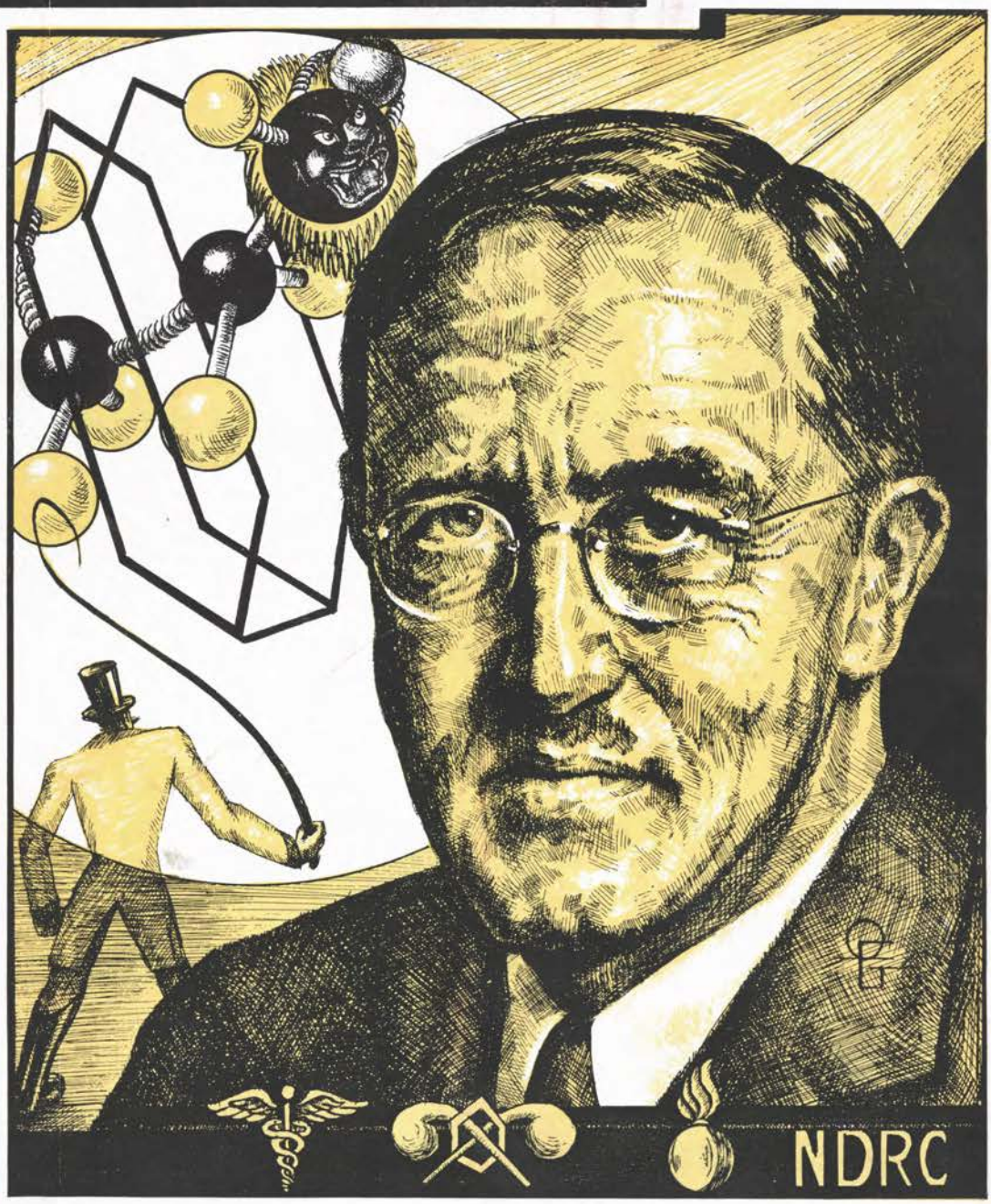
CHEMICAL AND ENGINEERING NEWS

SEPTEMBER 10
1946



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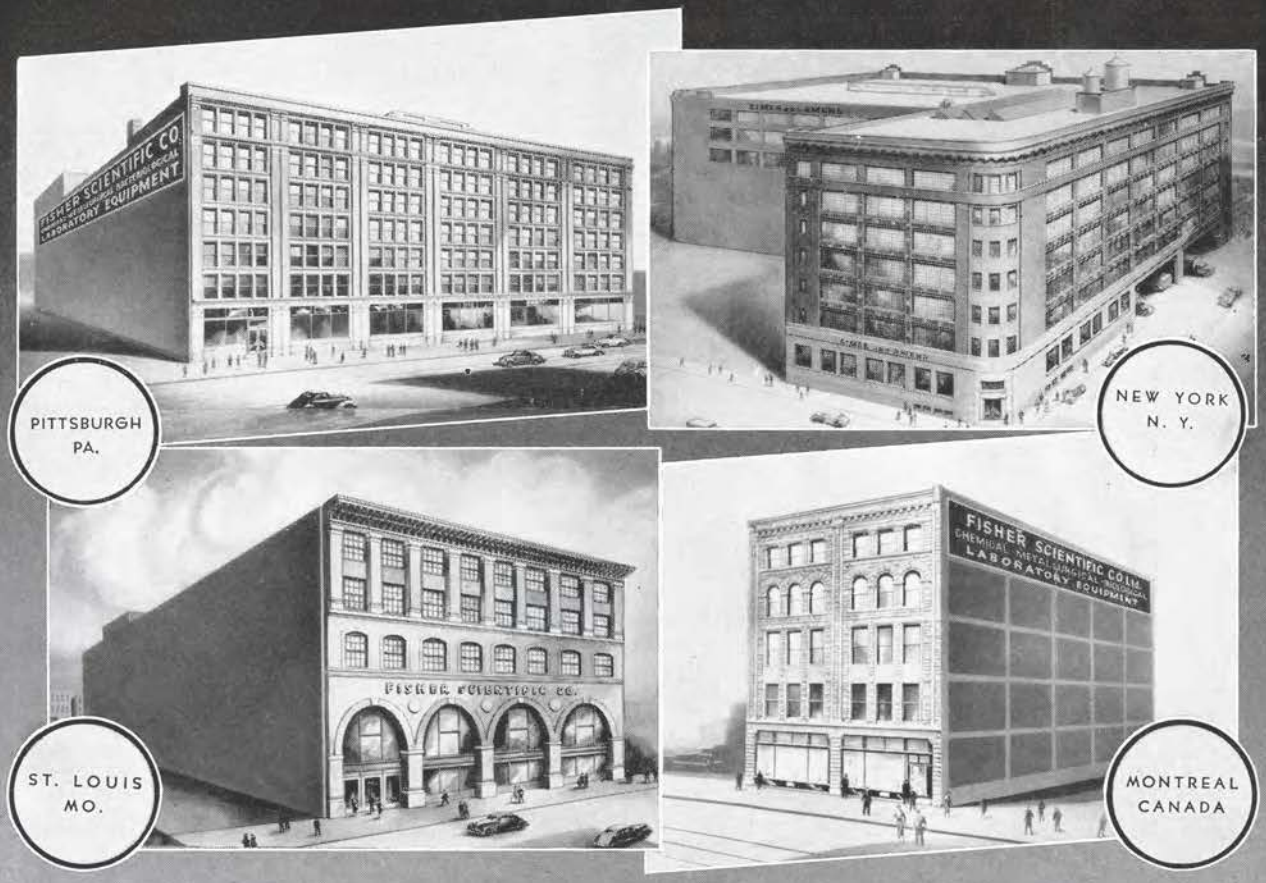

