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JUNE, 1950



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Volume 11

No. 6

JUNE, 1950



## MAY SPEAKERS SUMMARY

*Chemical Genetics*

DR. G. W. BEADLE

Dr. Beadle had a twinkle in his eyes as he passed around innocent-looking slips of paper for his audience to taste. Most of the audience soon discovered that phenylthiourea, with which the paper was impregnated, had an extremely bitter taste. The bitterness was not appreciably decreased by the request from Dr. Beadle to look at the poor unfortunates who were unable to taste phenylthiourea. The "Life Savers," with which he came prepared, were much more effective.

The ability to taste phenylthiourea is a genetically controlled factor, inherited as a simple Mendelian dominant. In order to be a non-taster, both genes must be defective. This means that both parents of the non-tasters transmitted the abnormal genes to their child. If the gene received from either parent is positive for tasting, the individual will be a taster.

Dr. Beadle went on to give other examples of genetically controlled characteristics. An extremely rare disease which is inherited was that which the "porcupine man" had. In all recorded history, only eleven cases of this disease have been observed. These were all before the time of studies of genetics, so the studies done on these individuals were not as thorough as they would be at present. The outstanding characteristic of these individuals was the thick, leathery skin which apparently was shed each year.

A well-known example of a disease which is genetically controlled is hemophilia, best known because of its occurrence in the royal families of Europe. Hemophilia occurs only in males, with an incidence of about 1 in 50,000. It is a recessive character and sex-linked. Only males show the defect, but it is transmitted through the females. Dr. Beadle showed the genealogy of Queen Victoria's offspring, and showed how the hemophilia which was observed could all be traced back to Queen Vic-

torial. The principal symptom observed in hemophilia is a slowness in clotting of the blood, so that these individuals are in constant danger of bleeding to death from relatively minor injuries. Their blood differs from the blood of normal individuals in lacking a portion of the gamma globulin fraction that is essential for blood clotting. Hemophiliacs can be given temporary relief by transfusions of normal blood or injections of the purified gamma globulin fraction, but they soon develop antibodies to the active protein.

Sickle-cell anemia is another example of a hereditary disease. In this disease the red blood cells show an abnormal "Sickle" shape with low oxygen pressure. This disease is transmitted as a dominant character, and in America is confined to the Negro population. Two types of the disease are seen, a mild form with an incidence of about 8% and a severe form with an incidence of about 1%. The hemoglobin of the individual with severe sickle-cell anemia differs from normal hemoglobin. In an electrical field at pH 6.90, normal hemoglobin migrates as a single peak toward the anode, while the hemoglobin from a person with severe sickle-cell anemia migrates as a single peak toward the cathode. Hemoglobin from individuals with the mild form of the disease shows both peaks in the electrophoretic pattern.

The above examples show that genes are involved in protein synthesis. Since all known enzymes are proteins, it is reasonable to inquire whether genes are involved in enzyme synthesis. Several classical diseases would seem to indicate that such is the case. In alcaptonuria, an enzyme necessary for the oxidation of 2,5 dihydroxyphenylacetic acid ("homogentisic acid") is lacking, and homogentisic acid is excreted in the urine. The principal effect of this excretion is that the urine turns dark on standing.

Among the inmates of institutions for the feeble-minded, some show an abnormal excretion of phenylpyruvic acid

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in the urine. This excretion of phenylpyruvic acid is always associated with a severe degree of feeble-mindedness, usually imbecility or idiocy. In Norway, where it has been studied more than in this country, phenylketonuria has been observed in about 1 % of the inmates.

Many other examples of genetically controlled physical and chemical characteristics could be cited, such as the pigments of flowers and insects.

However, man is a poor subject for a chemical geneticist to study biochemically. He has too long a life-span, a complete biochemical analysis is not possible, and he is notoriously uncooperative in his reproductive habits. Among the organisms which could be used, Dr. Beadle and his associates chose the bread mold *Neurospora*. This organism is readily grown in pure culture, reproduces both sexually and asexually and grows rapidly. In the medium for growth it requires only inorganic salts, sucrose for a source carbon and energy, and the vitamin biotin. Everything else required for growth, metabolism and reproduction is synthesized by the organism, consequently many synthetic processes are present which are lacking in higher organisms.

Dr. Beadle irradiated the spores of *Neurospora* with various high energy radiations, and in about 2 % of the cases found a usable mutation, which could not synthesize one of the vitamins or amino acids. From a study of these various mutants, he was able to show, for example, that there are at least 8 steps in the synthesis of nicotinic acid in *Neurospora* and the intermediates have been identified. Recently a portion of the pathway has been shown to occur also in mammals.

