# The PUGET SOUND CHEMIST

*Bulletin of the Puget Sound Section of the American Chemical Society*

VOLUME VII JUNE • 1946 NUMBER 10

# *June Meeting*

## JOINT MEETING

## Puget Sound Section of the American Chemical Society

***and***

## Chemical Engineering Society of Washington

**[American Institute of Chemical Engineers]**

## *Thursday • June 20, 1946*

**6:30 P. M. • Dinner • The Chalet**

15th Avenue N. E. and East 42nd Street

**8:00 P. M. • Address • Bagley Hall • Room 140**

SPEAKER

## DR. WALDO SEMON

**B. F. Goodrich Co.**

SUBJECT

## *Chemistry of Butadiene Synthetic Rubber*

●

Phone your reservation for dinner to

**DON REDFERN — MAin 3536**

or

**MRS. CURTISS — MElrose 0630, Local 439**

**Before 5:00 P. M. Wednesday, June 19, 1946**

# *June Speaker*

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## Dr. Waldo L. Semon 1946 Recipient University of Washington Alumnus Award

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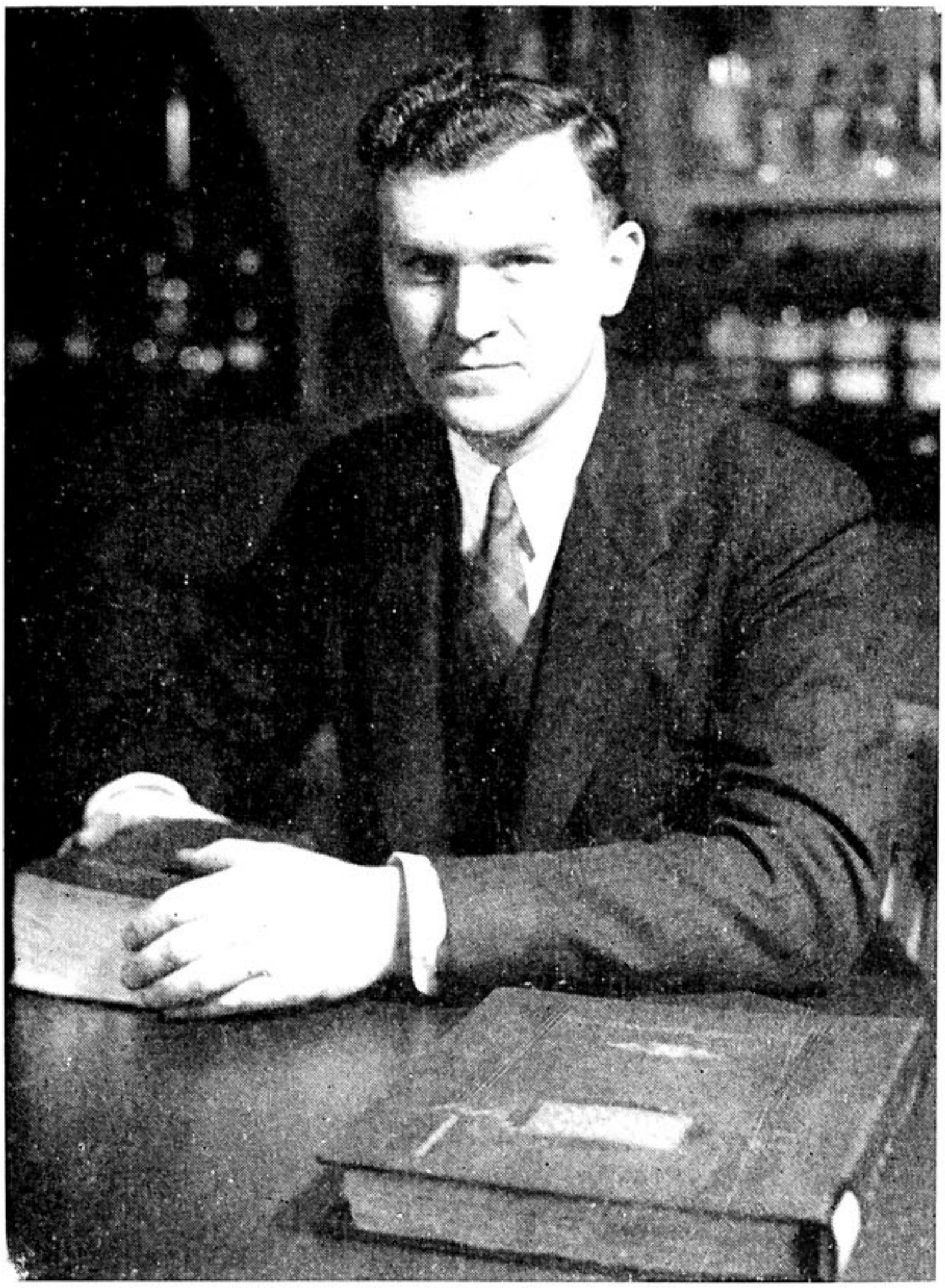
It may be truly said of Waldo L. Semon that he today ranks among the world's greatest industrial chemists. He has been much in the public eye lately, due largely to his spectacular contributions to the chemistry of synthetic rubbers. These contributions paid enormous dividends in the successful prosecution of the war. However, Dr. Semon's claim to fame is borne out by many other equally successful accomplishments in related fields.



***Dr. Waldo Semon, shown at his desk in one of the research laboratories at the B. F. Goodrich Rubber Company.***

Even in his early youth he showed unmistakable signs of that insatiable inquiring mind which has since brought him fame. These exploits ranged from the construction of wet-cell batteries and buzzer systems at the age of nine to the inventing of his own logarithm table to provide quick answers to arithmetic problems when he was in the sixth grade! At nine he constructed the first wireless receiver in his home town at a total cost of $5.00 which he had earned by picking strawberries at ten cents an hour.

The family moved to Seattle while young Waldo was still a boy. He spent his summer vacations, while going to grade school and high school, picking strawberries, prunes and hops. He was water boy on a construction project and later dug ditches at a dollar a day. When he was fifteen he drove 160 miles by horse and buggy to join a surveying crew for the summer. Before the summer was out he was doing most of the precise mathematical calculations required for the job. His interest in technical fields remained undimmed and in the autumn of 1916 he entered the University of Washington determined to be a chemical engineer. Here he again distinguished himself as an undergraduate. During the first World War he did special work for the U. S. Intelligence Service analyzing various inks for code messages and in research for a new gas for warfare. In the course of this latter project he made a selenium analogue of mustard gas. This report was pub-

*(Continued on page 14)*

# The PUGET SOUND CHEMIST

**Published monthly by the Puget Sound Section, American Chemical Society**

Volume VII June, 1946 Number 10

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# *Editorially Speaking . . .*

*Reconversion is a word*, which prior to last August had a delicious sound, connoting a return to a way of living which had not been enjoyed by the citizenry for five long and harassed years.