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CHEMICAL AND ENGINEERING NEWS

the newsmagazine of the chemical world

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SEPTEMBER 10, 1946

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Cover drawing by Frances O'Brien Garfield

"NEWS EDITION I. & E. C."

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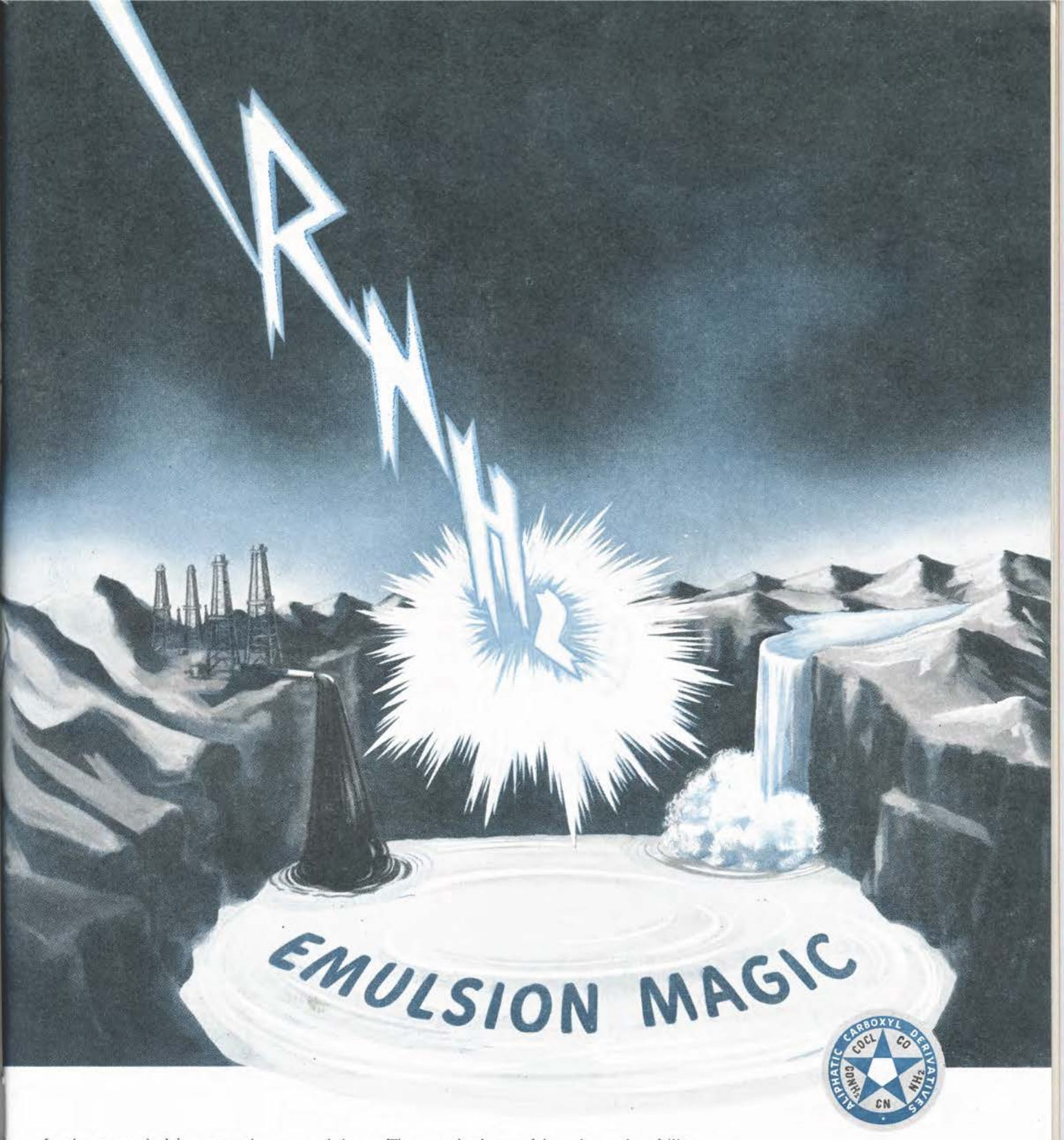

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Potomac Postscripts

by LYNNE M. LAMM

Committee on Reciprocity Information considers trade agreements; International Trade Organization and world conference planned . . . Patent Office reconsolidated . . . Carbon Black, Inc., on trial . . . Adjustable prices for resins from butyl alcohol

THE "Economic and Social Council of the United Nations" has called a meeting for October 15, at the suggestion of the United States, to launch the preliminaries to the reciprocal trade conferences involving this country and 19 other nations, in actual fact a world trade conference.

The council has established a committee which will meet at that time, and discuss further plans for the world trade conference and the creation of an International Trade Organization, which will become a part of the United Nations galaxy of new bodies, agencies, etc.

Of more immediate interest to trade and industry in the United States is the fact that a Committee on Reciprocity Information, which is another of the anonymous bodies springing up since the end of the war, is preparing to consider trade agreements in this procedure which will affect some 3,000 or more American commodities.

There is nothing sudden in any of this, since it became known about a year ago, that a plan of this general nature was being prepared in Washington. There was the promise at that time that all interested parties would have ample notice, and time to present pertinent facts. Then nothing much was heard about it.

However, certain less optimistic members of Congress, having home industries in mind, have devoted much effort to following the plan along.