How do genes control these chemical reactions? The evidence outlined above indicates that they do it by controlling the formation of proteins. Chemical reactions in the body are catalyzed by highly specific proteins known as enzymes. Consequently, genes also control the chemical reactions through controlling the formation of these catalytic proteins. The mechanism by which this con-

trol is exercised is unknown.

Dr. Beadle ended his presentation with a short discussion of some recent work with viruses, a class of substances representing the border-line between animate and inanimate forms of matter. Bacteriophage, a virus which destroys bacterial cells, multiplies inside the bacterial cell. One bacteriophage particle enters a susceptible bacterial cell, its identity is lost temporarily, but 20 minutes later the cell is ruptured and 300 bacteriophage particles can be recovered.

On irradiation, mutants of bacteriophage can be produced, which singly cannot destroy a bacterial cell. However, if two of these phage particles enter the bacterial cell, growth and reproduction of the phage again occurs producing rupture of the cell and allowing the recovery of normal phage. From quantitative studies it has been estimated that hage contains some 20-30 of these subunits.

—Carl Kuether.

★ ★

## SEATTLE NEWS

Rev. Clair Marshall has returned to his classes in analytical chemistry at Seattle University after extended leave of absence. During the past two years Father Marshall has been doing graduate work and research at Fordham University.

—Walter R. Carmody.

★ ★

Roger Harrison left Saturday, May 6, for Chicago to attend the meeting of the American Feed manufacturers Association to be held May 11-12 in that city.

★ ★

Scientific Supplies is pleased to announce that Mr. Harlow Snyder has been recently appointed as sales representative for the Puget Sound Area. Mr. Snyder has previously been associated with the Vitamin and Fisheries Industries of the Northwest.

★ ★

Dr. G. Ivor Jones, Chemist at the Seattle Fishery Technological Laboratory

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The Model III Polarograph may be used in any phase of polarography, but it is particularly recommended for applications to which it is peculiarly suited and in which recording facilities are unnecessary.

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The cell current is measured by a highly sensitive galvanometer from which a line light image is transmitted, through a mirror system, to a translucent scale located above the instrument panel. The scale is 30 cm. long, with circular curvature, to eliminate tangent error. A continuous selection of bridge voltage from 0 to 3 volts is provided, and the selection of output voltage is by rotation of a single dial, this dial reading direct in millivolts per span volt. Current is calculated simply by multiplying scale reading by multiplier reading by sensitivity coefficient of galvanometer. To adjust galvanometer sensitivity a ten position Ayrton galvanometer shunt is provided. Galvanometer sensitivity is approximately 0.005 microamperes/mm. and galvanometer shunt ratios are from 1:1 to 1000:1.

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of the Fish and Wildlife Service, recently returned from an extended business trip east which took him to Chicago, Illinois, Cortland, New York, and San Francisco, California. At Chicago, Dr. Jones attended the National Fisheries Institute Annual Convention. While there, he set up an elaborate exhibit containing a lyphilizer and a solvent extractor, complete with its own cooling system, as part of a display on chemical research on the utilization of salmon cannery wastes. We understand that great interest was expressed in the display. Dr. Jones also read a paper before the N.F.I. Technological Section on the "Freezing and Subsequent Canning of Sockeye Salmon," authored by John A. Dassow and Ernest Dietrich of the Seattle Laboratory.

Following the convention, Dr. Jones interviewed scientific staff members of the VioBin Corporation at Monticello, Illinois, the Cortland Hatcheries of the F.W.S. at Cortland, New York, and the Western Regional Research Laboratory at Albany, California.

★ ★

Dr. Robert B. Dean of the University of Oregon recently visited for two days at Seattle where he conferred with Dr. H. V. Tartar and Dr. J. L. McCarthy and their research groups.

—Bruce Sanford.

★ ★

Washington has 33.3 persons per square mile.

## WASH.-IDAHO NEWS

The Washington-Idaho Border section of the American Chemical Society met for a social hour and the annual election of officers on April 19; the following officers were elected:

President—Dr. C. C. Cowin,  
University of Idaho.

President elect—Dr. Harold L. Rice,  
State College of Washington.

Secretary-Treasurer—Dr. Elmer K.  
Raunio, University of Idaho.

Counselor—Dr. J. I. Jolley,  
University of Idaho.

Alternate Counselor—

Mr. E. H. Grahn, Univ. of Idaho.

★ ★

Effective April first, the Department of Chemistry and Chemical Engineering at the State College of Washington was split into two departments. The Department of Chemistry has Dr. Julian Culbertson, the former Chairman of the joint department, as its chairman. The new department of Chemical Engineering, which is in the College of Engineering, will have Dr. George T. Austin as its Acting Chairman. The Chemical Engineering Department will take up new quarters in the Chemical Engineering Building, which is being completely remodeled, on or about June first.

