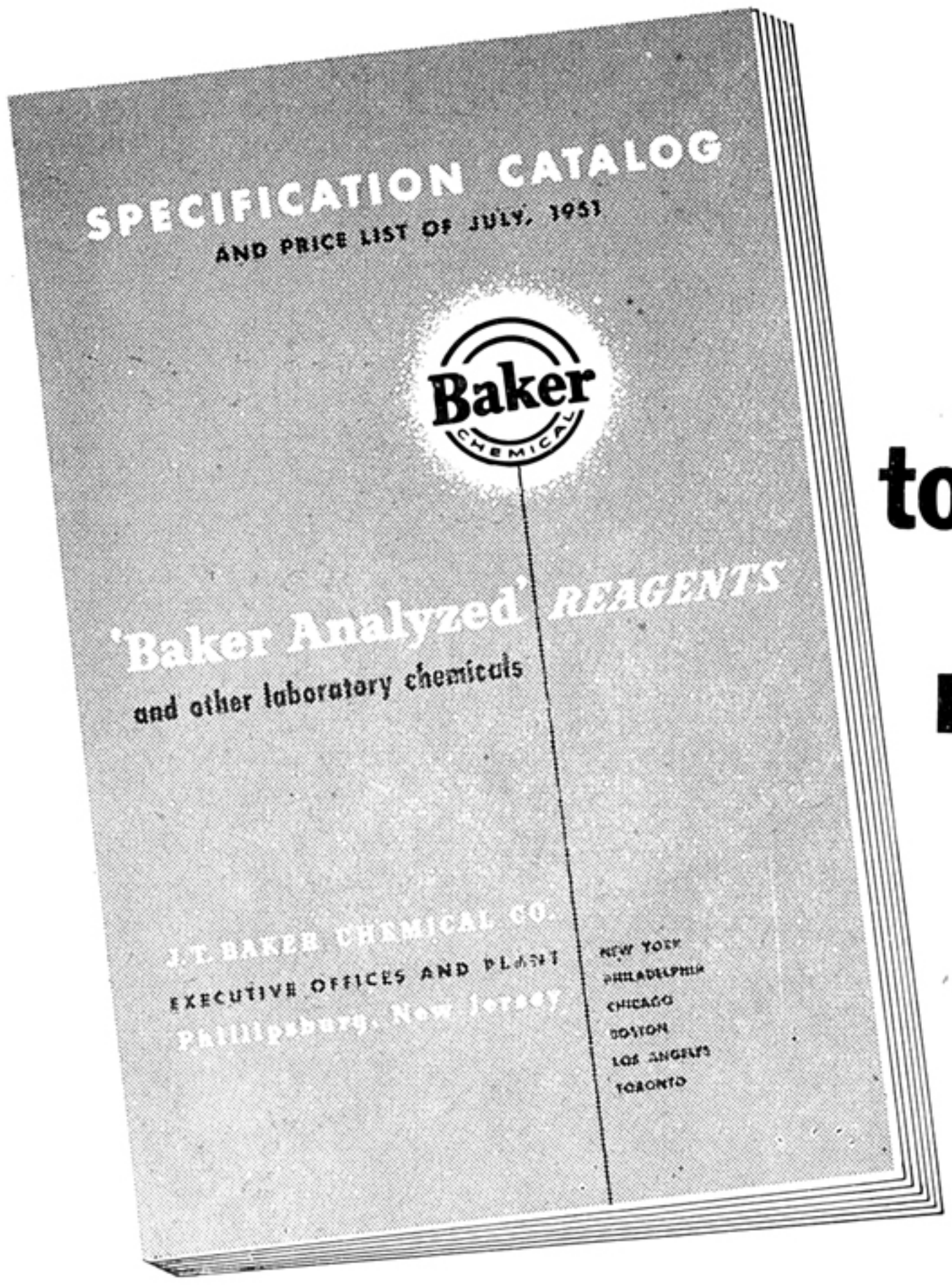
Season's Greetings

The

PUGET SOUND CHEMIST

BULLETIN OF THE PUGET SOUND SECTION OF THE AMERICAN CHEMICAL SOCIETY

DECEMBER, 1951



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The PUGET SOUND CHEMIST

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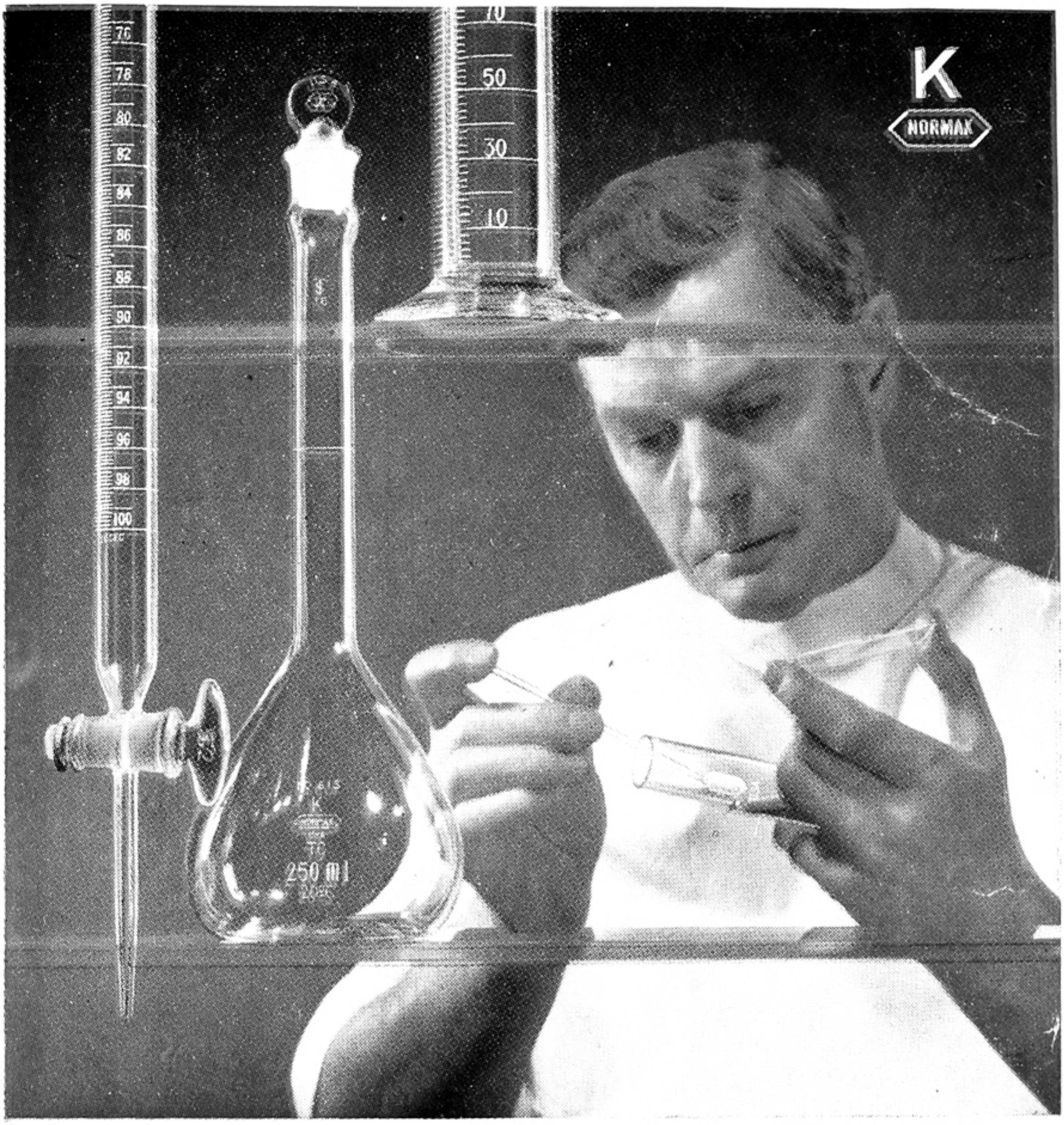

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HOW TO DO RESEARCH

(This article is reprinted from The Southeastern, which reprinted it from the Alembric where it appeared as a revision of an article in Chemunications whose editor acknowledges an article in Witcombings whose editor offers an apology to an author whose name has been forgotten.)

Research is easy and straightforward particularly to an outsider, but being within earshot of the big names of Research it becomes easy to offer general objective unbiased advice. From a brief but intensive study of the subject, research appears to consist essentially in repairing leaky condensers, calibrating weights, checking short circuits, replacing rubber tubing, stabilizing vacuum apparati, and scooping yields off the lab bench.

In order to do research, you must have ideas. One idea is sufficient. A second idea is apt to contradict the first and may get one in trouble. In any case never change your opinion regardless of how stupid it may seem. In time people may get the idea that you might have something on the ball and will respect you. Ideas are easy to get. If you haven't any of your own, there are several prolific sources (1) Ask one of the salesmen. Their one main attribute is the ability to talk at the slightest provocation. At least their jokes are good. (2) Ask the officers of the company. They know just what should have been done if certain responsible persons had been on the job. (3) Attend a scientific convention and learn the problems others have studied and failed. Solve them. (4) Consult the janitor.

Don't check Beilstein for you'll probably find the problem has been solved in 1820. There is very little that is original anyway.