The events of the last nine months have shown that this feeling must have been based on wishful thinking, for this period has certainly been one, which for uncertainty of standards of operation, was never surpassed during the war.

Now the word, "Reconversion," conjures up visions in our minds of the worst type of chaos; price wars, labor strife, lack of materials and tools in a vicious circle of industrial neurosis that has many a strong man hanging on the ropes. Even the Reconversion Director believes that a "declaration of the end of the war" would be unwise at this time because of its effect on the emergency labor bill and the selective service act.

It is small wonder then that we are amused by and sympathetic toward Grampa Futty of Toonerville when he changes from a pacifist during the war to a warmonger in the present "peace" and howls for another war because we were better off then than now.

The effect of this uncertainty of a basis for operation is bound to result in lethargy on the part of a good share of the people. There may be times when Elmer Ehrlenmeier, the chemist, feels much as Grampa Futty does.

Actually, however, out of this mess, there is good reason for optimism on Elmer's part. Although the industrialist may have good cause to become discouraged in the face of all the imposing restrictions of this reconversion period, it is yet true that an active long-range research and investigational program is comparatively unhampered. Elmer's professional associates are returning from the armed services and it is mainly on their efforts that a long-range research program depends.

Though confused, Elmer is a die-hard and will do his part in assuring that our researches will not suffer from the lethargy which is appearing in other channels.

* * *

*Praise and Protest*: In the last few years a great number of articles on scientific development have appeared in the public prints over a range of chemical products and subjects such as D.D.T., 2-4-D, penicillin, atomic energy. bacteriological warfare, etc. Oftentimes this reporting has been more sensational than factual and the results have been such in some cases as to make the chemist squirm in embarrassment; in others, to howl with rage.

Protesting to one another about this reporting and then waiting till the next article arouses our indignation is no solution to this problem. Following is a letter from Walter J. Murphy, Director, A.C.S. News Service, which clearly presents just what we can do about it.

"Dr. J. L. McCarthy, Secretary
Puget Sound Section, A.C.S.
Department of Chemistry,
University of Washington,
Seattle 5, Washington

"*Dear Dr. McCarthy*: There is occasional complaint about the reporting of chemical news in the daily press. Seldom is this leveled at the papers which employ science editors or special science reporters, but newspapers with small circulation cannot afford such specialists and not all publishers are aware of the need for such service. It is the responsibility of the American Chemical Society to create at the management level an awareness of the need for trained science writers. The local sections have an opportunity to exert influence at the local level, especially for small papers.

"It is not enough to watch for printed items on chemists and chemistry and 'raise Cain' over inaccuracies. A more constructive approach is desirable. A committee of the local section should

*(Continued on page 8)*

## OUR COVER PHOTO

*Courtesy of*

NORTHWESTERN MUTUAL FIRE ASSOCIATION

*"The Evergreen Playground"*

The majesty and peace of Western forests . . . the fragrance of pine scented air . . . sunlit ferns guarded by giant cedar and hemlock . . . all these invite you to come and rest your soul in the "Evergreen Playground."

## SUMMER SOCIAL

# *PICNIC*

**Starting 2:00 P. M.**

## *Sat., July 27*

**MILLERS LAKESIDE RESORT**

**at**

**FIVE MILE LAKE**

[Between Tacoma and Seattle]

*Refer to Social Activities, Page 11.*

## *Editorially Speaking . . .*

*(Continued from page 7)*

make it a point to get acquainted with the editors, the columnists, and if possible, the reporters. This committee should offer to provide without charge advice on technical matters and critical review of copy, if desired; give to those concerned a list of men competent to perform this service, with business and home addresses and telephone numbers; supply enough names so that at least one could be reached at any time. When matters of importance to our profession are in the public eye, such as legislation on atomic energy or the National Science Foundation, the committee should confer with the local editor in order to give him the viewpoint of chemists and to provide background for consideration of the news. And don't forget to write letters of appreciation and praise for an intelligent editorial and for accurate reporting as quickly as criticism for the reverse.

"We have pointed out repeatedly that the program of the ACS is a cooperative undertaking. Here is an important matter in which the headquarters staff, local section officials, and individuals must work together if worthwhile results are to be achieved. Each has a special field of influence and no one alone can accomplish the desired result."

Sincerely yours,
WALTER J. MURPHY,
*Director, ACS News Service.*

Here, gentlemen, is a constructive course of action.

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**Take interest, I implore you, in those sacred dwellings which one designates by the expressive term *Laboratories*. Demand that they be multiplied, that they be adorned; these are the temples of the future—temples of well being and happiness; there it is that humanity grows greater, stronger, better.**

—LOUIS PASTEUR

# *Chairman's Message . . .*

*Fellow Chemists:*

We are extremely happy to report that the membership of the Puget Sound Section of the American Chemical Society has passed the 300 mark. This growth has been substantial and steady and shows every sign of continuing in this fashion. In this connection we suggest that you refer to that interesting booklet titled "It's Your Society" which was recently made available to us by the national office. Under that portion of the pamphlet headed "Local Sections" is given details of each section relative to location, date of establishment, and membership totals. Note how favorably we rate in this list with reference to our date of founding and our relative standing on the basis of an active membership of over 300.

Mere size of our organization cannot be allowed to become a fetish in itself. On the other hand, if our growth is based on sound principles, then we can look upon our membership as an impressive voice for chemistry and the chemist.

Is the growth of our local section based upon sound principles? Let us examine some parts of our program and attempt to answer this question. For example, you will recall that in the latter part of last year the Puget Sound section sponsored a very successful regional meet. This was successful from many standpoints. The program was large and varied to the point that it was possible to have divisional meetings. The attendance was excellent and the meeting arrangements were well made. All told it was an outstanding contribution to the professional development of this section of the country.

From this contribution to the region as a whole let us pass on to a consideration of our own section programs. Here again we cannot help but be impressed by the overall high caliber of our speakers and the interest of the subjects presented. This is due in large part to the outstanding efforts of our program committee with the occasional alert assistance rendered by other members in offering appropriate suggestions. This high quality of speakers and subjects has been ably augmented by interesting short motion picture films at most of our meetings.

In a lighter but still constructive vein we note that our programs are preceded by informal dinner meetings during which is afforded opportunity for social contacts between our members. In addition one of our aggressive committees is planning a substantial summer activity which is announced elsewhere in this magazine.

Our interesting and stimulating magazine *The Puget Sound Chemist* is finding a warm welcome on the desks of many of the technical men of this region.