—George T. Austin.

★ ★

## EVERETT NEWS

Officials of the Meadowmoor Dairy, with headquarters in Everett, recently announced the formation of a new subsidiary, Med-O-Milk, Incorporated, to be located in East Stanwood. Construction of the new \$200,000 plant will begin immediately.

By a new process in which the milk is neither exposed to air nor touched by human hands, milk can be canned and still maintain its original freshness and flavor over a period of months and may be kept without refrigeration.

For four years the Meadowmoor Dairy has been shipping daily loads of carton milk to Alaska, via Alaska Airlines. The new method of canning is

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expected to increase sales in Alaska considerably and to enable the firm to process milk during slack seasons for use when the demand is more urgent.

Meadowmoor will direct all its grade A producers who can qualify to the new plant in East Stanwood.

Officers of the newly formed corporation are: Oscar Rygg of East Stanwood; I. R. Rygg, Adolf Rygg and Jess Simpson of Everett; Ole Lervick, Lake Stevens and Roy R. Graves, Valparaiso, Indiana.

★ ★

Miss Martha Samuelson, a student at Everett Junior College, was judged the best freshman chemistry student at E. J. C. as a result of her high score on an American Chemical Society comprehensive test. She was awarded a Physics and Chemistry Handbook, furnished by the publishers in Cleveland, Ohio.

The comprehensive test was given to all chemistry students at E.J.C. who had completed two quarters of freshman chemistry. Miss Samuelson, of Cashmere, made the highest score. Norman Weiss of Everett was one point lower and Hans Orup of Snohomish placed third. All three scores were above the 95 percentile, based on some eight thousand scores made by freshmen chemistry students at other colleges and universities in the United States.

Mr. Harry A. Simmermacher and Miss Celia Scott are the instructors in inorganic chemistry at Everett Junior College.

—Clifford Higer.

★ ★

## OLYMPIA NEWS

The St. Martins' Chapter of Student Affiliates brought to a close their year's activities with the annual dinner at which The Rev. Joseph McGrath, Dean of the Graduate School of Portland University, was the principle speaker. Father McGrath has been prominent in the Oregon section of the ACS for many years, and is chairman of the national organization's standing committee on local section activities. The topic for his address was "What, after College?". He encouraged the students to develop

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a professional attitude towards their science by active participation in ACS affairs, by acquiring the attitude of serving the community through chemistry, rather than an altogether one-way goal of personal security.

A special feature of the dinner this year was the presence of members of the College of Puget Sound Chapter of Student Affiliates who had been guests at St. Martin's throughout a full day meeting for papers presented by the students of the two colleges. Illustrated talks were given by Mssrs. Shoblom, Krier, Shryne and Mosby of St. Martin's in the morning; following a picnic lunch for the whole group Messrs. and a tour of the Olympia Brewing Co.'s plant, Mssrs. Morrison Carlson, and Barnes of C.P.S. delivered well-prepared papers. Dr. Robert Sprenger of C.P.S. was present, together with Drs. Ernsdorff and Horan of S.M.C., all of whom expressed their admiration for the content of the talks and the effective manner of presentation by the students. The success of the joint meeting should assure its



establishment as an annual affair by the student chemists.

★ ★

## OREGON NEWS

Roy Chester Andrews will have completed over forty years of teaching when he retires this June as Instructor of Chemistry at the University of Oregon. Roy will be affectionately remembered by generations of students as a patient teacher who has always had a great love for natural history in all its forms.

Born in Ohio in 1885 he moved west and taught school in Arkansas and Texas before coming to the Northwest in 1909 where his first assignment was teaching at a school in Lorane near Eugene. His attendance at the University was interspersed with various teaching assignments. In 1915 he received his bachelor's degree in mathematics. He taught in the Astoria high school for two years before returning to the University as instructor in botany. During our active participation in World War I he taught military topography and was finally an officer in the field artillery at Camp Taylor, Kentucky, when the Armistice was signed. A relief map of the Eugene quadrangle which Roy helped to construct at that time still hangs in the geology department in Condon Hall.

Following the war, Roy Andrews taught a year in South Bend, Washington and then was science teacher at Jefferson High School in Portland until 1934. During this time he took a year out to earn a master's degree at the University under the supervision of Professor Roger Williams. He also collected botanical specimens for the Herbarium under Professor L. F. Henderson. These part-time associations with the University finally culminated in 1935 when Professor Stafford offered him an appointment as Instructor in Chemistry. But Roy Andrews was destined to work under yet another department. With his wide range of experience he was a logical choice to teach a reorganized Physical Sciences Survey course under the budgetary control of the Physics Department. Although there is no official record of work in zoology there is no

doubt that Roy has studied and taught all of the sciences to receptive beginning students. He is in all respects a naturalist and at the age of 65, he is still an ardent mountain-climber who numbers his trips to the summits of the Cascade range in terms of "My second trip up the South Sister this year." He has a flourishing garden with never enough time to work in it, and he has one of the best private collections of classical records in Eugene.