Regardless, it is not always necessary to have an idea. Just put up some apparatus, the more complicated the better, and get an assistant to run the experiment, it adds to prestige. Start collecting data over various temperature ranges, in Centigrade never Fahrenheit, for that is the earmark of a poor research man. The readings should be plotted against other numbers that must be selected at random. By all means extrapolate the data to—274.1441 degrees Centigrade. This is a must. If you get a straight line the conclusion is obvious. If you get a curve, plot the data on semilog graph paper, everyone else does. Determine the slope which is significant and develop a theory, it is befitting that you present the theory before some important scientific society. Always present a few slides which can be shown at embarrassing moments. A slide with only one curve might be too easily understood. Therefore at least eight curves are necessary for camouflage. At least one person will mistake this for a spiral nebula which might get you membership in some astronomical society, if nothing else.

When presenting your talk, first write nine long equations on the blackboard. Memorize the equations before-hand if possible. The success of your talk depends on the number of people you can shake off at this point. Someone will call your attention to the fact that the fifth term of the second equation should have a minus sign, which you can obligingly change, since it doesn't mean anything anyway. Make several references to prominent names in the industry. This always creates a favorable impression and automatically infers a tremendous amount of library research on the problem.

Dwell at length on the sub-electron, the micron, and the tendon; covering briefly such unfathomed particles as the neutino, and the always elusive doubly charged ekaproton.

Now is the time to spring the surprise and you must coin a new name for the particle in your theory. The more elaborate the name, the better will your reputation improve. As an example we suggest—"The Zenatron-The limiting charge of an electron correlated with mass as the particle assymptotically approaches

(Continued on Page 13)

New Clue To Cause of Diabetes

Terre Haute, Ind., November 26—Chemits hunting the cause of diabetes in human beings have picked up an abandoned trail which, they now suspect, may lead to final solution of the problem, the Wabash Valley Section of the American Chemical Society was told tonight. The meeting was held at Indiana State Teachers College in the Chemistry Lecture Hall.

The new research is focused on a chemical called alloxan, which is employed in the laboratory to induce diabetes in experimental animals, Dr. R. Stuart Tipson, senior fellow in organic chemistry at the Mellon Institute of Industrial Research, Pittsburgh, explained.

It now appears possible, he said, that alloxan could be formed by the human body itself under certain conditions, and this may mean that the chemical is the key to human diabetes—although he emphasized that this is only a theory and that much more research will be needed before it can be accepted as an explanation of the disease.

Research in the past had shown that alloxan causes convulsions, excess sugar in the blood, permanent diabetes and even death when injected into experimental animals, according to Dr. Tipson. As a result of this research, it was thought some years ago that alloxan formation by the body itself might be connected with the cause of human diabetes. Later experiments indicated, however, that the material decomposed so easily that it seemed incapable of causing serious harm.

Recent work has suggested that this conclusion may be erroneous, Dr. Tipson said. He found that body conditions may be such that alloxan can be retained in its toxic form.

However, Dr. Tipson stated, further experiments must be performed before it can be known with certainty that alloxan is present in the body of a person suffering from diabetes.

Alloxan is closely related in chemical structure to vitamin C, the anti-scurvy vitamin, Dr. Tipson reported. Non-toxic forms of the chemical are found in beets, broad beans, vetch seeds and also in the vitamin riboflavin.

In stressing that it has not been proved that alloxan formed in the body is the cause of diabetes, Dr. Tipson said:

"Nobody knows what actually causes diabetes. There is no way of preventing or curing this disease."

The only weapon against the disease at present is the hormone insulin, which restores the proper sugar level in the body, according to Dr. Tipson, who added:

"Sometimes the symptoms of diabetes follow an injury about the base of the skull, severe worry, or a nervous shock of some kind. It has been noted that overheight is a frequent fore-runner of diabetes in the child, indicating a relation with the pituitary gland."

Pituitary gland extracts have also been used to cause diabetes in animals, Dr. Tipson said. It is thought that the gland secretes an "anti-insulin" harmone which slows or stops the formation of insulin in the pancreas.

"It is estimated that there are two and one-half million people in the United States today who have, or will develop diabetes," he asserted. "Approximately one out of every four persons is a diabetes carrier."

"A predisposition to diabetes may not be revealed until late in life, or the disease may not be recognized until long after it has developed. By 1980, if mortality rates continue to follow the present trend, deaths from diabetes will be exceeded only by those from heart disease. Increased longevity of the population as a whole explains this trend, because diabetes is most frequently found in women past middle life, although no age is exempt."

★

Johnny: Dad, I put a stick of dynamite under the teacher's chair.

Dad: What! Go right back to school and apologize.

Johnny: What school?

