask with raised eyebrows, "who, pray, are they, and what have they done that I should know them?"

Would you believe that in the whole city of Chicago not a single street, park, library or scohol is named after a chemist? In the stock yards district where they are so proud of telling you that the only unutilized part of a pig is its squeal, the chemists who brought about this miracle of chemical perfection are not remembered, and the streets out there do not bear the namesof pioneer packing plant chemists like Richardson, Loewenstein and Schmidt, but those of dead real estate speculators or their obscure sweethearts.

In all of our great city only one monument is dedicated to a chemist. It is not much of a monument; it is only a boulder, and stands modestly at the wayside, as you might expect. The name of this chemist was Samuel Guthrie, and the world is indebted to him for the discovery of chloroform. He did not cry out his wares at a street corner, he did not entertain people, but he saved millions from untold agonies. And, since a chemist lives an anonymous life it was perhaps thought that he should also remain anonymous after death, for his name was not engraved on his memorial until a few years ago, and then it was not the City of Chicago, but the American Medical Association which put it there.

I have on fault to find with those who stress the responsibility of the chemist tc his community. By all means, let him serve his fellow citizens to the best of his ability. I only would like to see a similar gospel spread among other professions and trades as well. Why we chemists have singled ourselves out to

apologize for the very breath we take and the bread we eat will always be a puzzle to me.

Responsibility is a two-way street, and I venture to say that on balance we chemists are putting more into the community pot than we are taking out. Not that we as individuals are more altruistic than others; but in the very nature of our work we must continuously invent, improve or cut costs for, unless we do, we starve. Once the public understands this, the question of who owes whom will resolve itself automatically; and if we present our case fairly and convincingly, the people among whom we live will realize that their responsibility toward chemists outweighs the responsibility of the chemists to them.

Our duty to the community can best be discharged by making our fellow citizens better acquainted with the part we as individual chemists play in their lives. It will redound to their benefit, as well as to ours.

When and if this happens, and not before, will the chemical profession be accorded the place it deserves, which, I maintain, is close to the head of the human procession.

◆ ◆

The time is coming when scientific research—provided that we are active in using the results and that the subjects of research are righly chosen—should be recognized as the most essential and vital of all the processes of production.

NOTICE!

BY-LAWS AMENDMENT

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To Be Voted On At May Meeting

●

"The Library Committee Shall Be Removed From the List of Standing Committees"

SYNTHETIC WAXES

A new 16-page catalog describing the newer synthetic waxes is now ready for distribution by the Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N.Y. This contains tables giving solubility, specific gravity, melting point, color, flash point and acid value and use data.

The synthetic waxes described are commercially pure products of the amide and ester types. They range in melting point from 133°F (54°C) to 285°F (142°C). In general they are light colored, hard, non-tacky waxes although special plastic, adhesive products are also available. The solubilities of the individual waxes range from water-insoluble and, in a number of cases, even solvent insolubility to water-dispersible (no additional dispersing agent being required) and solvent-soluble.

◆ ◆

Few things are harder to put up with than the annoyance of a good example.

STARTING A CHEMICAL SPECIALTY BUSINESS

H. Bennett, F.A.I.C.

President, Glyco Products Company, Brooklyn, N. Y.

Many chemists have gone into business for themselves. Some have been successful, others have failed.

Starting a new business, either small or large, is a serious undertaking that will take time, money, and intelligent surveying and planning. The latter is the most important factor. If you were starting on a chemical problem, you would first make a literature search. (A bibliography is given at the end of this article.) Ths should be part of your plan.

Just as you would discuss a research project with your group leader, technical director, and your development or sales executive, similarly you should discuss your proposed business project with all who may be in a position to give you information. For manufacturing a new product, conversations should be had with equipment, container, and raw material suppliers, distributors, dealers, and users. A lawyer, banker, and accountant should also be consulted. If indicated, an advertising agency should be included in the survey.

The data obtained from the above search should be assembled and critically studied. Before making a final decision, discuss your findings with an experienced business man and a chemical executive. It is far better to err on the side of caution and delay, at this stage, than to assume that everything will work out all right. A business which is worthwhile starting today will usually be as worthwhile a few months hence.

No one individual is equally gifted in all directions. He may be an excellent chemist and a poor executive. Such an individual should consider teaming up with a man of executive caliber. Sharing profits two ways is better than standing all of the losses.