In view of the fact that actual tariff negotiations are still some months away, official agencies concerned have declined to furnish a list of commodities affected, on the ground that it would be "premature" even if such a list were fully prepared and ready. Actually, however, department officials state, much work remains to be done.

It is necesary to give preliminary consideration to many factors surrounding each commodity, officials have explained, and even the decision to include a commodity on the list, apart from any action on tariffs affecting it, involves much work, they add. The Tariff Commission has been engaged for the past year in trade studies which doubtless will figure in these discussions, and interested members of Congress have access to the Commission studies on various commodities, which have been listed as the work is completed.

Getting down to ground, however, it is known that proposals to be considered at the forthcoming conference, and subsequent gatherings, contemplate reductions in tariffs, and removal of various other trade barriers and so-called discriminatory practices.

The obvious fact that other countries are not producing any great amount of goods, and want ours, is offset by their inability to buy American goods because of lack of exchange. This leads to the suspicion that a line of reasoning will be followed later that the way to give them exchange is to let them sell in our market. And the next question is, what do other countries propose to sell here, and at what tariff reductions, in competition with like American commodities?

Chairman L. R. Edminister, of the Committee on Reciprocity, has stated in a letter to Rep. Thomas A. Jenkins, of Ohio, that his group is "not unmindful of the feeling of apprehension which exists among various American industries by reason of uncertainty concerning the publication and contents of this commodity list".

"I should like to emphasize however," Mr. Edminister wrote, "that after announcement of the negotiations has been made and the list of commodities to be considered has been published and given the widest possible dissemination, every opportunity will be accorded interested parties to prepare and present their case. Adequate time will be allowed for preparation of briefs, public hearings will be held, as required by law, and the trade agreements organization will carefully analyze and digest the testimony and collate it with other information available to it before arriving at a decision with respect to any product".

Patent Office Returns

The Secretary of Commerce has announced definitely that Patent Office units which have been situated in Richmond, Va., for some years, will be moved back to Washington in the next month. Additional space has been found in Temporary Building 7, at the Washington National Airport. Many examining divisions will be incorporated in the organization within the Commerce Building itself. Some 36 examining divisions are scheduled to be returned to Washington. As rapidly as space can be found in the Commerce Building all units temporarily located elsewhere in the city, as at the airport, will be brought back to the building, where the Patent Office formerly was located.

Since 1942, it is recalled, Patent Office functions have been split between Washington and Richmond. Included have been the following: Applications, Assignments, Issue, Docket, and Mail divisions, which, it is now planned, will be brought together again at the temporary airport location. As soon as the Maritime Commission and other extraneous activities can be moved out of the Commerce Department proper, absent units will be assembled in their old quarters, it is said.

Export Case

The Federal Trade Commission has launched hearings in the case of Carbon Black Export, Inc., to determine if the association and members have engaged in practices or arrangements in violation of the Export Trade Act, better known as the Webb-Pomerene Law.

Butyl Alcohol Price Adjustments

The OPA has now acted to provide for automatic adjustment of maximum prices by manufacturers selling synthetic resins containing butyl alcohol, which will offset increases in the price of the alcohol used.

Synthetic butyl has a ceiling of 10.75 cents a lb., and fermentation butyl from either molasses or grain, roughly 20 cents, for molasses base, and made from grain, based on the grain price. With grain prices no longer controlled, and already increased, grain butyl alcohol has reached 18 cents, and higher prices are expected. Hence the adjustable provision for resins using these components, however, OPA will require complete reports on adjusted prices.

Sales of Industrial Chemicals

Wholesalers' sales of industrial chemicals totaled $8,455,000 for the first 6 months of 1946, a rise of 2% from the corresponding period of 1945, according to Bureau of Census, based on figures from reporting firms. June sales totaled $1,491,000 a decline of 5% from May; 5% less than in June last year. Inventories in June dropped 2% from May levels, but showed no change from June 1945.

Sales for May were $1,135,000, showing no change from April or from May last year. Inventories declined 4% in May from April, but were 3% above those in May last year, according to the report.

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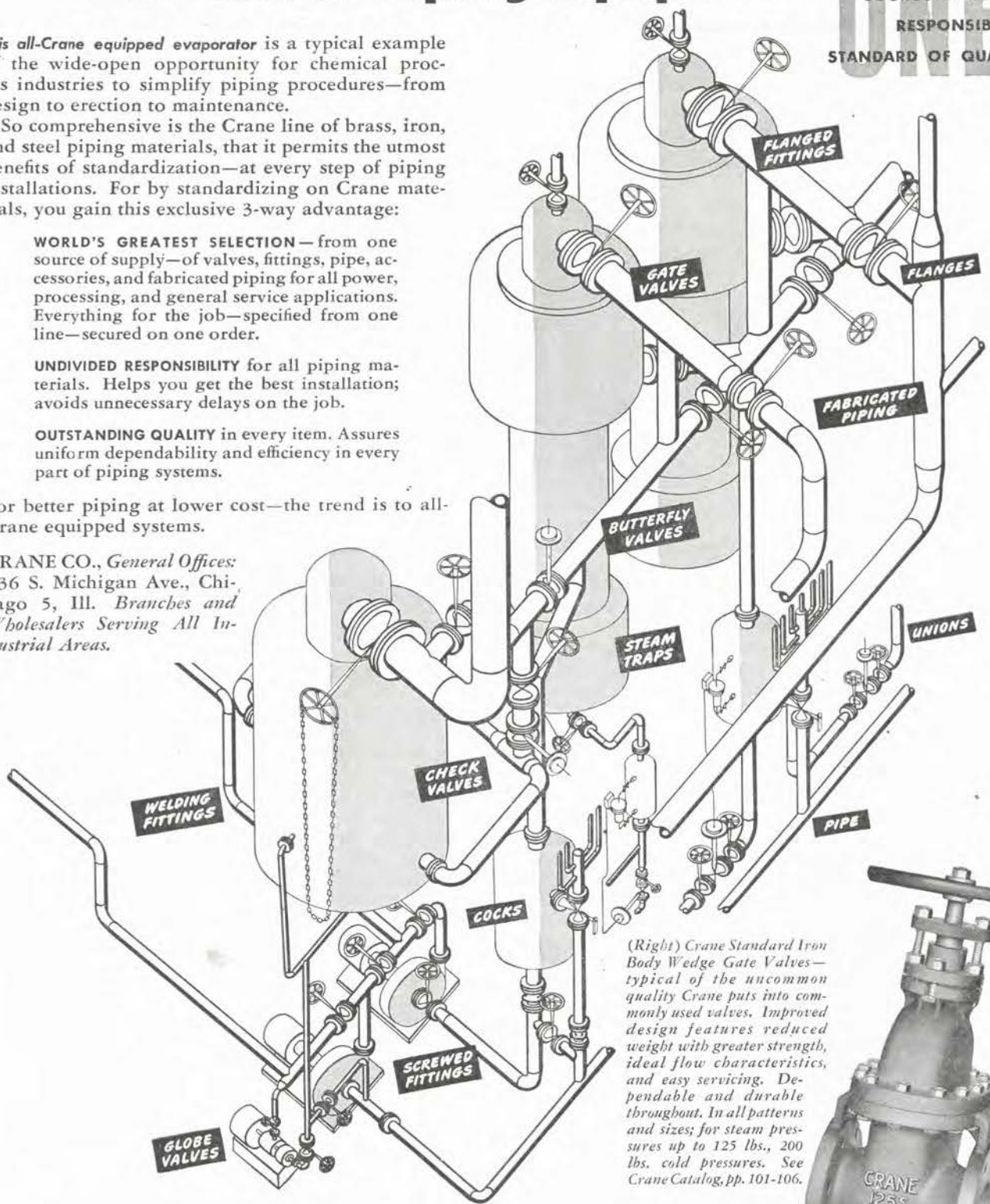