OREGON NEWS

Dr. James B. Conant, president of Harvard University, was the principal speaker at the Seventy-fifth anniversary celebration of the University of Oregon on November 2. Dr. Conant spoke on "University Education and National Security." He stressed the fact that the great strength of our country lies in the diversity of our opinions. He said that, with the single exception of card holders in the Communist party, he maintained that a professor's political views, social philosophy or religion are of no concern to the university.

With regard to military service for men, which he feels is inevitable, he said that the universities should make adjustments as they did after the last war to let men who have completed their service take up their studies with a minimum of disruption.

The American Chemical Society was represented at the celebration by Dr. A. H. Livermore, of Reed College. Seattle University was represented by its president, A. A. Lemieux and the College of Puget Sound by John D. Regesten.

★

Dr. Myer Horowitz, who completed work for his Ph.D. this summer at the University of Oregon, has received a fellowship from the National Foundation for Infantile Paralysis. He will work with Dr. F. J. Reithel on enzyme problems related to energy transfer in biological systems.

★

Dr. Robert B. Dean has received a grant from the National Institute of Health for a study of the adsorption of anesthetic "gases" on monolayer systems. He is assisted by Kenneth Hayes and Roy Neville both from Professor N. K. Adam's laboratories in Southhampton, England.

★

Dr. D. F. Swinehart has received a grant from the Atomic Energy Commission to enable him to build a Nier type mass spectrometer for the study of reaction rates in gaseous systems. He will be assisted by Robert O. Engh and William D. Clark.

ST, MARTIN'S COLLEGE

The Department of Chemistry at St. Martin's College has received a renewed Frederick G. Cottrell grant-in-aid from the Research Corporation of New York, according to an announcement made by the Right Reverend Raphael Heider, O. S. B., President of the College. The grant was made for the continuation of a research project inaugurated last year under the direction of Dr. F. E. Horan, Jacob P. Rettenmayer Associate Professor of Chemistry, at the Olympia College. Doctor Horan is using the novel technique of ultrasonic vibrations to break down the large starch molecule into smaller fragments in order to learn more about the architecture of that important food-stuff.

An original grant last year from the Research Corporation financed the purchase of the necessary expensive apparatus and a research scholarship for James E. Baxter of Port Angeles, who graduated last June, and is now with the Air Force. Part of the fund granted this year will be allotted by the Department of Chemistry to another undergraduate chemist to assist Dr. Hogan in there research. Bernard Steckler, graduate of Marquette High School of Yakima in 1949, has been selected to receive this scholarship. Mr. Steckler, a junior in chemistry, divides his time between the chemistry laboratories and the Music Hall as a member of the popular College Glee Club.

This is the third award made by the Research Corporation for research in the Chemistry Department at St. Martin's. In 1949 a Frederick Cottrell grant was given for the inauguration of studies in synthetic organic chemistry under the direction of the Rev. Bede Ernsdorff, O. S. B., Professor of Organic Chemistry and Head of the Department. Three undergraduate chemists have helped with this work since its inception and in its continuation at the present time. Father Bede is studying the selenium oxide oxidation of pyridine compounds.

—Bede Ernsdorff,
Head of Dept. of Chemistry

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DISEASE IMMUNITY CLARIFIED BY RADIOACTIVE STUDIES

CINCINNATI, November 29.—The method by which the body develops immunity to diseases has been clarified through radioactive tracer studies reported tonight at a combined meeting of the American Chemical Society's Cincinnati Section and the scientific society Sigma Xi.

The studies have added weight to the theory that the body's cells use an antigen—the poison that causes an infectious disease—as a pattern for the construction of protective antibodies designed to counteract the specific disease, Professor Felix Haurowitz, of the University of Indiana declared.

It has also been shown why acquired immunity to a disease is not inherited, Dr. Haurowitz said, since the antigens have been traced to the granules of the cells, known as mitochondria, and are not concentrated in the cell nucleus, which is the only part of the cell affecting subsequent generations.

Extremely sensitive radioactivity counters indicate that a significant amount of antigens remains in the body for a year or more after they are introduced, Dr. Haurowitz reported. The antigen molecules are, therefore, available during that time to act as patterns for the formation of the antibodies to counteract them, he said.

Although the theory was proposed in 1930 by Dr. Haurowitz and Dr. Breinl, a co-worker, that the body cells produced immunity in this way, it has been impossible to explain the observed formation of the antibodies long after the disease was gone and the poisons had apparently been eliminated from the body, Dr. Haurowitz said.

When antigens containing radioactive iodine, sulfur, or carbon were injected into the veins of laboratory rabbits, they eventually concentrated in the liver, spleen, and bone marrow, where they were easily detected by measurements of radioactivity, the speaker said.