★ ★

## U. OF. O. CHEMISTRY DEPT. RECEIVES RESEARCH GRANT

A \$2000 Frederick Gardner Cottrell research grant has been received by the University of Oregon Chemistry Department from the Research Corporation for the support of research under Dr. V. R. Gaertner. The grant is for the synthesis of strained, fused, polynuclear hydrocarbons. If the synthesis is entirely successful a new ring system will have to be added to the Ring Index and a controversial theory of aromatic chemistry will have been shown to be not universally applicable. Dr. Gaertner, who received his Ph.D. at the University of Illinois, declined to name the possible product before he has completed its synthesis. The actual work will be done by a graduate fellow who will be a candidate for the master's or doctor's degree. No candidate has yet been chosen for the fellowship. This is the fourth grant received in the last three years from the Research Corporation.

—Robert B. Dean.

★ ★

Installation Banquet for Portland University Sigma Xi Club was held at University Club May 18, 1950. Dr. Pearson of the University of Oregon chapter of Sigma Xi was installing officer. J. S. McGrath and P. S. Skell are President and Secretary-Treasurer of the new club.

Twenty-seven Sigma Xi members attended. Speaker for the evening was Dr. P. J. Van Rysselberghe, University of Oregon talking on "Developments in Thermodynamics and Electrochemistry of Importance to All Sciences." Dr. William



A. Waters, visiting author and teacher from England will address the Portland University Sigma Xi Club June 7, 8:00 P.M.

★ ★

Dr. Arthur B. Anderson, formerly research chemist for Oregon Lumber Co. of Portland, is now Research Biochemist in the school of forestry at University of California, Berkeley.

★ ★

The Oregon Section is awarding 47 certificates to students in high schools of the area selected by their instructors as "the outstanding student in chemistry for the year."

—Dr. Albert W. Stout.

★ ★

### COUNTER PART OF BATTERY COMPOUND & SOLUTIONS

Dear Sir:

We are writing to ask you to correct certain errors in your volume 11, April, 1950, issue of the Puget Sound Chemist. On Page 16 of the aforementioned publication under the heading "Battery Compounds and Solutions."

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## HIGH SCHOOL STUDENT CONTEST ANNOUNCED

For some time past the Puget Sound Section has been investigating possibilities of promoting a section-wide contest among high school students. A number of years ago such contests were sponsored by the section and received much interest throughout the state. Since then many plans have been proposed for re-

viving this in a form more adaptable to our present conditions. These plans have finally matured into a new type of contest which was approved at the last executive committee meeting and was thereafter outlined to the general meeting.

In brief, it is an essay contest open to qualified high school students throughout the section. The basic idea is that the student is to attempt to project himself into the future in his own community and to visualize the relationship he might have with his community if he were trained as a chemist. This would involve a subject such as "What Chemistry Can Do for My Community" or "What Could I Do for My Community as a Chemist." In other words, the high school student investigates the implications of becoming a chemist beyond the conventional viewpoint that "it would be fun to work in a laboratory."

A number of winners will be selected next spring from throughout the section. Each winner will then temporarily become the personal responsibility of a section member in that community who is willing to sponsor him for this event. The winners will be brought by their respective sponsors to Seattle where they will be rewarded by a full and exciting day. This will include such events as an industrial plant trip, a luncheon, a tour of the Chemistry Department of the University of Washington, and finally a dinner in company with chemists of the region where they will hear an address by a well-known man of science.

The entire program of this contest will attract wide attention throughout the region. To carry it out successfully will require much assistance. Help will be needed in the various fields of publicity, judging, and arrangements for the big culminating day. We hope that many will volunteer their services as members of the key general planning committee who are:

Collis C. Bryan

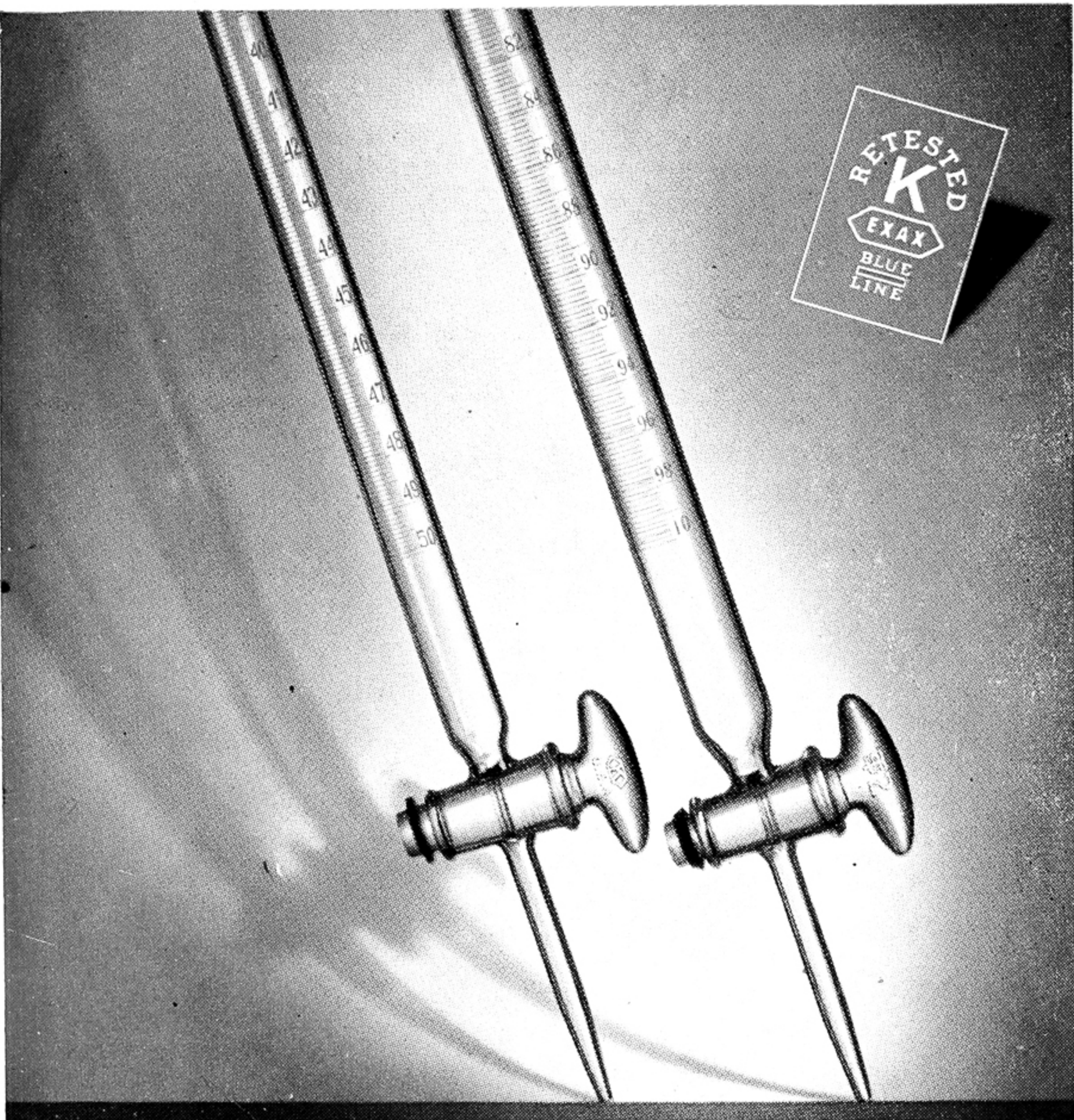
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## NEW MEMBERS

ANDERSON, James K., Central Res. Lab., Rayonier, Inc., Shelton, Wn.  
BOVEE, Harley H., 2304 N. 64th, Seattle 3, Wash.  
KELLY, Frank D., 1633 East 11th Ave., Vancouver, B.C., Canada.  
SPENCER, Charles F., Baker Hall, Rm. 137 Univ. of Wash., Seattle 5, Wn.  
YOUNGMAN, Edward A., 1911 N. 46th, Seattle 3, Wash.

★ ★

## EXPOSITION WILL GIVE CHEMISTS CHANCE TO SHOW ARTISTIC SKILLS

What do chemists do with their pictures?

They admire them—until next September 5 to 9, when they will have opportunity to hang them, for others to admire or not, in an art exhibit to be staged as a part of the National Chemical Exposition in the Chicago Coliseum here.

A general invitation to all chemists with artistic leanings to submit their work for display at the Exposition was issued today by Seymour Goldfarb, art exhibit chairman. Photographs and sculpture are not accepted, but any type of painting, oils, tempera, watercolor, etchings, prints — will be shown. Inquiries should be directed to Mr. Goldfarb at 86 E. Randolph St., Chicago 1.

★ ★

## WANTED

ASSOCIATE EDITOR for the P. S. Chemist beginning Sept. 1st. Bruce Sanford, who has so ably handled news from our correspondents is retiring.