Successful businesses have been started in the depths of depression, during boom times, during every season of the year and in many different parts of our country. The same can be said for businesses that have failed. Thus there is no ideal time or place for a start.

The essential difference between working as a chemist and being in business for yourself is that your scope and duties will no longer centralize around a laboratory bench. It will no longer be of a paramount importance that you are a very good organic chemist. It will be of prime significance that you can analyze a business problem and come to a cleancut and logical conclusion in a minimum of time and then take the immediate necessary action. All your conclusions and actions will not be right. If your mistakes are chiefly minor, then your chances of success will be greater.

Your business problems will include, among others, purchasing, manufacturing, packaging, selling, financing, accounting and legal matters. Since neither you nor anyone else can be an expert in all of these fields, recourse must be made to suitable sources of information and counsel. Time and money spent in this direction will often avoid costly mistakes if not complete failure.

Thus far we have spoken in general terms. To be specific, let us suppose that you have an idea for a general-purpose adhesive that seems to have some outstanding properties. It consists of a plastic copolymer, resin, plasticizer and solvent. The manufacturing process is one of simple agitation.

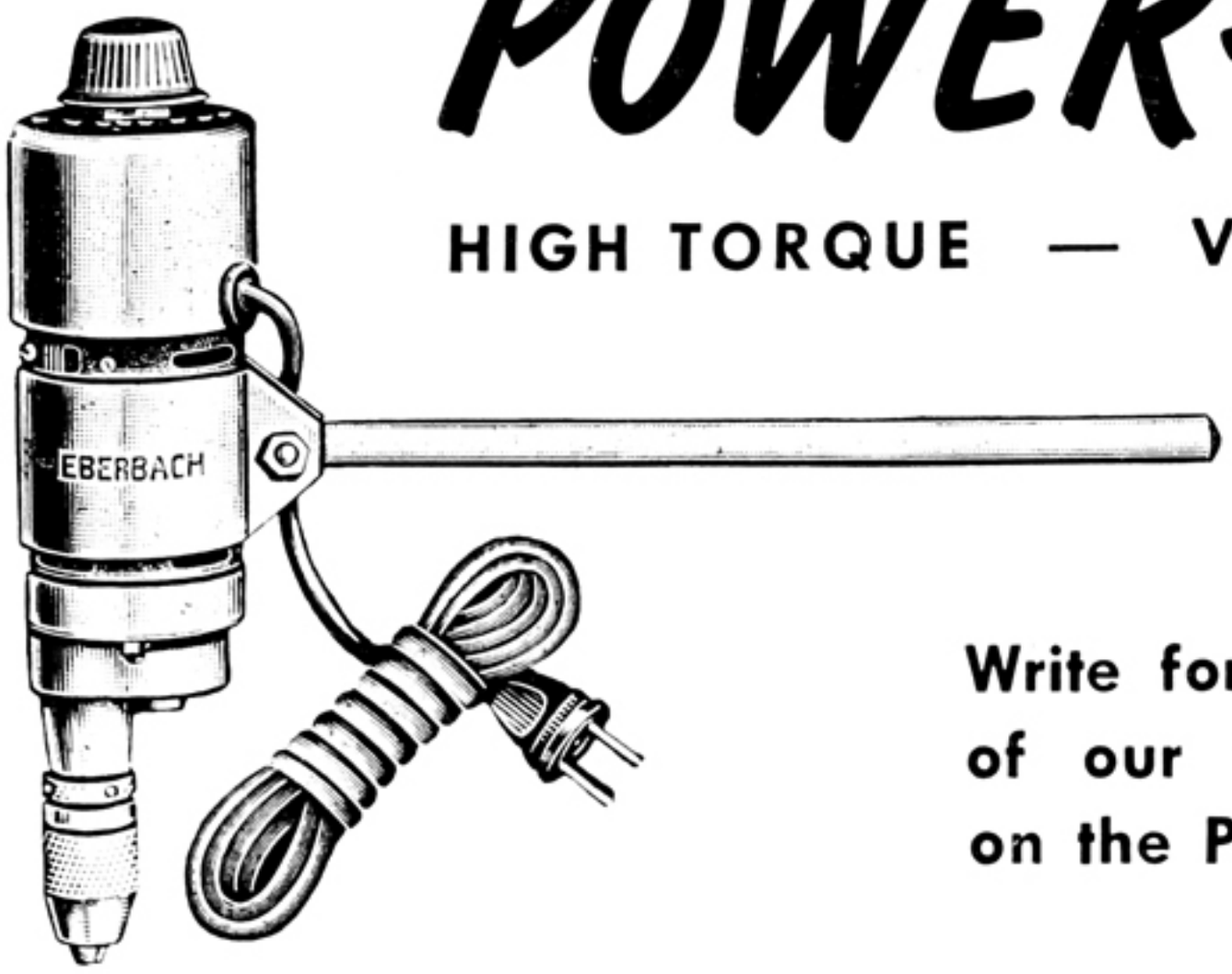
Various phases must now be considered before going into this business:

A. Marketing Survey

1. Evaluate its possible uses in
   a. Industry.
   b. Office
   c. Home
2. Compare it with competitive products in
   a. Price
   b. East of use
   c. Durability
   d. Aging characteristics
3. Estimate volume that could be

POWER-STIR

HIGH TORQUE — VARIABLE SPEED



Write for a Copy of our Literature on the Power Stir

58920 POWER-STIR, VARIABLE SPEED. Through 15 to 1 gear reduction this small stirrer develops unusually high torque. The universal, continuous duty motor is resistance controlled; without load speed range is 450 to 1200 r.p.m.

Handy mounting rod 9" by ½" facilities adjustment on any support to meet operators' individual needs. Stainless steel propeller stirring rods listed below are held by adjustable chuck. Plastic knob controls built-in rheostat. Built-in fan and duct system cool the unit.

An off-on switch is built into housing; overall height is 9½" without paddle; weight is 3½ pounds. Approx. 1/20 H.P. Operates on 115 volts 60 cycle AC or 115 volt DC. $24.50

58921 STIRRING RODS, Propeller Type, 18-8 Stanless Steel. Have ¼" shafts and 2½" diameter propellers.

Shaft length:	12"	18"	24"
Price, each:	2.25	2.50	2.75

SCIENTIFIC SUPPLIES COMPANY

122 Jackson Street **ELiot 1134**

Seattle 4, Washington

sold by *you*
   a. Initial sales
   b. Repeat sales
4. What type of sales effort will be needed
   a. Salesman
   b. Direct Mail
   c. Advertising
   d. Distributors
   e. Dealers
5. Packaging
   a. Bottle, tube or can
   b. Cardboard container
   c. Label and Use booklet
   d. Display container
   e. Protective shipping carton

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The above marketing survey plan can be extended or shortened, but it is a "must."

B. Financing

The initial capital required for a business of this type may vary from a few hundred dollars to thousands. The first step is to project how much money will be necessary for all needs for a period of six months to a year. It is here assumed that this length of time will be required before a fair profit will appear. Under no circumstances should you invest all of your money or that of your associates. If this business should fail, you will at least have half of your money left. Do not depend on promises of friends and relatives to lend you money as you need it. They may be sincere, but when the time of need comes they may not have funds available. Borrowing from banks or other outside sources should not be counted on. Bankers and business men, as a rule, do not lend or invest without security or *assured* good prospects. The time to get financing is before you start. Then, if it is refused, or promises for the future are made, you can decide whether or not to take the risk. Of course, a going business can get financing more easily, but weare concerned with a new business here.