These glimpses of some of our activities would be incomplete without mention of that faithful group of your section officers, councillors, and committee chairmen who make up the local council of our group. These men have met faithfully each month, a week prior to the regular section meeting, and have spent many hours in making and carrying out plans which have resulted in many of the activities listed above.

In conclusion I think that we can rightfully say that our local section is carrying out a high caliber of activities and that our growth is sound and justified. We can speak with authority for the chemists of this region, both from the standpoint of the broad fields from which our membership is drawn and from the standpoint of the high professional level of our programs and activities.

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*Every theory which urges men to labor and research, which excites acuteness and sustains perseverance, is a gain to science, for it is labor and research which lead to discoveries.*—LIEBIG.

## EMPLOYMENT COMMITTEE REQUESTS . . .

The Employment Committee of the Puget Sound section of the American Chemical Society would appreciate knowing if any companies in the Northwest area are in the need of technically trained men.

If the companies needing additional technical personnel will notify the Chairman of the Employment Committee, John G. Meiler, 620 E. 20th St., Tacoma, Washington, giving the general qualifications of the man or men desired, with or without the approximate salary range, all suitable applicants will be referred to these companies. While the number of applicants has not been too large, some men of excellent training have applied for positions. Further, it is felt that if the Committee does know of positions open it will receive a greater number of applicants.

## *JULY MEETING . . .*

Dr. Hermann O. L. Fisher of Banting Institute, University of Toronto, will address the Puget Sound Section on July 30. The subject of Dr. Fisher's talk will be "Cyclic Plant Acids, Inositols and Carbohydrates."

Original plans for the summer had been to have no regular scheduled speaker meetings but when it was learned that it was possible to avail ourselves of the opportunity to hear Dr. Fisher, arrangements were made to hold a meeting July 30.

Your publication plans to go to press once this summer with one issue covering the activities of both July and August. The Summer issue will be published as soon as possible after the Picnic July 27 and the July 30 meeting, and will give pictorial coverage of the picnic and furnish editorial copy on Dr. Fisher's talk.

# *Social Activities . . .*

## SUMMER PICNIC [Refer to announcement, page 8]

Calling all members of the Puget Sound Section of the ACS. Come the 27th day of July—Saturday—you should gather up your baseballs, bats, bread, butter, beans, books, babies, and better-halves to bring them all to Miller's Lakeside Resort on Five Mile Lake, between Tacoma and Seattle, for the first annual ACS picnic—a gala affair with entertainment, games, and food for all, both young and not-so-young-as-you-used-to-was.

As to the food at this picnic, it will be the best you ever ate. There will be pink lemonade, fried chicken, your favorite sandwiches, pickles, olives, fresh green onions, tomatoes, a swell fruit salad, cookies, and even sugar for your coffee. All you have to do is to get your wife or girl friend to pack that kind of a lunch. For in order to avoid confusion each family or group of families must bring its own food. The committee, however, plans to furnish the ice cream, coffee and cream (no sugar). Oh yes, bring your own dishes, too.

Be prepared to laugh at the three-legged race for men over 50, the sack race for women, and the wheel-barrow race for analytical chemists.

This is just a sample of the work your Entertainment Committee is doing. Soon you will receive a questionnaire regarding social activities of this Section We hope you will cooperate by filling it out and returning promptly to this committee.

Thus far, the pre-meeting dinners have been very successful, but some have indicated a desire to see some changes inaugurated. The questionnaire will give you a chance to express your opinion; blame yourself if you miss the boat.

BUT DON'T MISS THE PICNIC!

D. V. REDFERN, *Chairman,*
*Entertainment Committee.*


***ELMER EHRLENMEIR who read with mixed emotion the May Editorial on "Reading Habits."***

# CHEMISTRY and DENTISTRY

***Recently G. Otto Orth, associate editor of this publication, became interested in the subject of the effect of fluorine in the human system on resistance to tooth decay. Herein is presented the results of his literature search and discussions with authorities on this topic.***

The chemist today has many and varied research problems from atomic fission to waste sulphite liquor and probably from penicillin to dental caries. Today a great project is under way to study the riddle of tooth decay. Fluorine is one of the chemicals now under careful scrutiny because of its preliminary merit in eliminating caries in children. Fluorine has been known for some time to have had certain value topically in dental work but not until recently has any great research program been undertaken to study its action from a biological or oral pathological standpoint. It is notable here, needless to say, that this research for the betterment of mankind is unhampered by secrecy or restriction and all information both pro and con will be available for public surveillance.

The great public demonstration of fluorine and its value has been highly publicized by the discovery of practically perfect teeth in Smith Deaf County, Texas. First it was believed that high calcium and phosphorus content of the soil might be responsible but later Dr. F. J. McClure of the Public Health Service concluded that there is no appreciable difference here and elsewhere, therefore assigning credit to the 3.1 parts per million of fluorine.

Research men are not prone to accept any one example for a complete answer to the problem of dental caries. Would it be wise to add fluorine to all drinking water in the United States on the strength of one successful area? They said no and proceeded to set up synthetic experiments in other parts of the country to examine more thoroughly their results. Grand Rapids, Michigan, is adding fluorine to its public water supplies to compare with fluoride-free Muskegon, Michigan, water in one test; Newburgh, New York, is paired with Kingston, New York, in another. Midland, Michigan, took it upon itself to add 1 part per million of fluorine to its water with the belief that it would be beneficial to its children.

The fluorine is usually added to the water as sodium fluoride. One of the main objections to fluorine is that it is very poisonous. This fact has led to many and varied researches by X-ray techniques in modern and fossil bones to determine whether or not fluorine is a collective poison.

Heavily fluorinated areas under study today show serious mottling of teeth. The people in these areas are being studied from standpoints other than dental caries to try and find whether or not physiological symptoms may be noted which might be harmful to the nation as a whole if fluorine were added to drinking water.

As far back as 1916 Drs. G. V. Black and F. S. McKay commented on the lack of decay in teeth where people had mottled teeth although the apparent cause was not discovered until fifteen years later. During this time Dr. R. W. Bunting of the University of Michigan suggested that there might be chemicals of some type in the drinking water which either protected the teeth or inhibited decay. Attention was quickly drawn to areas which had little or no fluorine in the water and soon it was recognized that fluorine was playing an important role in the prevention of caries. Dr. Elias Elvove, of the U. S. Public Health Service, developed new methods for the analysis of fluorine in drinking water which greatly assisted in plotting the course of caries in different areas. According to Dr. Dean of the U. S. Public Health Service, as little as one part per million of fluorine in drinking water will show a marked decline in tooth decay without discoloration. Children up to 12 years of age are more susceptible to positive results than adults. In some instances, topical application is showing some retarding effect on adult cavities.