(Right) Crane Standard Iron Body Wedge Gate Valves—typical of the uncommon quality Crane puts into commonly used valves. Improved design features reduced weight with greater strength, ideal flow characteristics, and easy servicing. Dependable and durable throughout. In all patterns and sizes; for steam pressures up to 125 lbs., 200 lbs. cold pressures. See Crane Catalog, pp. 101-106.

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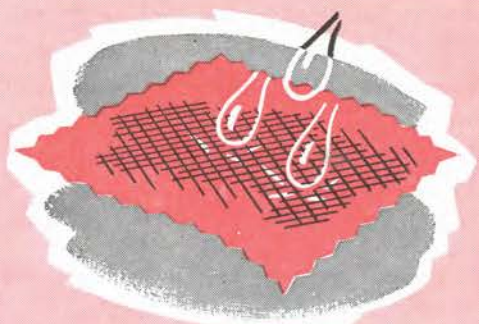

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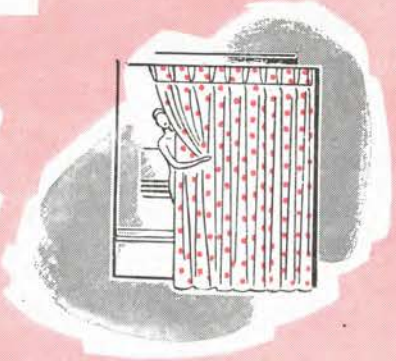

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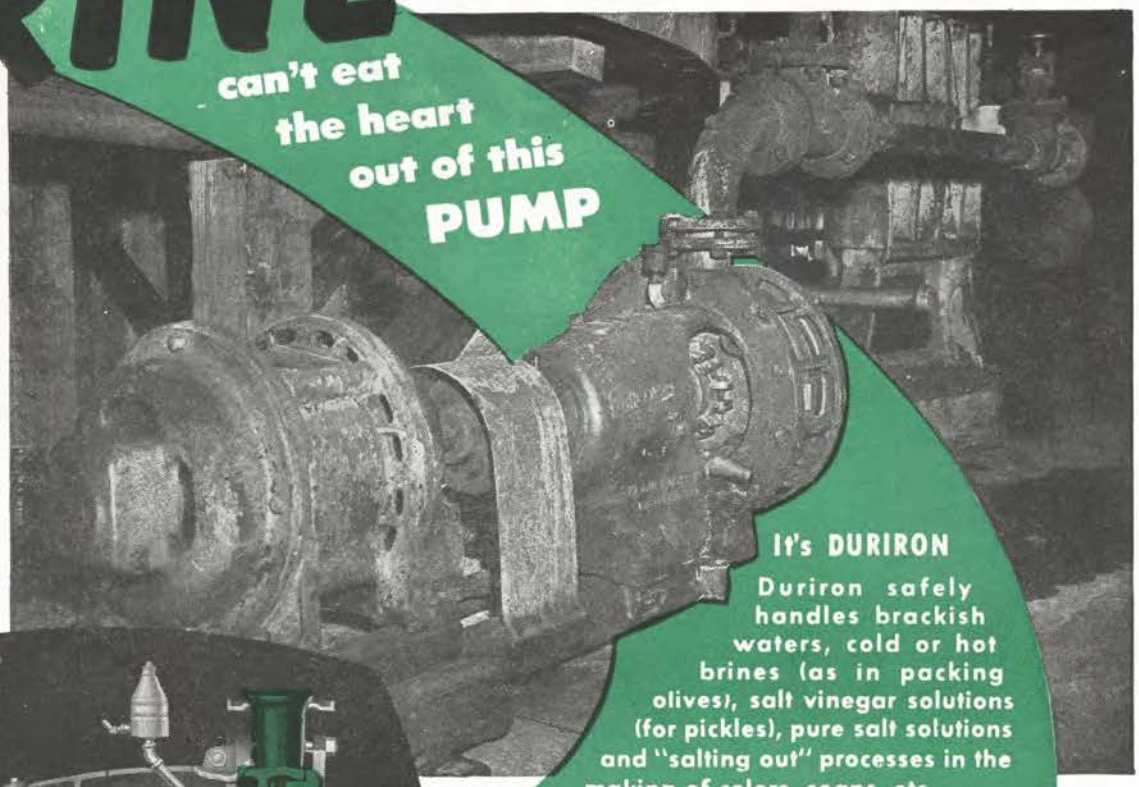

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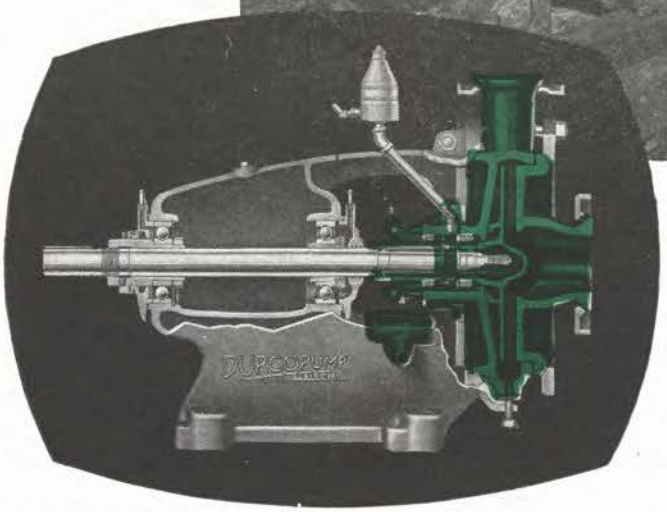
Duriron safely handles brackish waters, cold or hot brines (as in packing olives), salt vinegar solutions (for pickles), pure salt solutions and "salting out" processes in the making of colors, soaps, etc.