C. Costing

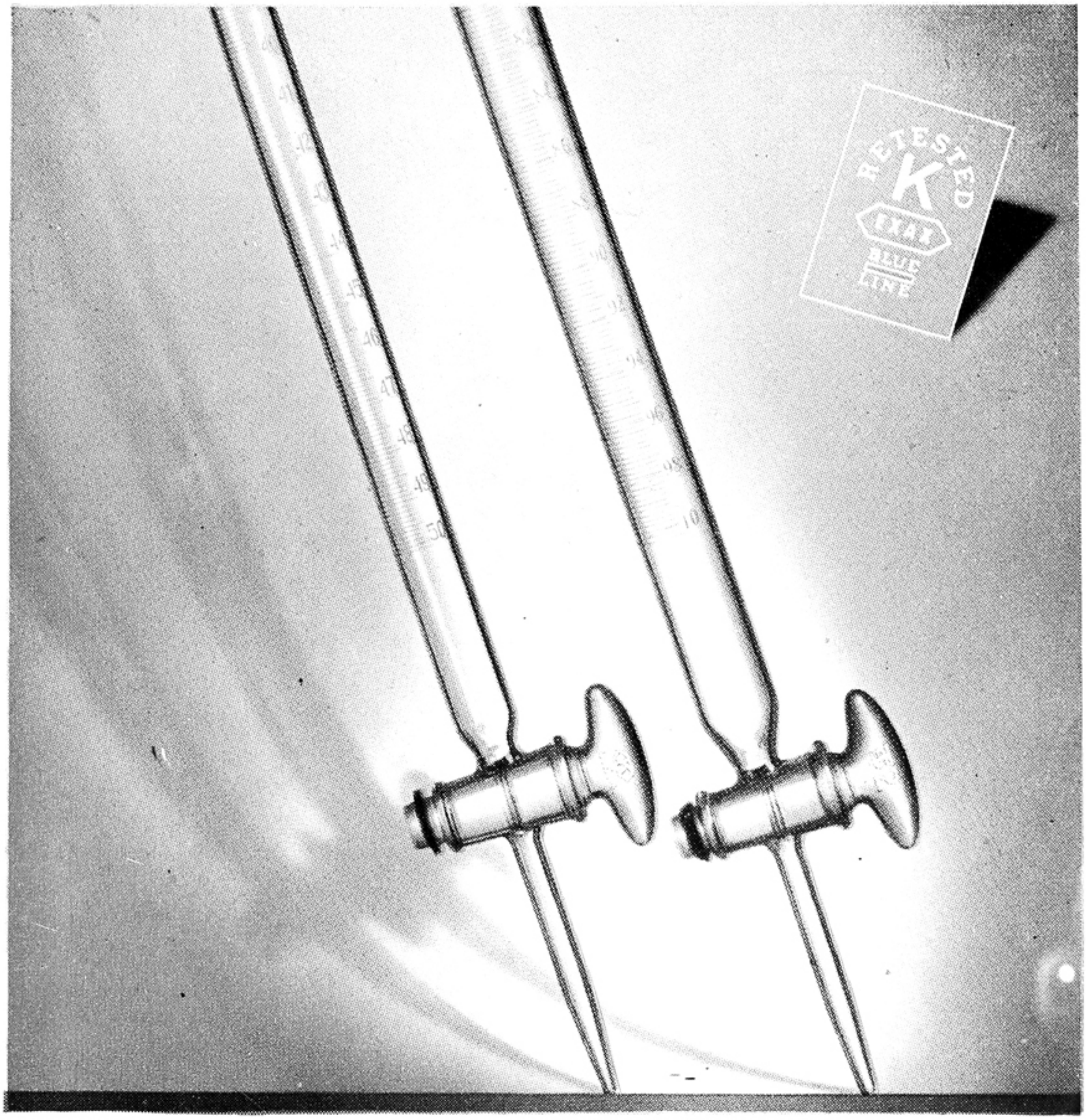
An accurate estimation of costs is not possible until you have been in business for some time. An estimated cost can be projected from the costs of raw materials, yields, containers, labels, cartons, delivery charges, selling expense, overhead, your salary, etc. It is desirable to get an accountant to set up a costing plan here and a simple accounting system before the business is started. While your initial costs may be high because of small scale purchases, it is desirable to figure costs based on quantities to be used in actual commercial production.

D. Factory Space

You should preferably rent rather than buy a factory. Whether it is to be a loft or a building depends on many factors. Its location will be determined by rental (or cost,) distance from customers, raw materials, neighbors, etc. The floor plan should be such as to lend itself to efficient manufacturing, storage, and office operations. Light, ventilation, and low fire hazards are important. Facilities for incoming and outgoing shipments should be surveyed. The floor should be of proper construction for any heavy equipment and of such a nature as to facilitate cleaning and passage of trucks, etc. Extra ceiling height is useful where stacking of containers, etc., is intended. A ground floor is to be preferred to an upper floor. Yard space is useful for storage of drums or for sinking a solvent tank. If a sprinkler system is present, insurance rates are considerably lower. Check the kind of electricity available against the motors you will be using. If inflammable solvents are to be used, check against all inherent fire and explosion hazards. Have an attorney go over the lease for the premises to try to protect you against unseen pitfalls.