Many theories have been propounded in the past as to what causes decay in

teeth but it is rather well accepted today that the Lactobacillus Acidophilus groups are probably responsible. These bacteria, for the most part, form lactic acid which attack the enamel of teeth. It is agreed that the elimination of the acid by changing the diet or by hygienic methods should correct the cause—but this would be hopeless as public co-operation could not be expected.

The next step was the thought that if bacteria required an enzyme to metabolize, then a simple enzyme poison might be the answer. Today it is believed that this is exactly what happens—fluorine is an enzyme poison.

Believing that many secrets of fluorine's effect upon teeth might be learned through a detailed study of tooth structures, two Dow men, L. C. Chamberlain, Jr., and Charles H. Gerould, of Physical Research Laboratory, embarked on a program of comparing the internal structures of normal and fluorosed teeth. Their laboratory tools were two of science's newest, the electron microscope, and the polystyrene silica-surface replica technique, developed by Dow for minute surface studies of various metals.

In the replica technique, the surface to be examined is polished and acid-etched, after which a negative replica of the surface is made by molding the thermoplastic, polystyrene against the etched surface. Evaporation of silica on this polystyrene molding results in a positive replica film, which is then viewed in the electron microscope.

Contrary to popular opinion, it was known that fluorosed teeth—those containing more than normal quantities of fluorine—are softer, rougher and often whiter than normal teeth. And yet they resist decay.

As studies were begun, an initial difficulty developed in obtaining specimens of fluorosed teeth. The explanation was simple, fluorosed teeth, being resistant to decay, are good teeth and their owners just weren't having them extracted. However, by contacting various sources, a quantity of fluorosed teeth were received, and comparisons were made with normal teeth.

The electron miscroscope revealed that the fluorosed teeth were composed of a much finer internal structure, on a submicroscopic scale, than that of normal teeth.

Further, it was learned that mottled teeth, those that are discolored due to excessive fluorine in drinking water, contained three to five times as much fluorine as normal teeth. And the fluorine content in teeth was discovered to be directly proportional to decay resistance.

Further studies have led the Dow men to believe that the fluorine entering a child's system is metabolized and forms an acid resistance which is decay resistance. The fluorine in the tooth is believed to be calcium apatite. Examination of a tooth which had been imbedded and never exposed to external absorption was fluorosed, bearing out the theory of ingestion and not absorption.

Chamberlain and Gerould believe that when the bacteria become concentrated in a protected region of a fluorosed tooth, their acids attack the tooth slightly, producing a fluoride solution at the point of attack. This fluoride solution may then become strong enough to kill the bacteria, thus eliminating harmful infectious decay.

In the final analysis the work is as yet incomplete. Findings so far have indicated that people who are living in an area containing appreciable quantities of fluorine have better teeth than those who do not live where fluorine is available. Studies are being conducted to determine the effect of fluorine on the human system. From these studies the world as a whole will soon have the answer to the fluorine problem—good or bad.

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# DR. WALDO L. SEMON

*(Continued from page 5)*

lished in the Journal of the American Chemical Society—an almost unheard-of honor for an undergraduate.

In June, 1920, he was graduated with honors and that summer, on the strength of a university part time teaching fellowship, he married Marjorie Gunn, a pretty blonde chemistry student. She too ended her college career with high honors.

Waldo immediately started on his graduate work with a major in chemistry and minors in mathematics and physics. In 1923 he received his Doctor's degree and accepted a position as full-time instructor at the University of Washington. His research continued and several more papers were published in the chemical journals.

In 1926 Dr. Semon was contacted by Dr. Harlan L. Trumball, then manager of chemical research at the B. F. Goodrich Company at Akron, Ohio. Trumball was seeking a particularly able man to engage in fundamental research in rubber. Dr. Semon eagerly accepted this opportunity and vindicated the hopes placed in him by soon creating one synthetic adhesive after another.

One day he struck out in another direction in his researches as a result of being attracted to the possibilities of the use of polyvinyl chloride in this field. Years before this substance had been prepared by a Russian scientist and was found to be hard and horny. However, its molecular structure possessed similarities to that of rubber, so Semon attempted to convert it to an adhesive. The result was the development of a new rubbery-like material which possessed astonishing properties. Unlike rubber, it was non-inflammable and was very resistant to oxidation. Again, unlike rubber, it was unaffected by oil or gasoline. Because it sealed against the corrosive action of almost every known acid, the new material was named Koroseal. It served our country in a multitude of ways during the war and is now serving our peace-time economy.

Next Dr. Semon created more than a score of new age resisters which impart to rubber longer life and strength against the effects of heat, flexure, and oxygen.

For many years the B. F. Goodrich Company was concerned because the entire rubber industry had to rely entirely upon foreign sources for its basic raw material. Moreover, it was conceivable that this source could be entirely cut off in time of war. For this reason Dr. Semon was called from his other duties in 1935 to concentrate on a practical synthetic rubber for tires. The problem was truly impressive when we realize that German and Russian scientists had been working on this for twenty-five years. Semon first critically investigated every detail of their work; for six months he toiled 16 hours a day, reading scientific reports in French, in German, in English.

When this was completed he knew the main ingredients, but not the secret formulas, of the five principal synthetics in the world. He set out to reproduce each one in his laboratory. In six months he had reproduced them all — a staggering scientific feat.

After building up this immense technical background, Semon sailed for Europe in 1937, hoping to learn something of Germany's synthetic rubber techniques. He was particularly interested in Buna S, the rubber on which Hitler's armies later smashed France and Poland. German scientists received him cordially, but found it "inconvenient" for him to inspect their synthetic rubber installations.

By this time it was apparent to Dr. Semon that war preparations were under way. Upon his return he recommended that synthetic rubber research be pushed at redoubled speed. Additional scientists were placed under his direction. About 14,500 synthetic rubbers were produced with more than 250,000 separate evaluation tests on the various samples. By Christmas of 1938 the first large charge of promising synthetic rubber was produced in the new pilot plant.

This soon led to the actual production of tires with results that exceeded the hopes which had been built. Al-

*(Continued on page 16)*

# SPECIES OF SHARK IMPORTANT TO THE NORTHWEST CHEMIST

By F. BRUCE SANFORD and G. IVOR JONES

*Chemists, Seattle Fishery Technological Laboratory U. S. Fish and Wildlife Service*

Sharks are interesting, and they can be beautiful if they furnish you with a livelihood as they do for many of the chemists of the Puget Sound Section. For these chemists, the shark is important primarily because it serves as a rich source of vitamin A.