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Duriron Durcopumps: Bulletin 810.
Duriron Durco Valves: Bulletin 605-2.
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News and Views . . .

ACS Washington News Bureau

By AL LEGGIN, *Associate Editor*

Agricultural Research

Agriculture will not lag behind industry in the field of research during postwar years since Congress has taken steps to pass legislation permitting a greatly expanded research program.

Public Law 733 (Flannagan-Hope Act), signed by President Truman on August 14, authorizes the Secretary of Agriculture to undertake a broadened agricultural research program with special emphasis on the utilization of farm products, the marketing and transportation of farm products, and cooperative production research. Basic agricultural research, which is now being carried out under the authority of the Bankhead-Jones Act of 1935, will be greatly expanded by this new measure since funds are now available to the states for additional research on new and improved methods of production, studies on human nutrition and the nutritive value of agricultural products, discovery of new crops, plants, and animals which may be utilized in chemical and manufacturing industries, and research for the conservation and development of land, forest, and water resources for agricultural purposes.

The legislation also provides for the expansion of research and service in the marketing, transportation, and distribution of agricultural products. It is intended that this program will bring about a reduction in the spread between farm prices and the cost to consumers. Approximately one fifth of the funds available through this legislation must be earmarked for research in marketing.

Although the major share of this expanded research program is to be done by the Department of Agriculture's laboratories and state Agricultural Experiment Stations, public and private research institutions may participate in this work since the Secretary of Agriculture is authorized to contract for the services of these organizations in carrying on this program.

Funds totaling $9,500,000 have been authorized to be appropriated for the fiscal year 1947. Appropriations for subsequent years are gradually increased with $61,000,000 being authorized for the year 1951. The 1947 funds are broken down as follows: $2,500,000 to states for research, $3,000,000 to Department of Agriculture for utilization research, $1,500,000 for use by the department in cooperation with states for work other than utilization research, and $2,500,000 for marketing research.

Although the 1947 funds have been authorized to be appropriated, the program will not get under way until the early part of 1947 when Congress reconvenes, since Congress, in its desire to adjourn in a hurry, neglected to appropriate the funds. Department of Agriculture authorities hope to obtain a hurried passage of a deficiency appropriation in order to get the program under way before the fiscal year ends—June 30, 1947.

The measure also provides for the establishment of a national advisory committee of 11 members, six of whom are to be producer representatives. This committee, to be named by the Secretary of Agriculture, shall meet at least once each quarter and make recommendations regarding the research and service work. The appointment of this committee has also been held up presumably due to the lack of appropriations, but it is anticipated that Secretary Anderson will name this committee before Congress convenes.

Economic Status

Chemical engineers will now be able to compare their economic status with those in other fields of engineering since the Department of Labor, in cooperation with engineering societies, is now conducting a survey of the earnings and economic status of professional engineers before, during, and after the war.

During September approximately 125,000 engineers will receive questionnaires sent out by the Bureau of Labor Statistics in cooperation with the National Roster of Scientific and Specialized Personnel. The questionnaires will be handled by mail and will be completely anonymous.

This is the first major survey of the economic status of engineers since 1935, when the Bureau of Labor statistics reported for the years 1929–34 (BLS Bulletin No. 682). The new survey will supply information for 1939, 1943, and 1946.

The data collected are intended to:

1. Permit individual engineers to compare their own status with that of others in their own engineering field and to appraise opportunities in other fields of engineering.
2. Assist employers in establishing appropriate salary scales.
3. Aid in the improvement of the economic status of engineers.
4. Provide information to schools and other institutions engaged in training or in vocational guidance of prospective engineers.

Patents

Public Law No. 490 has increased the cost of printed copies of patents from 10¢ to 25¢. Copies of designs and trademarks continues at 10¢.

Copies of 80,000 German patents issued by the German patent office during the war years have been received by the Patent Office. Photostatic copies may be obtained for 20¢ per page. Patents will have to be identified by number and year.

It will no longer be necessary for patent applicants to sign in several places since the Commissioner of Patents has approved Form PO-30 which requires only one signature. These forms may be reproduced with the approval of the Commissioner of Patents.

Technical Advisory Service

The Technical Advisory Service, which formerly was a part of the Smaller War Plants Corp., has now been transferred to the Office of Technical Services, Department of Commerce.

TAS, which during the war provided aid to small businessmen and industrial firms in the solution of their technical production problems, will continue to render such service, but under a modified plan.