E. Equipment

Whether you buy new or used equipment, try to do business with a responsible dealer who can give you technical service. After you have determined the capacity and type of equipment needed, lay your problem before the latter and get his recommendation. Then discuss this with other competent people. In planning an equipment layout, make cardboard scale models and place them



Kimble Exax Retested Burettes
Sturdily constructed and fully annealed

Shortage and delay are over

Ware as accurate as Kimble Glassware can't be rushed. Its manufacture cannot be entrusted to other than care-taking and long-skilled hands. So perhaps you haven't been able to get all you wanted.

But again you can get, without delay, the sturdy, clear, carefully annealed—and, above all, highly accurate—Kimble Glassware you know so well.

For example, the burettes you see here are machine-made, with uniform bore and thick walls. We mark them with utmost care, etch them deeply, and fill the calibrations with durable, fused-in contrasting filler. Then the markings are retested for accuracy.

• • •

With Kimble Glassware again readily available, you will want to specify Kimble whenever you order from your Laboratory Supply Dealer.

KIMBLE GLASS TOLEDO 1, OHIO
Division of Owens-Illinois Glass Company

in a scaled space equivalent to the factory you will occupy, showing columns, doors, windows, etc. Try to visualize all conditions as to loading, emptying, packaging, storing, and have others look at and criticize your plan. All changes require time and money. Better take extra time in this phase than later.

F. Containers and Packages

Suppliers of containers and packages have a wealth of information as to the best type for your purpose. Give them full information as to your requirements. Then they can give you sample containers, packages, and cartons. A good printer will help you design labels and use literature. Make up a few units and have them examined by salesmen, dealers, etc., for suggestions.

G. Raw Materials

Uniformity of raw materials is of prime importance. Sources of supply that will supply products according to fixed specifications should be found. Deliveries should be made when you want them or you will have to buy ahead to avoid a shutdown. Proper storing of raw materials to avoid deterioration due to heat, cold, light, etc., must be recognized. Legal restrictions on quantities and types of inflammable solvents and methods of storage and handling must be ascertained.

H. Manufacturing

If process heating is needed, a source of steam is necessary. Whether the fuel is to be gas, oil, or coal (unless steam can be bought), what type of boiler is to be used requires careful study. Whether manual or mechanical controls are to be used on processing vessels is another problem. Proper safety provisions for guarding moving parts, protection from fire and explosion hazards, and good housekeeping (cleanliness) must be provided. All materials used must be measured or weighed and carefully checked to avoid spoiling products. Small batches should first be made on a pilot plant scale before going into commercial production. Control tests should be set up for checking all finished products.

I. Introducing a Product

One or all of the following methods may be used:

a. Sampling
b. Direct Mail
c. Newspaper or Magazine Advertising
d. Radio
e. Demonstrations in Stores
f. Displays in Stores
g. Salesmen
h. Distributors
i. Exporters

Space does not permit further detail on the above and other important factors. Such detail can be obtained from the references at the end of this article. All of the above may lead you to believe that starting a new business is very hazardous. It is. So is a long term research project. Yet some are successful. You, too, can be successful if you go about it in the right way.

◆ ◆

Salesman: I want to see someone around here with a little authority!

Chemist: Well, I have about as little as anyone. What is it you want?

CONTAMINANTS

There was a young chemist named
Myrtle
Who wore a neoprene girdle
She ate this and that
Grew impossibly fat
Finding boy friends for her is a
hurtle.

◆ ◆

A guy with a hangover was leading an eight-legged dragon down the street on a leash. The creature kept stopping at every fire plug and finally the exasperated owner jerked the leash and growled, "Come along, now, or I'll take an aspirin and you won't be here."

◆ ◆

A group invented an atom bomb so powerful that it would destroy the world. They couldn't resist trying it just once. When the smoke had cleared away, the only thing left alive on the face of the earth were two monkeys somewhere in Tibet. The male monkey leered at his companion and said, "Well, shall we start the whole thing over again?"

◆ ◆

Do you remember the Scotchman who wouldn't buy his girl a parasol when he took her to the beach, but told her shady stories instead?

◆ ◆

Alaskans tell of the bartender in a Nome saloon who handed a glass of crystal clear water to an old sourdough and asked for an opinion on it.

With a wry face, the sourdough forced half of the water down his gullet and then with a shake of his head, said:

"Can't spot it at all, but don't put in a big stock. It'll never be a popular drink."

◆ ◆

"What did you do when her dress started coming off?"

"I helped her out the best I could."

DR H S BENNETT
DEPT OF ANATOMY UNIV OF WASH
SEATTLE 5 WASH