While most sharks produce some vitamin A, only a few species produce it in abundance. Fortunately two of the species which contain this vitamin in the greatest amount are found here in the Pacific Northwest. To handle the chemical processing of their vitamin A, three plants are located in Seattle alone and this city is now one of the world's principal centers of vitamin A production.

The two species primarily responsible for this important industry are the soupfin shark (Galeorhinus zyopterus) and the grayfish or dogfish (Squalus suckleyi). The vitamin A reserves of these two fish are concentrated almost entirely in their liver oil and the livers of the soupfin are the more valuable. The price of its liver ranges from 25 cents to about 15 dollars per pound. The average is about one dollar for livers from females and six dollars for those from the males. The grayfish livers range from five cents to about one dollar per pound with the average price being about 40 cents.

In the case of the soupfin, the male furnishes the more potent liver oil. It averages about 120,000 units per gram while the oil from the female liver averages about 30,000 units. However, the female livers are higher in oil content, yielding about 70 per cent oil against 60 per cent for the males, and the female livers are nearly twice as large. Consequently the yield of vitamin A per fish approaches the same value for the two sexes. The combination of a large liver containing a high oil content with a high vitamin A potency makes the soupfin shark the world's most sought after fish. A single specimen may be valued in excess of fifty dollars.

The early fishing methods for this species used hook and line but later it was found that the soupfin could be taken in nets. Since these fish swim in schools, the fisherman usually hits the "jack pot" or else has a "skunk trip." A typical case is that of a two-man boat which earned 12,000 dollars in four months fishing, 8,000 dollars of which were made in a period of only two days. These high stakes have attracted a large number of boats to the fishery and as a result the soupfin shark has been severely depleted.

While less spectacular than the soupfin, the grayfish is nearly as important a source of vitamin A due to its greater abundance. Before the discovery by chemists that the grayfish liver contains appreciable amounts of vitamin A, these fish were so numerous as to be a nuisance to the other fisheries. Having been subjected to intensive exploitation since 1938, the grayfish are now becoming difficult to find.

The grayfish is only a small shark about one-half the size of the soupfin. The male grows to an average length of three feet while the female grows a foot longer. Their livers contain about 70 per cent oil which has a maximum potency of 30,000 units per gram with an average in the neighborhood of 14,000 units.

Unlike most other fish which reproduce themselves by laying eggs, the grayfish are ovoviparous (the eggs are hatched within the body of the female). Gestation takes the surprisingly long period of two years and the average number of young per female is seven. The rate of growth is exceedingly slow. Tagged fish recaptured after a period of several months show no appreciable increase in length. With such a low rate of reproduction and slow growth, the early abundance of the fish was due to their high rate of survival and their longevity.

*(Continued on page 16)*

**The soupfin shark bears this peculiar name because the dried fins from this species are used by orientals to prepare a reportedly delicious soup.*

## SPECIES OF SHARK

*(Continued from page 15)*

All evidence points to a maximum age of thirty or forty years.

Both the oil content of the liver and its vitamin A potency are a function of the size of the fish. The changes in oil content of the livers with growth of the fish are particularly interesting. Fetal livers contain 60 to 65 per cent oil. Shortly after birth this drops to 10 or 20 per cent. Thereafter it slowly increases until in the largest grayfish it reaches a maximum of 75 to 80 per cent. Apparently, the oil in the liver serves as an energy reservoir. During the period immediately after birth, while the fish is adjusting itself to its new environment, the oil in the liver furnishes the energy until the young has learned how to find its own food.

Contrasted with this stored up oil is the low vitamin A content of the fetal livers. The potency is only about 200 units per gram. After birth this increases slowly with length until the fish attains sexual maturity. The increase in vitamin A with increase in length then accelerates rapidly.

Another interesting fact concerning the fish is that those with the darkest colored livers have the highest vitamin A content. Advantage of this observation was taken in the early days when livers were bought by "guesstimate" or "blind-buying." In general, for fish of the same size and sex, as the livers become darker, they weigh less, contain less oil, but they develop a higher vitamin A content.

The future of this industry seems to depend almont entirely upon the supply of fish. As the standard of living rises in our own and other countries a greater demand for vitamin A can be anticipated. Even at the present time, the United States can not supply its own requirements but is now partially dependent upon imports from other countries, principally Argentina. The possibility exists that vitamin A will be produced synthetically. Several patents have already been granted for the chemical synthesis of this vitamin, but commercial production still seems distant.

The extent of the shark depletion is difficult to estimate. Certainly it is becoming serious. Whatever effect this may have in the future, the soupfin and the grayfish have served well the chemists of the Pacific Northwest in establishing here a biochemical industry. The various concerns in this region have a vigorous management and many of the laboratories are now advancing beyond the control stage into investigative research. Undoubtedly this will eventually result in the establishment in this area of a permanent biochemical industry of substantial proportions.

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## DR. WALDO L. SEMON

*(Continued from page 14)*

though there was at that time no place for general purpose synthetic rubber because of its higher cost, Dr. Semon believed that the manufacture of the synthetic product should be undertaken in the interest of national defense. This program was initiated and quickly attracted the attention of our military leaders. After a considerable period of hearings the Government's synthetic rubber program was finally launched.

Fellow chemists from all the rubber companies involved elected Semon to be chairman of their first technical committee. His patents were poured into an industry pool, and many of his processes have now become standard.

Dr. Semon now predicts that in the future there will be many synthetic rubbers specifically tailored to suit the particular uses. In the case of tires, one rubber will be used for inner tubes, another for coating the cords in the carcass, another for side walls and still another for treads.

Processes for bonding rubber to steel have been part of a project under Dr. Semon's sponsorship. This has reached a point where it is now being used for lining acid carrying tank cars.

Through the years many publications, among them over a hundred technical papers and patents, have borne Semon's name as an author. Recently he has been placed in charge of the new Pioneering

*(Continued on page 26)*

# REPORT of the COUNCILORS . . .

**Following is a report presented by Victorian Sivertz, Walter R. Gailey and George H. Cady, councilors of the Puget Sound Section.**

The duties of councilors of the American Chemical Society are determined by the Constitution and By-laws of both the National Society and the local section. They are members of the Council of the Society and as such are elected by the local section, one member being allotted to each 100 members or fraction thereof. Their term of office is one year starting January 1.

The Council thus includes some 400 councilors and other officers of the Society. It meets twice a year at the general meetings. The Constitution outlines the manifold duties of the Council, including advisory action in matters of management of the Society; fixing times and places of general meetings; establishment of local sections; drafting by-laws; acting on proposed constitutional amendments before vote by the membership; and bringing appropriate items of business before the Council.

One function of the Council, little realized by the membership at large, is that they choose the president-elect from the four persons receiving the greatest number of nominating ballots for the president-elect. They likewise elect the councilors-at-large and elect the editors of the journals.