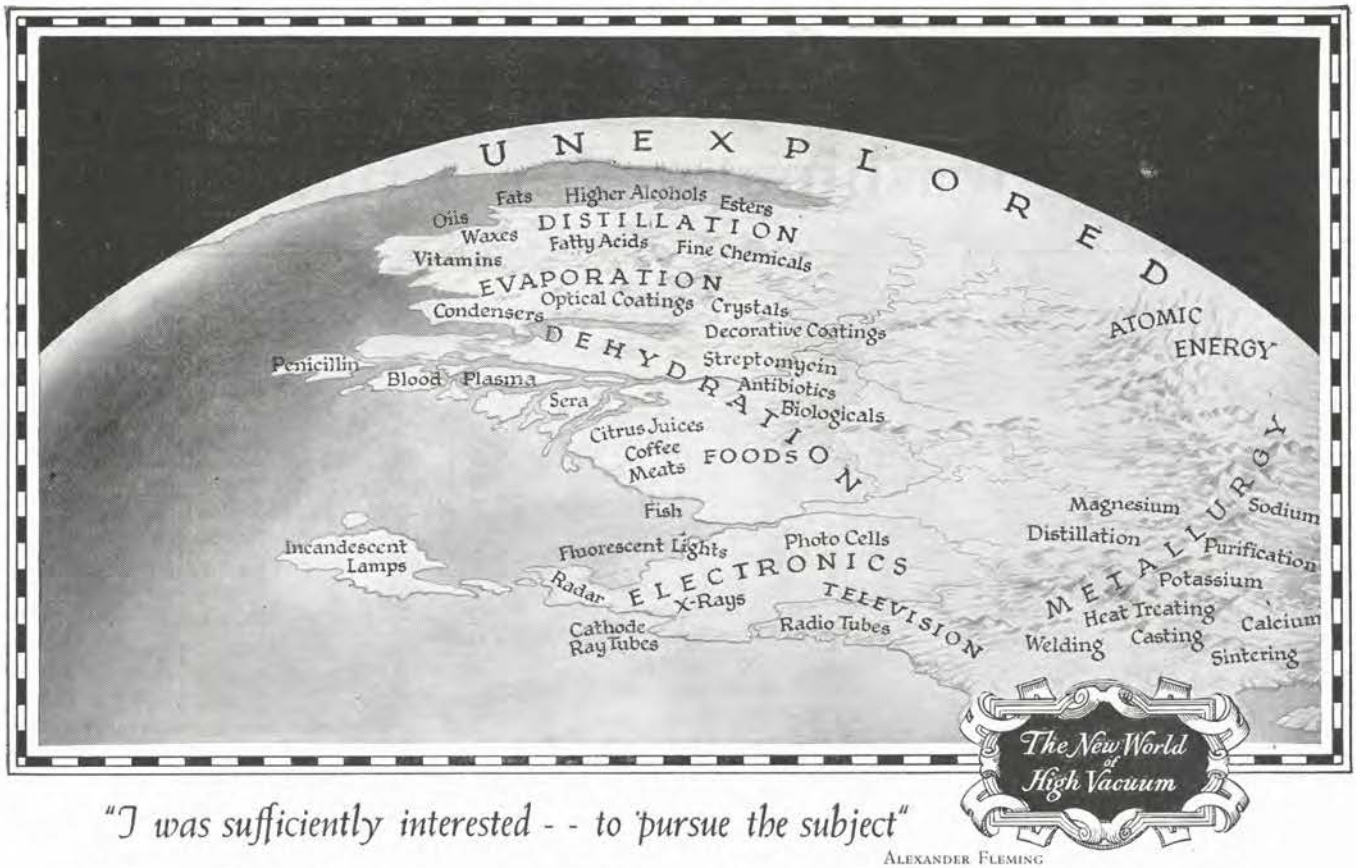
This division will no longer collect and compile information from various sources for the applicant but will direct the businessman or industrial firm to an appropriate consultant or research institution. However, any technical information or data compiled by government agencies will be made available by the division.

John C. Greene, director of the Office of Technical Services, stated that private consultants and research institutions are better qualified to render such technical production assistance.

Chlorine Report

The long-awaited report on the German chlorine industry will shortly be available, according to the OTS.

All the reports have now been completed by the technical investigating team and are now being reproduced. However, the report on the horizontal mercury chlorine cell has been reproduced and sent to this country and should be available this month. Drawings of the chlorine cell can now be obtained from the Chemical Alliance, Inc., Washington, D. C.



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For thousands of years men had looked at the blue-green mold, Penicillium Notatum, and had seen nothing of importance to humanity until, in 1928, Professor Alexander Fleming found that his staphylococcus cultures had been spoiled by an air borne mold and realized the significance of the accident.

For ten years, busy Dr. Fleming "pursued the subject" in such times as he could. In the mold he found a minute quantity of a sensitive, active antibiotic that he called "Penicillin." But the problems of its extraction and utilization were tremendous.

With war looming, English medical scientists turned to Dr. Fleming's discovery. Dr. Florey of Oxford organized a group to study its extraction and by 1939 enough penicillin had been prepared to successfully treat eight mice. In another month enough was available to treat one man. Basic facts were established after treatment of ten cases of staphylococcus septicemia.

In 1941, Dr. Florey and his associate Heatley came to the United States and OSRD went into action. The mold was grown by "kitchen culture" in milk bottles, idle vats and mushroom cellars. Production was pitifully slow. Only fifty patients could be treated in 1942. In May, 1943, WPB took over production with the almost unbelievable objective of enough penicillin for 500,000 persons monthly.

Two major obstacles to quantity production remained: large-scale fermentation processes and correspondingly large-scale low-temperature dehydration equipment. The answer came in terms of modern American engineering "know-how." The chemical and pharmaceutical industries developed the deep tank fermentation method, and National Research Corporation offered its Vacuum Diffusion Process of Dehydration to all penicillin producers royalty free.

At the request of the Chief of the Penicillin Unit, WPB, the National Research process was demonstrated to top ranking Army and Navy medical personnel. The possibility of removing large quantities of water vapor at pressures in the micron range was proven, and top priorities granted for equipment construction.

In February, 1944, the first full-scale industrial plant began to ship penicillin. In one month, the entire production for 1943 was equalled. In March, 1945, less than two years after WPB had made their seemingly impossible demand, the goal was achieved. Today, practically every major penicillin producer, both here and abroad, uses our equipment in the High Vacuum phase of the process.

We suggest that you yourself consider High Vacuum as a new approach in your industry. There may be an application that should be explored, whether you are concerned with antibiotics or other heat-sensitive materials—foods, citrus products, yeasts, enzymes, amino acids. We are fully prepared to help you with both laboratory-scale and full-size plant equipment.

VACUUM ENGINEERING DIVISION, National Research Corporation, Boston 15, Massachusetts.

We engineer Plant installations and manufacture High Vacuum Gauges, Valves, Seals, Diffusion Pumps, Stills, Furnaces, Coating Equipment and Dehydration Equipment.

HIGH VACUUM FOR INDUSTRY

NATIONAL RESEARCH CORPORATION

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UNIFORM LECITHIN-ACTION

CENTROL'S uniformity is guarded by strict laboratory control from bean to finished product. And that means consistent lecithin-*action*, time after time, without formula juggling

There's only one way to insure uniform *performance* of a lecithin in your product . . . and that's to specify the lecithin with no question marks about its *own* uniformity.

That is why there is a nation-wide swing to Centrol by so many large lecithin users. For Centrol is laboratory-controlled from bean to drum . . . processed entirely by one responsible processor every step of the way. You'll find Centrol has all the superior lecithin characteristics that come from using only select quality yellow soybeans, the most modern methods and equipment and a special deodorizing process.