After several weeks most of the injected poison had been eliminated from the body, and only about one hundredth of one per cent remained in the liver cells, the studies showed. But even this small percentage represents five to ten thousand antigen molecules in each liver cell, Dr. Haurowitz pointed out. And calculations show that after a year each liver cell would contain several hundred of the antigen molecules, so that antibodies could be patterned from them during all that time.

Samples of the liver and spleen of the laboratory animals were homogenized and centrifuged—separated into fractions representing the cell nuclei, the plasma granules, and the cellular fluid—and radioactivity measurements indicated that the antigens, starting about an hour after injection, concentrated in the mitochondria granules, referred to as the "power plants of the cells."

"The mitochondria contoin a large number of enzymes (body chemical agents) and have been considered as self reproducing units, those parts of the cell which are endowed with the capacity to produce proteins," Dr. Haurowitz asserted.

"Our finding of their role in antibody synthesis is in excellent agreement with these views, and reveals a new function of these granules.

"The nuclei contain only a small amount of the antigen. This indicates that the nuclei are not involved in antibody formation, and that the production of antibodies takes place in the cytoplasmic granules. This view is in agreement with the fact that acquired immunity is never transmitted to the next generation. If injection of an antigen would affect the nuclei, one would expect some alteration of the descendants of the cells containing the antigen."

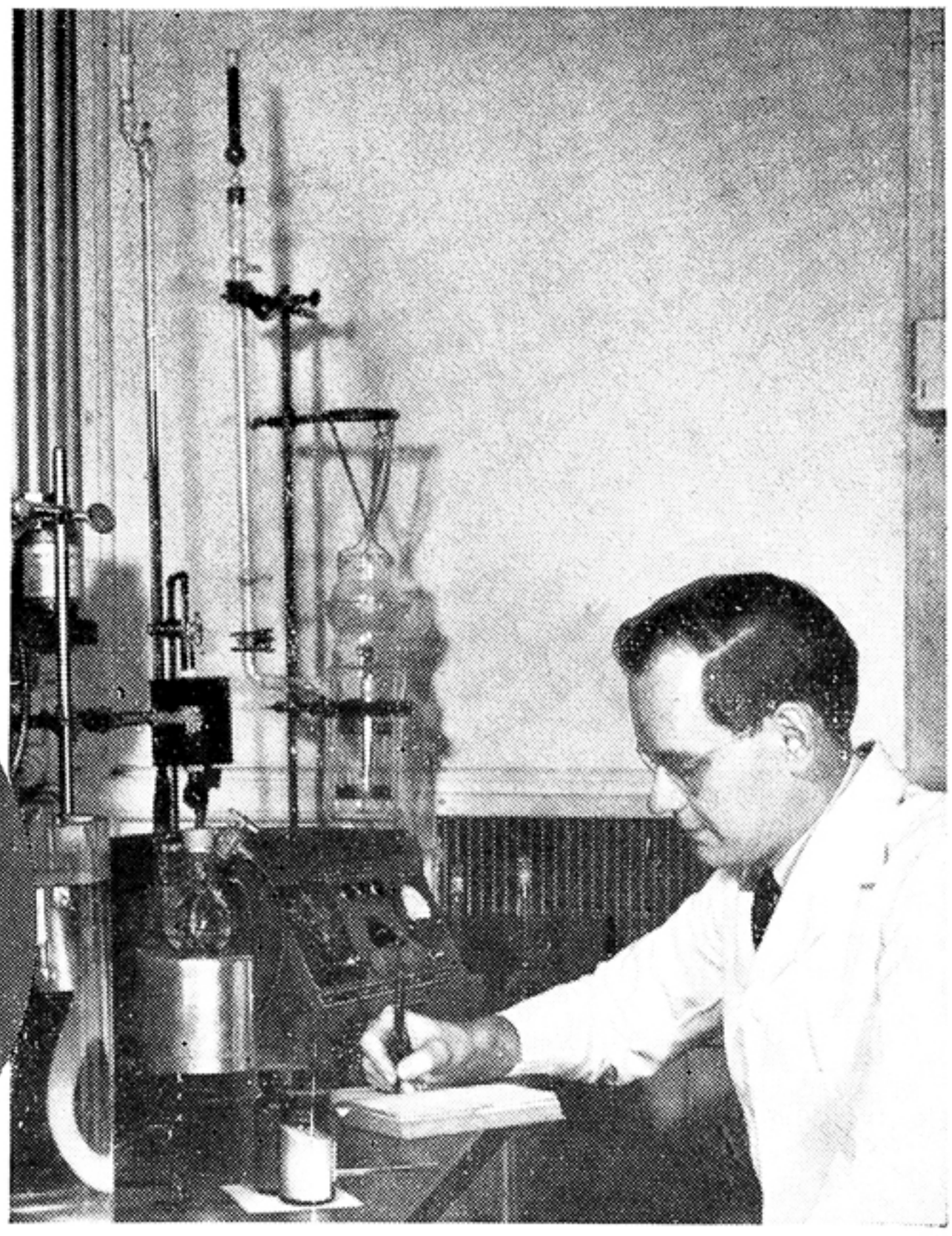
The meeting was held in the Engineering Society headquarters.