The Puget Sound Section has three councilors (until our membership exceeds 300—which means that in 1947 we will have 4 councilors). They are elected at the annual meeting of the Section along with the other officers of the section. Our local constitution designates them as members of the executive committee of the section. In this capacity they help determine policy and act on matters which fall within the sphere of the executive committee. They may or may not participate in committee work.

It is thus seen that the councilor is your representative in matters relating to the National Society in much the same way that members of Congress are your representatives. It is quite fitting that the local section or individuals bring matters before them since, as outlined above, they and they only apparently can bring such matters before the council. Actually in our Western Sections a serious handicap is imposed on the full democratic operations of the process by the rather infrequent attendance of councilors at general meetings. However, this should not discourage members from bringing their views to the attention of councilors. Certain matters, such as choosing the president-elect, are conducted by mail. It should perhaps be noted that there have been and probably will be proposals to change the nature of the council. Such proposals deserve the earnest consideration of every member.

The above brief account attempts to outline the relations of the councilor to the Society and to the local section. In view of the fact that these relations are somewhat in a state of flux, it is fitting that you consider them seriously and critically.

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"The first essential in chemistry is that thou shouldst perform practical work and conduct experiments, for he who performs not practical work nor makes experiments will never attain to the least degree of mastery. But thou, Oh my son, do thou experiment so that thou mayest acquire knowledge. Scientists delight not in abundance of material; they rejoice only in the excellence of their experimental methods."

—JABIR IBN HAYYAN *(Islam chemist in the eighth century)*

# LICENSING of CHEMICAL ENGINEERS

## *Should Chemical Engineers in the State of Washington be Licensed?*

**By R. W. MOULTON, Sec'y-Treas., Chem. Engr. Soc. of Wash.**

The licensing of chemical engineers is a matter which should be given considerable thought by every chemical engineer in this state. Washington is one of the few states in the country which does not yet have an engineering licensing law which includes chemical engineers.

The present engineering registration act of the State of Washington (*) reads as follows:

> "The term "practice of the profession of engineering" whenever used in this act, shall mean assuming responsible charge of investigating, reporting on, designing and/or supervising the construction of equipment, structures, utilities and/or projects, when the proper performance of such services requires technical engineering knowledge and skill, and shall include civil, electrical, mechanical and/or hydraulic engineering.
>
> "The term "professional engineer" whenever used in this act, shall mean and include only a person who, through technical knowledge and skill, gained by education and/or by experience, is qualified to practice one or more of the above enumerated branches of the profession of engineering."

There are some rather strong arguments in favor of the licensing of chemical engineers. One of the best of these is that because of the growth and expansion of collective bargaining units the subprofessional as well as the professional groups tend to be included in such units. Doctors and lawyers, on the other hand, do not face this pressure because of their recognized professional status.

Most existing state license laws require about five years post graduate practical experience as a perequisite for licensing. This leaves a period for the new graduate during which he is not protected by recognition as a professional engineer. Several states have amended their laws so as to qualify the young graduate as "engineer in training" immediately after graduation and thus bridge the gap until full professional status is reached. This practice is spreading and may soon be generally accepted.

The licensing of chemical engineers, as is true of all engineers, has as one of its main objectives the protection of the public, the employers, and the professional engineer. Through the application of the license law the right to practice may be denied to those inadequately qualified. This is about the only means available today for upholding by law the standards of our profession.

Many chemical engineers feel that licensing should be on a national scale rather than by the separate states. This would have some very desirable aspects but it seems that it still is a long way off. A substitute for a universal law is coordination of existing state laws and the granting of complete reciprocity between the various states. There is a need for more active interest in this matter.

In the states having licensing laws the chemical engineers represent a very small percentage of the total registered engineers. As such they are in a poor position to exert influence in state professional societies on matters which affect the professional welfare of chemical engineers. In a recent poll of members of the American Institute of Chemical Engineers it was found that where licensing laws were in existence only 19.7 per cent of the active members, 17.5 per cent of the associate members, and 3.0 per cent of the junior members were licensed.

At the present time it appears that the state licensing laws provide the best method of providing recognition for the professional status of chemical engineers. These laws can be designed to include the recent graduate by means of the "engineer in training" category. The responsibility for action rests with the chemical engineers of this state. The licensing laws provide a method of distinction between the professional and non-professional man. We can use them to improve our profession.

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**Laws of the State of Washington, 1935, p. 556, Paragraph 1.*

# *Student Activities . . .*

## UNIVERSITY OF WASHINGTON

### *Phi Lambda Upsilon*

The annual sophomore award for maintaining the highest grade point in his class of men chemists and chemical engineers was awarded to Girard Ordway at the initiation banquet of Phi Lambda Upsilon on May 25. The banquet was held at the Malloy Manor in honor of the following initiates: Marshall Bartlett, Aven P. Miller, Layton McCoy, Raymon Lawton, Leland Burger, Ernest Wenkert, Derry Curtiss, LeRoy Wilcox, Dean Hudson, and Jerry Nelson.

Dean Edwin R. Guthrie of the graduate school spoke on "Industrial Psychology." The initiation was well attended by both student and faculty members.

The election of officers to serve next year will be held in the very near future.

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### *Iota Sigma Pi*

At a recent meeting the members of Oxygen Chapter of Iota Sigma Pi elected the following officers to serve for the coming year: Margaret Gano, president; Carol Green, vice-president; Hilda Daniels, recording secretary and treasurer; Betty Armour, corresponding secretary.

The date for the annual spring picnic was set for Saturday, June 1, and was held at the home of Dr. Zalia Gailey. Two awards were made at the picnic—a scholarship award to Miss Carol Green as the outstanding student of the year and a second award to Miss Myrtle Logue.

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### *AICHE—Student Branch*

The next meeting of the student branch of the American Institute of Chemical Engineers will be held on Wednesday, June 26, at 7:30 p. m. in Room 140, Bagley Hall. Mr. Redfern, from Adhesive Products Co., will address the group on "Bonding Agents for Plywood."

Because of the large enrollment that is expected this summer, the student chapter meetings will be continued at intervals of about every three weeks.

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### *Ammonii Socii*

Ammonii Socii sponsored a dance "For Dreamers Only" on May 25 at Eagleson Hall. Dancing was to the soft, smooth rhythm of the nation's best bands. Since only a minimum number of tickets were offered for sale, the guests had a delightful evening of uncrowded dancing.

Ammonii Socii will sponsor a joint all-chem-shack picnic with the help of the Pharmacy Club. The picnic will be held on the afternoon and evening of June 7 at Beaver Lake. The traditional tug-of-war will be waged across Frosh Pond between the members of Ammonii Socii and Pharmacy Club at Friday noon. Dancing, swiming, baseball, and other sports and games will be in order at the picnic.