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TYPE	CENTROL I	CENTROL II	CENTROL IB	CENTROL IIB	CENTROL A-I	CENTROL A-IB
Moisture	1.5%	Less than 1%	1.5%	Less than 1%	1.5%	1.5%
Benzol Insoluble	Less than 0.3%	Less than 0.3%	Less than 0.3%	Less than 0.3%	Less than 0.3%	Less than 0.3%
Acid Value	5-10	5-10	5-10	5-10	5-10	5-10
Color	Light brown	Light brown	Yellow	Yellow	Brown	Light Brown
Consistency (80°F)	Plastic Mass	Viscous Fluid	Plastic Mass	Viscous Fluid	Heavy Viscous Fluid	Heavy Viscous Fluid
Specific Gravity	1.04-1.06	1.04-1.06	1.04-1.06	1.04-1.06	1.04-1.06	1.04-1.06
Flash Point	575-600°F.	575-600°F.	575-600°F.	575-600°F.	575-600°F.	575-600°F.

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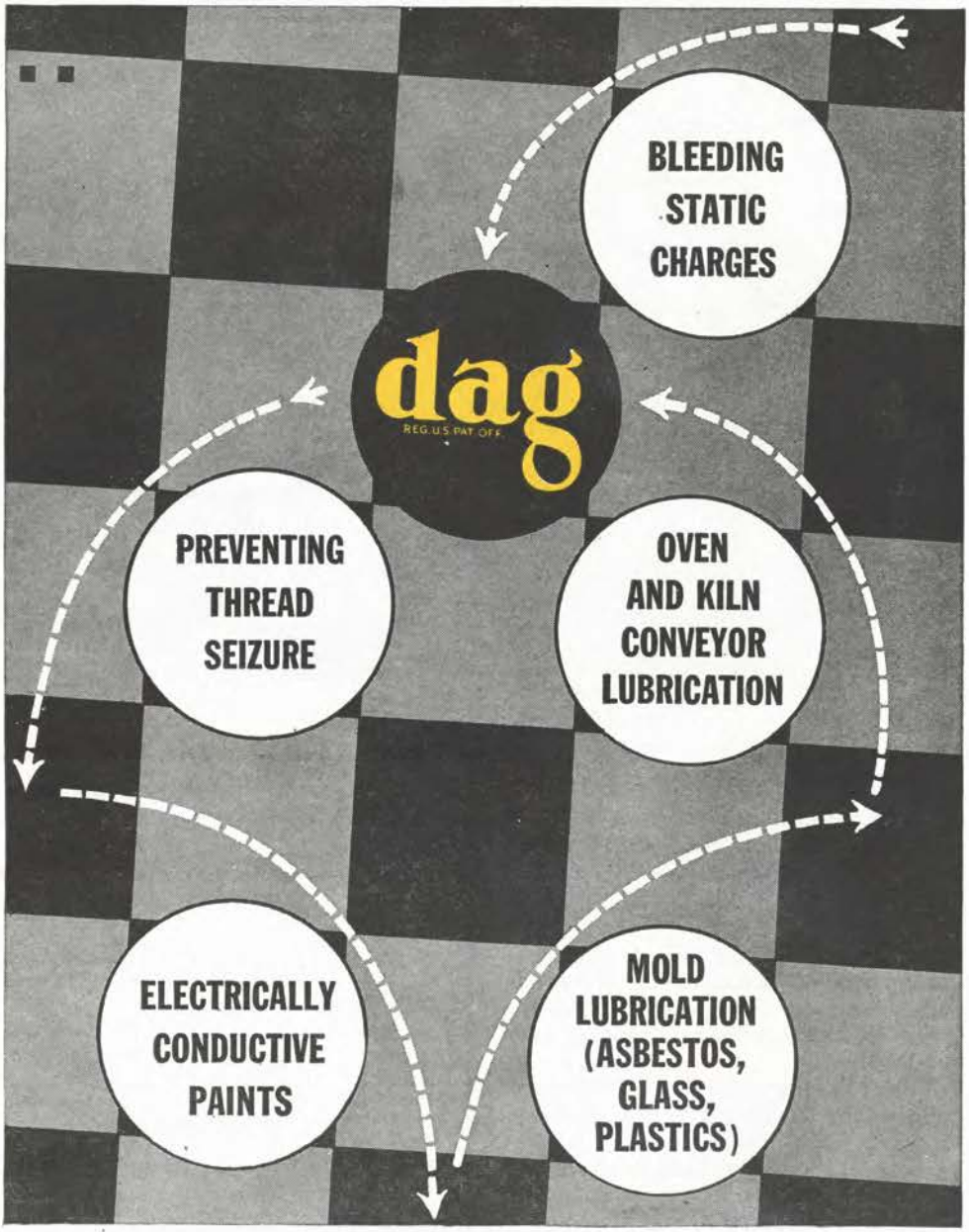
It pays to be up-to-date on the latest applications of versatile "dag" colloidal graphite. Newly-discovered uses and newly-developed dispersions make this unique material more valuable to you today than ever before. 18 "dag" dispersions are now available, and the comprehensive, free, booklets listed below tell you *what* they are and *how* they can be applied in *your particular plant* or *process*.



dag
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colloidal products

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This new literature on "dag" colloidal graphite is yours for the asking:

460 A data and reference booklet regarding "dag" colloidal graphite dispersions and their applications. 16 pages profusely illustrated. ☐

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JMLcoA-JJ-1

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(Lubricants containing "dag" colloidal graphite are available from major oil companies.)

Regional Employment Clearing Houses

Regional ECH files now are available for inspection in the following seven places:

Southeast Regional Employment Clearing House
Room 153, Chemistry Annex, Georgia School of Technology
Third and Fowler Sts., **Atlanta**, Ga.
Phone: Hemlock 4887, Extension 75
(Dr. W. M. Spicer in charge)

New England Regional Employment Clearing House
Room 503, Boston University
84 Exeter St., **Boston** 16, Mass.
Phone: Commonwealth 6230, Extension 28
(Dr. Chester M. Alter in charge)

Midwest Regional Employment Clearing House
Room 744, 35 East Wacker Drive
Chicago 1, Ill.
Phone: Central 6052
(Dr. Marvin J. Hall in charge)

Southwest Regional Employment Clearing House
Room 212, Chemistry Building, Rice Institute, **Houston** 1, Tex.
Phone: Lehigh 4141, Extension 43
(Dr. W. O. Milligan in charge)

Middle Atlantic Regional Employment Clearing House
Room 93, 50 East 41st St., **New York** 17, N. Y.
Phone: Lexington 2 7340
(Mr. Walter J. Baeza in charge)

Pacific Coast Regional Employment Clearing House
585 Howard Street, **San Francisco** 5, Calif.
Phone: Sutter 3238
(Dr. Sterling L. Redman in charge)

Regional Employment Clearing House Headquarters, AMERICAN CHEMICAL SOCIETY
1155 Sixteenth St., N. W., **Washington** 6, D. C.
Phone: Republic 5300
(Mr. William B. Lodder in charge)

It is important for all users, both registrants and employers, to realize that the files in all offices are duplicates. The applicant submits one form to Washington which is reproduced and distributed.