★ ★

A chemist had looked long and fruitlessly for a room to rent, and finally saw a sign on a house "Apartment To Let." He was shown what the accommodations were by a very pretty servant girl.

Chemist: "Are you part of the apartment?"

Girl: "No. The apartment is 'to let,' but I am to be let alone."

## TRANSFERS

GRAHM, Ralph A., 1145 California Way, Seattle 6, Wash.  
From Michigan (Detroit)  
JORDAN, William K., Dr., care of Dr. A. A. Ward, Univ. of Wash., School of Medicine, Seattle 5, Wn.

★ ★

## CONTAMINANTS

### YES, INDEED

The weather-beaten guide and his tenderfoot companion were camping out in rattlesnake country. The tenderfoot asked:

"Is there any other cure for snake-bite beside whiskey?"

The guide looked up with a grin and drawled: "Who cares, son, who cares!"

★ ★

The old engineer pulled his favorite engine up to the water tank and briefed the new fireman. The fireman got up on the tender and brought the spout down all right but somehow his foot caught in the chain and he stepped right into the tank.

As he floundered around in the water, the engineer watched him with a jaundiced eye.

"Just fill the tank with water, Sonny," he drawled. "No need to stamp the stuff down."

## COVER PHOTO



Courtesy of  
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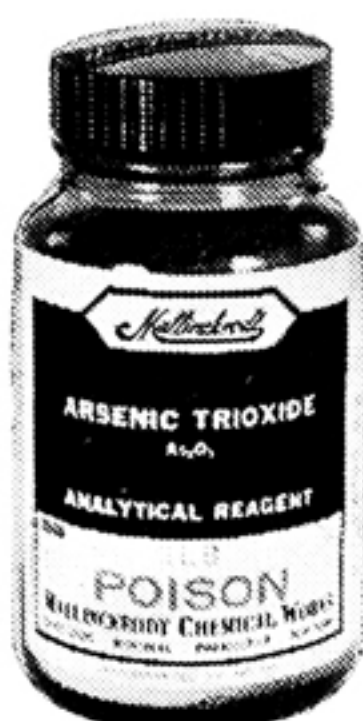