★

A tramp called at a house and asked for food. "How would you like a nice chop?" asked the housewife.

"That depends, lady," replied the tramp. "Is it lamb, pork, or wood?"

A new, stable primary standard for Karl Fischer reagent



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1. Neuss, J. D., O'Brien, M. G., and Frediani, H. A, Analytical Chemistry 23, 1332 (1951)

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Extract of an Address by George Gunn to Spokane C. of C.

Mr. Chairman, Ad Club members, and guests:

Next to food and good health, probably the most important thing that we could wish for is productive work. In the industrial age in which we are living, one of the primary requirements for all of us —in whatever type of labor we are engaged—is electrical energy.

1.—We have 3,000,000 acres of irrigable land in the Columbia River watershed still to be developed.

2.—We have a vast amount of water for agriculture and commercial usages.

3.—We have 40% of the potential hydro-electric power of the Uniteed States in the State of Washington.

4.—We have technical manpower for mechanical, electrical. chemical, agricultural or mining development.

If we could put the four of those together to work to the best advantage of the people in this area, then we would be accomplishing something for ourselves and our heirs.

Do you realize that one Department of our Government, namely the Department of Interior, is actually taking one of these resources away from us at the present time, namely power—through the sale of power to the aluminum industry and also at the expense of a critical concentration of a defense industry in this area —and is planning, with your tax money, to take another one from us, namely water?

All of you must know that the Interior Department, through the Bureau of Reclamation is spending hundreds of thousands of dollars on the study of transportation of water from the Columbia River to California.

It seems so ridiculous on the face of it that we pass over it lightly.

It is not to be passed over lightly.

Our Bureau of Reclamation must of necessity look many years ahead and plan for the future when we will have many more millions of people in this country to feed than we have now.

HOW TO DO RESEARCH

(Continued)

the speed of one plus the speed of light."

Your talk is now a success. When you see that vacant stare, indications of a temporary lapse of intelligence, steal into the eyes of the audience, stop; pause for effect, gather up all papers, and ask for any questions. If the question is simple, merely state the answer is obvious and ask for the next question. If the question is difficult, merely refer to the expansion of the eighth or ninth equation as a solution or refer to a slide. This last bruiser will put a stop to even the most persistent questioners. The chairman will thank you for a very comprehensive contribution to the vast knowledge of Chemistry and you may now glow with pride.

In the future when asked what sort of work you do, you can put out your chin, incline the angle of your nose, peer down the slope of the bridge, and say, "I do Research!"

Extract of an Address

(Continued from Page 12)

One of the reasons I am talking to you today is to see if we can't get on a basis in this watershed and our own State of Washington where we are doing some more planning ourselves.

There are movements on foot to do this, and places where you can help, on which I will talk later.

The original estimated cost of irrigating the Grand Coulee area was approximately $400 an acre. Since costs have risen during construction, it is now estimated it will cost approximately $600 an acre. The land is being sold at $85 an acre.

Presumably, the sale of power will retire the $600 per acre over a 50-year period, including interest.

I want to impress upon you that the Bureau has already made what they call a detailed study of taking the Klamath River, which originates in Oregon, into

California to irrigate 2,000,000 acres of land. They say it will cost $3,250,000,000. That is $1,625 per acre just for the irrigation—not for the land.

The Bureau says that they will take the Rogue, the Umpqua and the Smith southward at what they call a "slightly greater' cost per acre.

I dont' know how much the Bureau thinks a "slightly greater" cost is, but I think we had better find out, or see that the Bureau of Reclamation does, and how much per acre it will cost to irrigate the 3,000,000 acres in this watershed—where we do have the water and where we have the potential power in which to pump it.

While we are talking about this proposed movement of water by the Bureau of Reclamation from the Oregon rivers southward, and knowing that President Truman has already written letters about moving water from the Columbia River to California and the Bureau is already spending hundreds of thousands of dollars on this study, as previously stated, maybe we should take a look at the highly controversial Hells Canyon Dam in the Snake River that the Bureau of Reclamation is trying hard to get appropriations for.

In their own figures they show of a total cost—

1.8% for navigation
1.4% for flood control
2.1% for recreation
94.7% for power

You will note there is nothing there for reclamation.

The high dam that they are planning does not help flood control materially, there is absolutely nothing below to be irrigated, the cost per KW is reported to be about twice the cost of a proposed dam at Libby, Montana that would really give us flood control and storage in the upper Columbia River which, when the water was released, would be generating power in all the down stream power plants.