# News Items...

## Erickson Addresses Chemists Club at Seattle College

At a recent meeting, members of the Seattle College Chemists Club heard a talk by Mr. Herbert R. Erickson, Superintendent Plastics Division of the Tower Company, Inc., of Seattle, who spoke on "Opportunities for Chemists in Industry."

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## Pac. Coast Chemical Exposition At San Francisco Proposed

Our neighbors in the California Section of the American Chemical Society have announced plans for a proposed Pacific Coast Chemical Exposition to be held at San Francisco some time during the fall of 1947. Under consideration at the present time is a meeting similar to the National Chemical Exposition which is held annually at Chicago. Surveys are now being made throughout California and the Pacific Northwest to obtain the interest and support of the various Pacific Coast Chemical Industries.

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## Oregon Section May Meeting

Among the speakers of the recent May meeting of the Oregon Section of the A. C. S. held in Portland were Mr. Fay W. Libbey of the Oregon State Department of Geology and Mineral Industries, who spoke on "Some Features of Oregon's Mineral Industry"; Mr. S. C. Schwarz, who gave an illustrated talk on the "Portland Gas and Coke Company Operations"; and Dean G. W. Gleeson of Oregon State College, whose topic was "Some Random Arguments."

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## Cereal Chemists Met In Spokane June 2 and 3

The Pacific Northwest Section of the American Association of Cereal Chemists held their annual meeting at the Davenport Hotel in Spokane on June 2 and 3. In addition to papers given by members of their section, talks were given by a number of outstanding speakers, including Dr. W. S. Hale, Director of the Enzyme Research Laboratory at the Western Region Research Laboratory, Albany, California; Mr. Willard M. Crawford. Field Secretary of the Pacific Northwest Crop Improvement Association; Dr. G. H. Brother, head of the Industrial Products Division of the Western Regional Research Laboratory, Albany, California; and Mr. O. A. Vogel, Agronomist in the Bureau of Plant Industry at the U. S. Department of Agriculture Experiment Station, Pullman, Washington.

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## Local Chapter of Institute of Food Technologists Being Petitioned

As a culmination of a highly successful membership drive, a group of local food chemists are now petitioning for the establishment of a local chapter of the Institute of Food Technologists. Under the temporary chairmanship of Mr. Walter Gailey of the Crescent Manufacturing Company, three meetings have been held this year. No further meetings are planned until this fall, when it is hoped that the new chapter can be established. Other officers include Dr. H. C. Douglas, Secretary; Dr. R. W. Cluff of the National Canners Association, Treasurer; and on the Executive Committee, Mr. K. E. Monfore of the U. S. Food & Drug Administration, Mr. M. E. Stansby of the U. S. Fish and Wildlife Service and Dr. E. D. Clark of the National Canners Association.

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The first Federal laboratory was established in 1862. C. M. Wetherill was the first official in the Government service to hold the title of chemist. His salary was $1600.00 per annum.

The first laboratory to be established in this country representing an organized industry was that of the National Canners Association in 1913.

The first laboratory within what is now the United States was established in 1631 by John Winthrop.


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## *New Members Who Attended May Meeting . . .*

Presenting seven of our new members who were in attendance at the last meeting, May 25. Reading from left to right:

COLLIS BRYAN, *M.S.* U. of W. '35, has been with I. F. Laucks, Inc., for the past five years. Prior to that time he taught chemistry in Bellingham and Seattle.

JOHN SCOTT, U. of W. '43, has been with Adhesive Products Company since graduation.

BOB STEPHENSON is a transfer from the St. Louis Section A. C. S. He received his doctorate from Illinois in 1942. Since that time he has been with Monsanto in St. Louis and has just been transferred to I. F. Laucks, Inc.

JACK SKEWES, U. of W. '38, returned to Laucks Laboratories last October after three years in the Navy serving as a commander in the Pacific.

GERALD FREEMAN, College of Puget Sound, '36, also studied at U. of W. 1936 to 1938 (Geology), has been with Laucks Laboratories since 1939.

ERNEST STREET, U. of W. '43, was with Nash Kelvinator in Detroit before joining the staff of Laucks Laboratories as a chemist.

JOHN LINCOLN, U. of W. '37, was with the State of Washington Bureau of Fisheries before going with Laucks Laboratories.

## TWO DOCTORATES IN CHEMISTRY AT UNIV. OF WASH. IN JUNE

DONOVAN A. COURVILLE has completed requirements for his Ph. D. in Chemistry at the University of Washington and has returned as assistant professor of chemistry at Pacific Union College at Angwin, California. Mr. Courville's thesis was on the subject "The Chlorination of Trans-decalin with Sulfuryl Chloride."

FATHER GERALD R. BEEZER, S. J., will also receive his Ph. D. in Chemistry in June. His thesis, "The Preparation of Diphenylstibine" was an outgrowth of his study under Dr. Dehn, whose outstanding contribution was the discovery of the primary arsines.

As a young boy Father Beezer attended the Minor Public School and later Seattle College. He received his B. Sc. at Gonzaga University in Spokane in 1921, his M. A. in 1922 and his M. Sc. in 1932. He has also studied at Fordham, Santa Clara and Georgetown. From 1935 to 1937 he attended the University of Washington full time doing course work in chemistry and mathematics towards his Ph. D. (Father Beezer has a full minor in mathematics). He started teaching at Seattle College in 1937.

In th last forty-two years Father Beezer has attended institutions of learning as a student for all but seventeen years—a total of twenty-five years in actual study.

## CHEMICAL & ENGINEERING NEWS TO OPEN SAN FRANCISCO OFFICE

### *Sawyer Appointed Associate Editor*

Frederick G. Sawyer has been appointed associate editor of *Chemical & Engineering News* and *Industrial & Engineering Chemistry*, in charge of the office which is to be set up in San Francisco.

Dr. Sawyer received his bachelor's, master's and doctor's degrees in chemical engineering at the Polytechnic Institute of Brooklyn, where he was editor of the *Polytechnic Reporter*, college weekly. During his doctorate studies he was recipient of the Bloede Scholarship given by The Chemists' Club, New York. In 1943 he joined the research staff of the American Cyanamid Co., Stamford, Conn. Two years later he was transferred to the Cyanamid Sales Department in New York City, where he edited bulletins concerning chemicals for the paper industry.

He has been a member of the American Chemical Society since 1940, and is also a member of Sigma Xi, Phi Lambda Upsilon, American Institute of Chemical Engineers, and the American Institute of Chemists.