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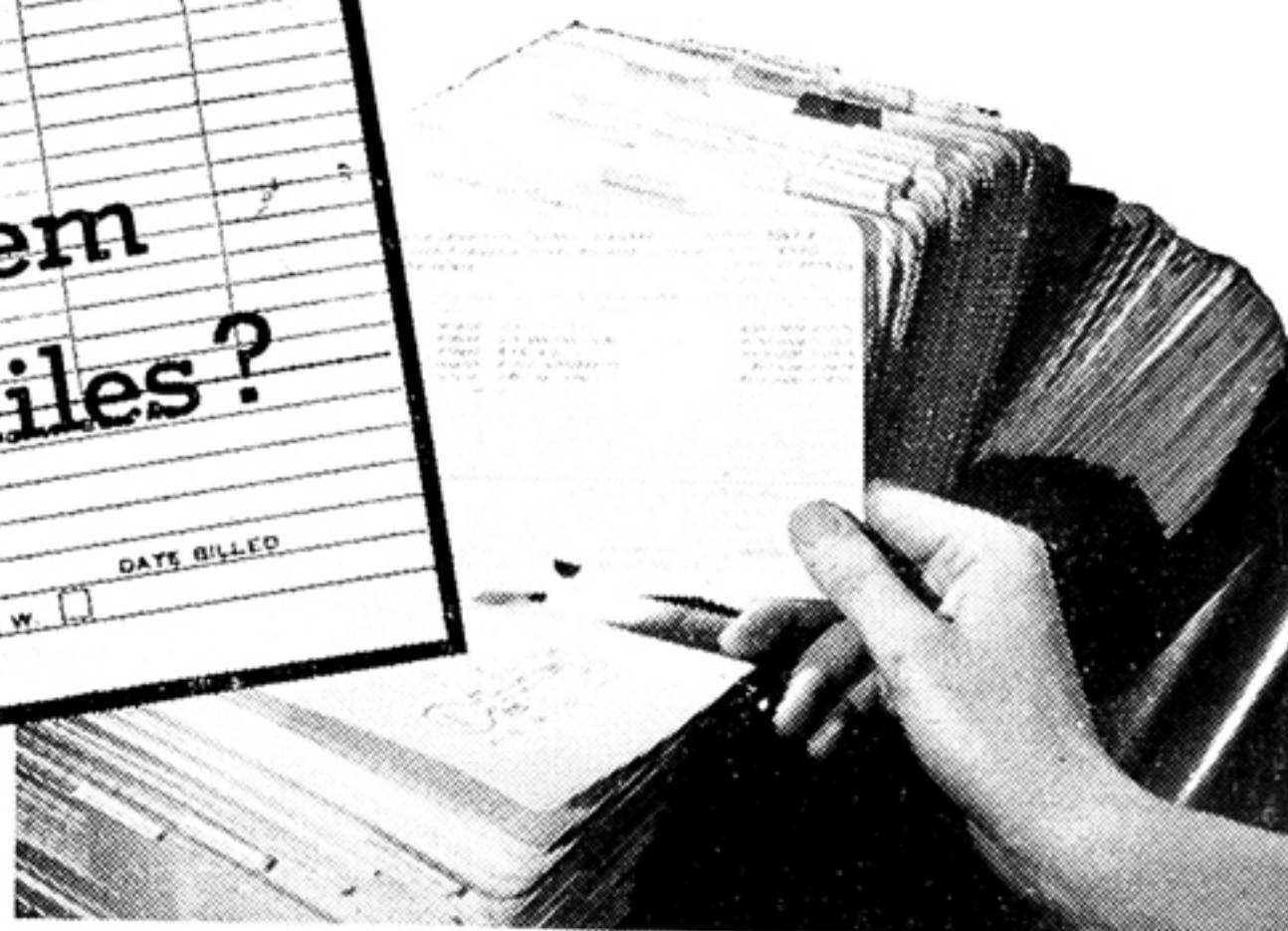
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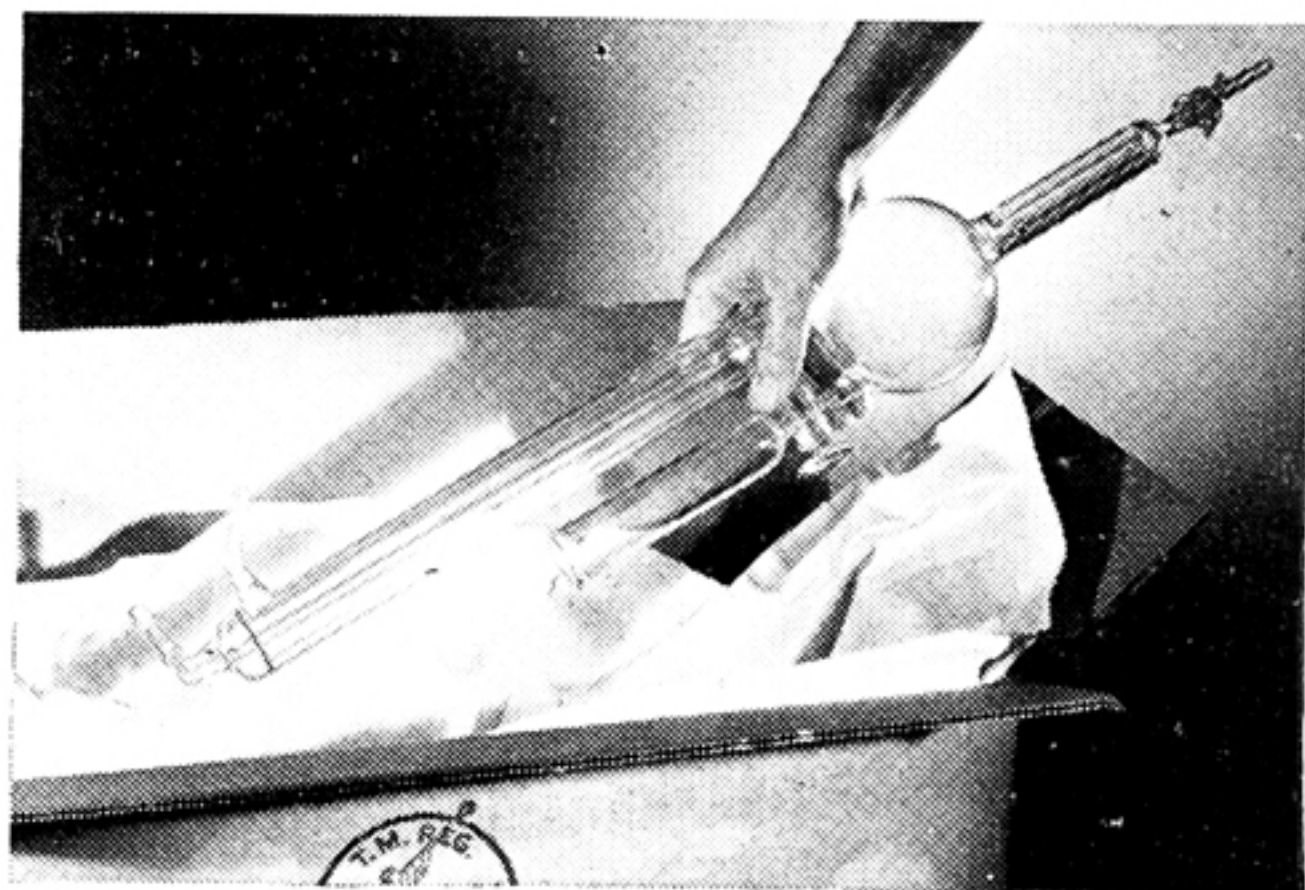
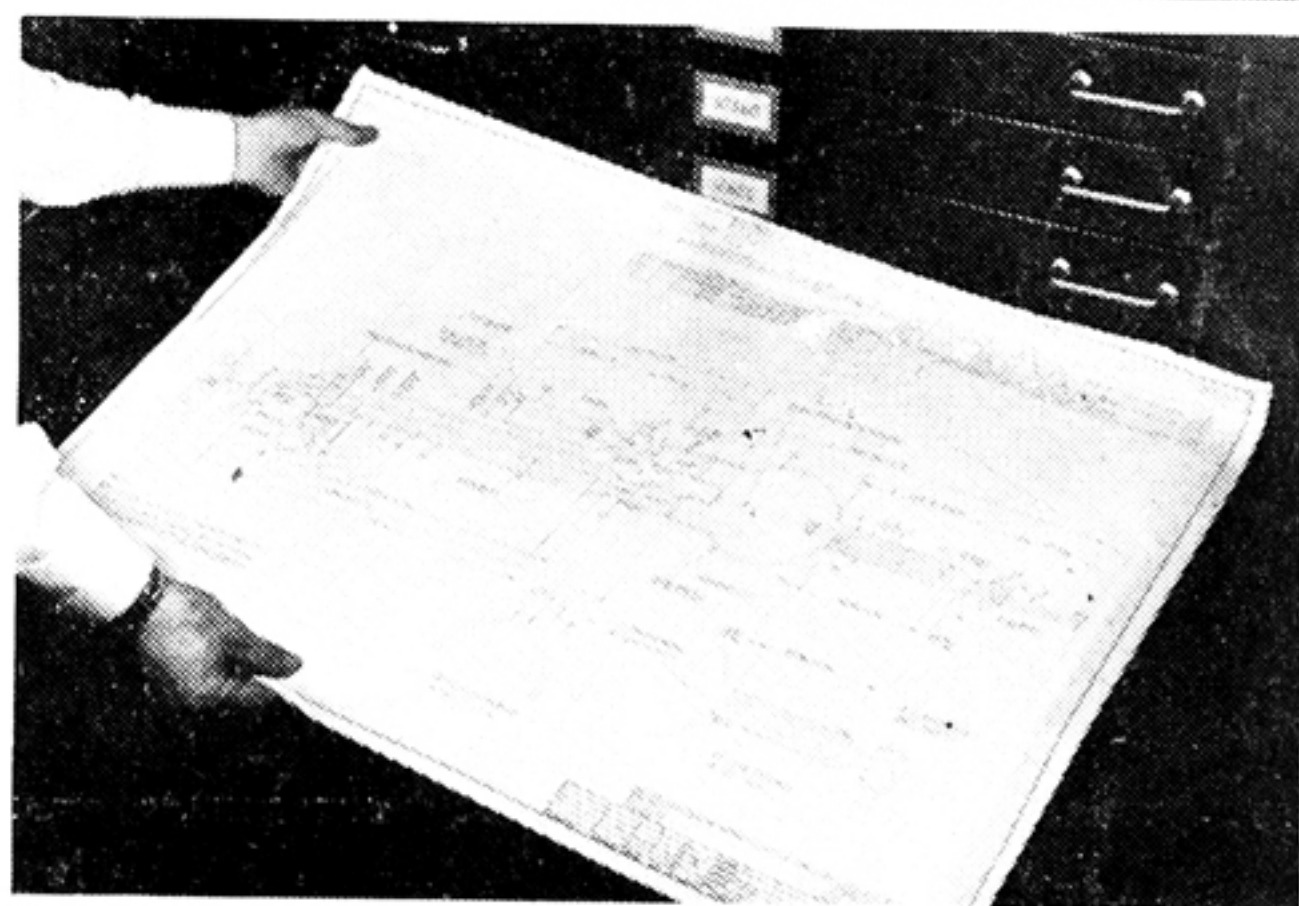
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If the problem is relatively simple, one that might be solved with minor changes in standard apparatus, you may wish to tackle the job yourself. If so, you will find the "Laboratory Glass Blowing Manual" helpful. It contains many practical suggestions for working PYREX and VYCOR glasses. Write to Corning for your copy.



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