Further than that, the Idaho Power Company has agreed to build and privately finance 5 dams in the same area—and they have prior rights to them—and for some reason which nobody has been able to find out yet, the Department of Interior, through the Bureau of Reclamation, still wants to build this Hells Canyon Dam.

The Division of Industrial Research of the State College of Washington at Pullman, in conjunction with a survey made with the Department of Agriculture economists, have found that the food processing plants in the irrigable and potentially irrigable areas, would be great consumers of electrical energy in the form of BTU'S in their processing operations.

Why ship our power to California to process their crops when we need it here?

If we keep the power here, we have the irrigable land—we have the know-how to cultivate it—we have the technical manpower of all kinds to develop it and industries that use great amounts of labor—and in the skilled classes of labor where our total earned income in the State will continue to rise and keep us in the highest standard of living area in the country.

Submitted by
A. J. NORTON

★

A jobber went to see his doctor with a complaint that the sleeping pills he had prescribed did not cure his insomnia.

"Can't I have some of that twilight sleep that they talk about?" he asked.

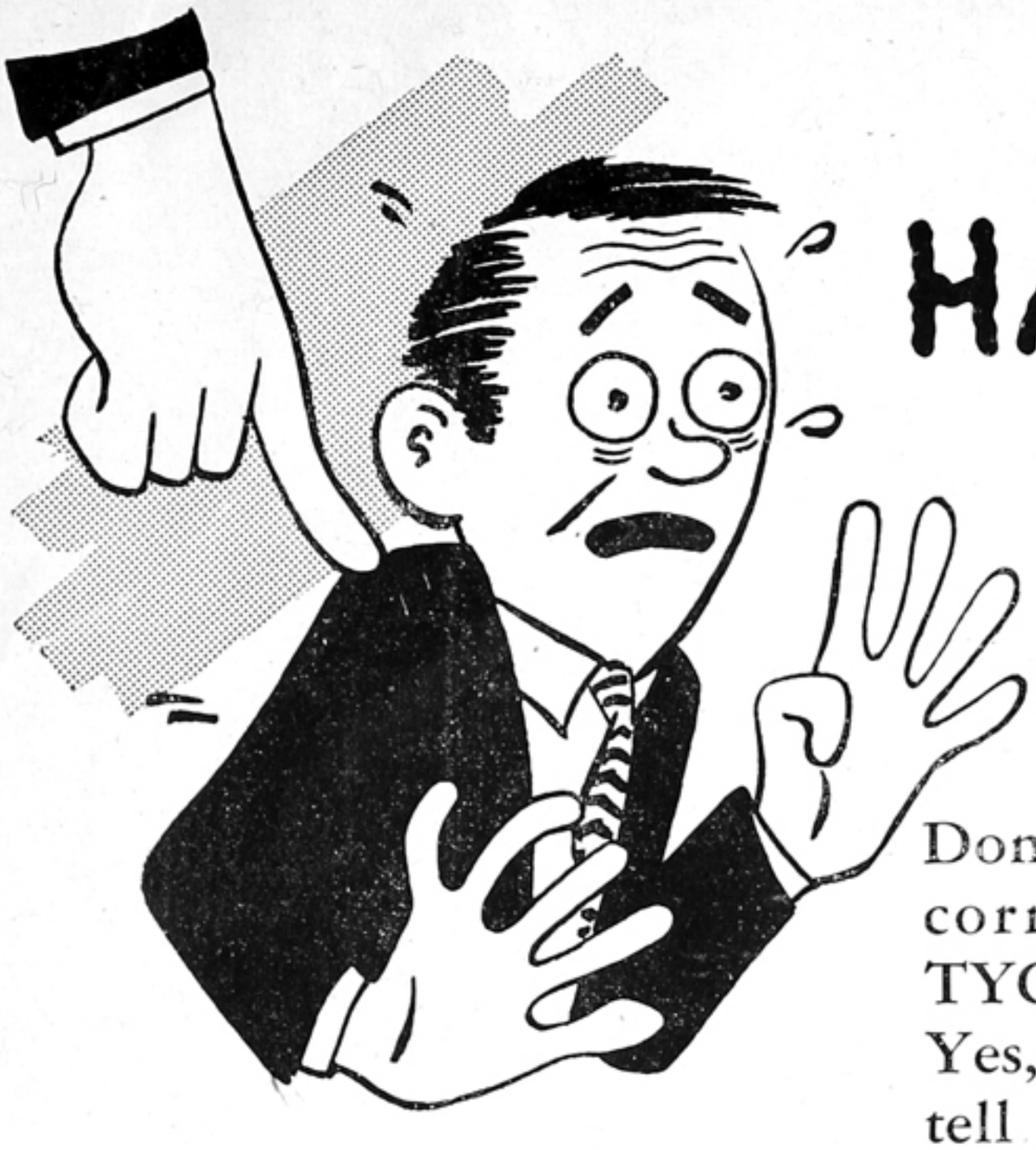
The doctor snorted: "Twilight sleep? Why thats only for labor."