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*As a result of the Alaska gold rush in 1898, Stewart & Holmes Drug Company, Seattle (now a unit of McKesson & Robbins), established a department of assay supplies, which grew to include general laboratory apparatus.*

## CHEMISTRY AND CHEMICAL ENGINEERING GRADUATES FROM UNIVERSITY OF WASHINGTON IN JUNE

### *Bachelor of Science; Major in Chemistry:*

Cecil Henry Baldwin, Marian Boehr, Willard S. Bross, Ramsey Gordon Campbell, Fred Casserd, Eugene Collias, Catherine Cooper, William De Hollander, Clark Wm. Fowler, Lloyd Fry, Richard Hildebrandt, Dean Gordon Hudson, Raymon Lawton, Jerry Allen Nelson, Richard V. Polson, Edward Van Steenvoort, Cynthia Watkins, V. Zacharenko.

### *Bachelor of Science; Major in Chemical Engineering:*

P. W. Conolley, P. A. Apostoli, G. W. Steele, R. D. Gillen, W. B. Thielicke, E. M. Read.

(Because of the change in the chemical engineering schedule due to the war, most of the chemical engineers will graduate at the end of the summer quarter this year).

## DR. WALDO L. SEMON

*(Continued from paget 16)*

Research Laboratory of the B. F. Goodrich Company.

In 1940 Dr. Semon was chosen as one of the Modern Pioneers of Industry by a national committee of leading scientists, selected by the National Association of Manufacturers. Last year Dr. Semon was named for the Charles L. Goodyear award by a committee of outstanding rubber chemists chosen by The American Chemical Society. This year the University of Washington Alumni Association confers on Dr. Semon, for distinguished work in chemical research, its highest honor, Alumnus Summa Laude Dignatus.

Dr. Semon is a big man in physical as well as mental and spiritual stature. He is six foot two and weighs 220 pounds. His associates like him for his modesty and friendliness. The Semons have three daughters, Mary, who has been teaching with her husband at Williams College; Beth, who is attending the University of Michigan, and Constance, now finishing high school.

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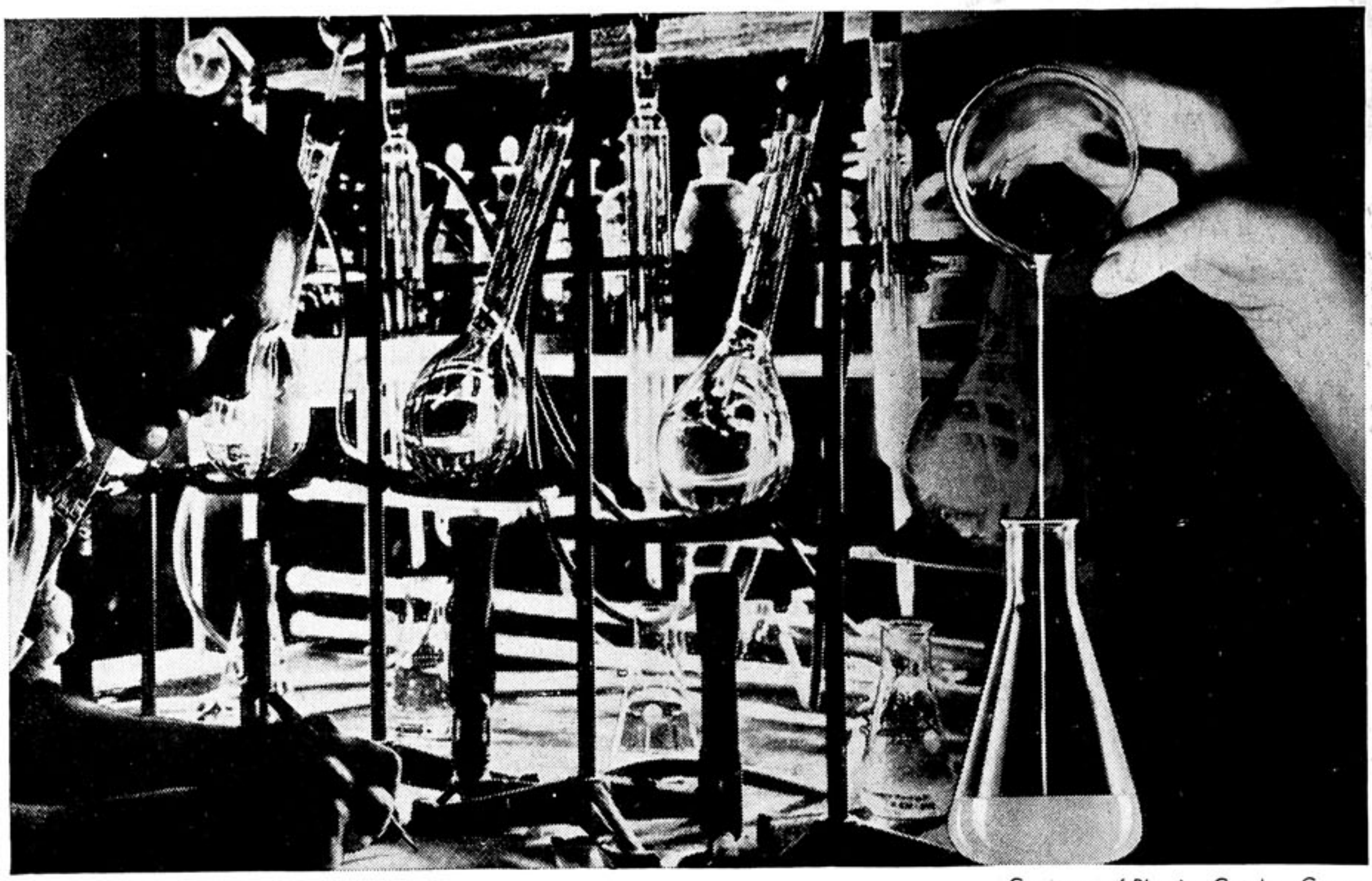

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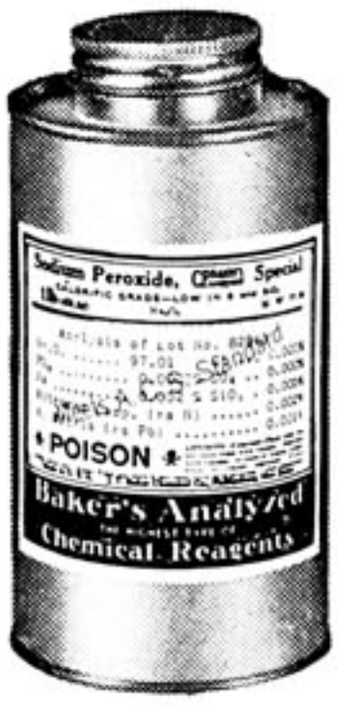


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