The patient replied disgustedly, "Shucks, isn't there anything for us tories?"

★

During the War Between the States, the Union Army captured a small town where they found some Confederate uniforms. As they were in need of uniforms, they sent them to a tailor to be dyed blue. Later, the town was recaptured by the Confederate Army and the tailor was compelled to dye the uniforms back to the original grey. After that the tailor threw up his hands and joined the army.

Moral: Old dyers never fade, they just soldier away.



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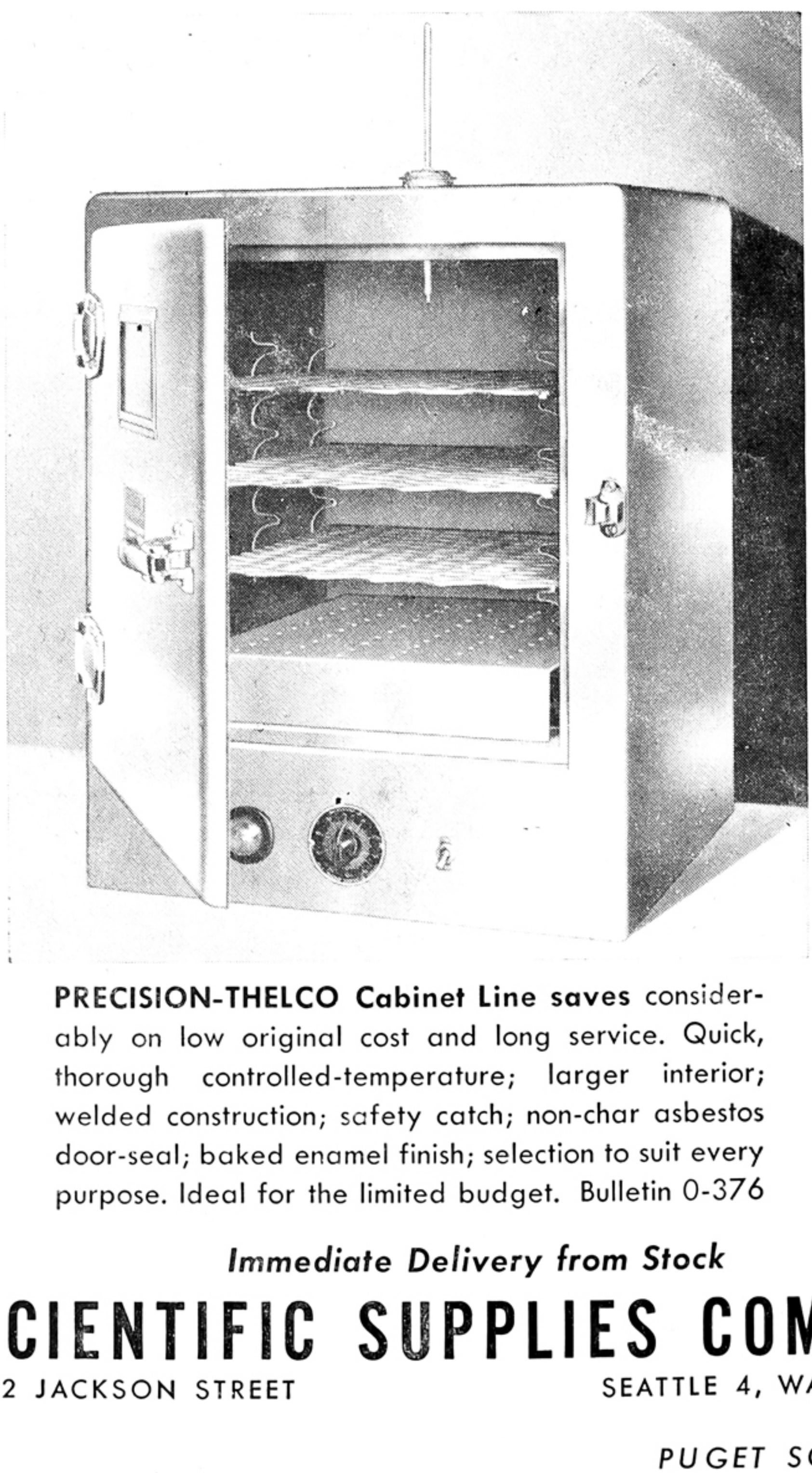

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