Employers need visit only the one place which is most convenient to them to see all records which are available. A man who travels extensively can devote spare time in any of the seven cities to examination of new records, picking up in San Francisco at the point where he stopped his study in New York. A central personnel officer can screen the product at one place and notify representatives in any of the other cities to look at certain records, easily identified by number. All of these things are being done.

A summary card is prepared for each registrant, and a copy is filed in the index under each special field of training or experience shown by the registrant. Thus back of a guide labeled "Spectroscopy" are cards showing age, highest degree, special qualifications, etc., for each person who indicated knowledge of spectroscopy. An employer can make a preliminary screening from these cards and then consult the detailed records of those about whom he wishes to know more.

No record can be more than three months out of date because every registrant is circularized after that interval to ascertain whether or not he wishes to continue his registration and, if so, to indicate any changes that should be made in his record. Failure to respond is cause for removal of vitae.

Actually, there are interim checks which, while not infallible, usually function. Registrants are requested to report employment promptly. Employers are asked to notify the central office of the results of their use of the ECH and if no report is sent, a check is made 30 days after use. Thus, it is only in rare cases that the record of an employed man remains in the files more than a week after he no longer is available. There is *no* "dead wood".

On August 26, 822 persons had at some time been registered. Of these, 331 remained in the active files. This level has been maintained fairly constantly for many months, withdrawals roughly equaling additions.

Those who wish a detailed description of procedures are referred to CHEMICAL AND ENGINEERING NEWS, 23, 793–4 (1945).

It is believed that the files are maintained in such a condition that they are of maximum usefulness to employers. If the service is to justify its cost and the effort expended in its maintenance, greater use must be made of the files in all centers. Employers needing chemists or chemical engineers are urged to examine the records periodically.

ALDEN H. EMERY
Secretary

Atomic Energy Exhibit

Interest in the ACS Atomic Energy Exhibit has been so widespread that it is now booked solidly for the remainder of the calendar year; it will be impossible to make additional loans this year unless there are cancellations.

The last week in August, the exhibit was shown at the Kentucky State Fair in Louisville. Following the showing at the National Chemical Exposition in Chicago it will go to Cincinnati to be shown in the Gas and Electric Bldg., Sept. 16 to Oct. 5 under the sponsorship of the Cincinnati Section of ACS. It will then go to Paris for UNESCO month, Oct. 28 to Dec. 1, and upon its return it will go to Boston for two showings, one at MIT Dec. 10 to 23 and another in connection with the AAAS meeting Dec. 26 to 31.

Selective Service Certification Progress

The certification procedure for deferments outlined in the August 10 issue [CHEM. & ENG. NEWS, 24, 2010 (1946)] is now in effect. Several thousand applications have been processed by the various certifying agencies, and so far as can be determined, local boards are accepting practically all certifications as adequate evidence for deferment.

Some difficulties were encountered at first because of the organization problems involved. It was physically impossible to clear all cases of men scheduled for induction on September 3, 4, and 5. The Labor Day holiday further handicapped the work of the various agencies with the result that some men, fully qualified for deferment, have been inducted. However, the Research and Development Division of the General Staff is now well organized and is in position to screen classification cards of all inductees so that technical assignments will be found for some of the men.

The following offices act as certifying agencies for chemists and chemical engineers:

1. Office of Scientific Research and Development, Washington 25, D. C., for men engaged in advanced studies doing university, foundation, or industrial research not directly connected with production.
2. U. S. Office of Education, Temporary Bldg. M, 26th and Water Sts., N. W., Washington 25, D. C., for teachers employed by accredited colleges or universities.
3. Civilian Production Administration, Office of Labor Requirements, Social Security Bldg., Washington 25, D. C., for men engaged in production or in activities connected with production in essential industry.

Employers should submit Form 42-A Special Revised (in triplicate), obtainable at local draft boards, to the proper agency. Students and university research workers should submit the notarized statements and supporting documents described in the August 10 issue. The full details of the present deferment procedure are contained in Selective Service Local Board Memorandum 115 as amended August 12.

From the Secretary's Office . . .

ACS Elections

The method of electing SOCIETY officers is described in Article VII of the Constitution. A brief description is given in Bulletin 1, "It's Your SOCIETY". Nevertheless, it is not well understood. Since we are on the threshold of another election, in which every member should take part, the Secretary believes it is advisable to summarize this information.

President-Elect. On or before September 10, each of the 112 local sections will be given an opportunity to name one ACS member whom it considers to be qualified for the Presidency. Place of residence should not be a factor in the selection. In this way, the 90% of the membership enrolled in local sections has an opportunity to suggest names of men whom they believe to be good administrators, vitally interested and active in the SOCIETY and its program, and worthy of the honor. All proposals must be received by the Secretary not later than October 5.

Each person so suggested is asked concerning his willingness to serve and his wishes are followed. Brief biographical statements about each candidate are published in C&EN as soon as possible after October 5.

Not later than November 1, a list of all those suggested by members through their local sections, and who have allowed their names to be proposed, is sent to each member of the SOCIETY. On the blank ballot which accompanies the list, each member should write the name of the one person he believes best qualified for the Presidency of the SOCIETY and send it to the Secretary.

Three weeks from the date of mailing, the returned ballots are counted by a committee appointed by the President. The four members receiving the largest popular vote are the nominees for President-Elect.

Councilors-at-Large. The method of nomination of Councilors-at-Large is identical with that for President-Elect, except that

(1) Each section may propose four names

(2) Only those suggested by two or more sections are included in the list

(3) Every member should vote for four (not one)

(4) Eight persons (not four) are nominated.

Regional Directors. Article IV, Section 2, of the Constitution provides that each of six geographical regions shall be represented on the Board of Directors. These districts are outlined in Bylaw 12 and include all 48 states, Alaska, District of Columbia, Hawaii, and Canada.

On or before October 1, each local section in each geographical district from which a Director is to be chosen is asked to nominate a candidate. Such nominations must reach the Secretary not later than November 20.

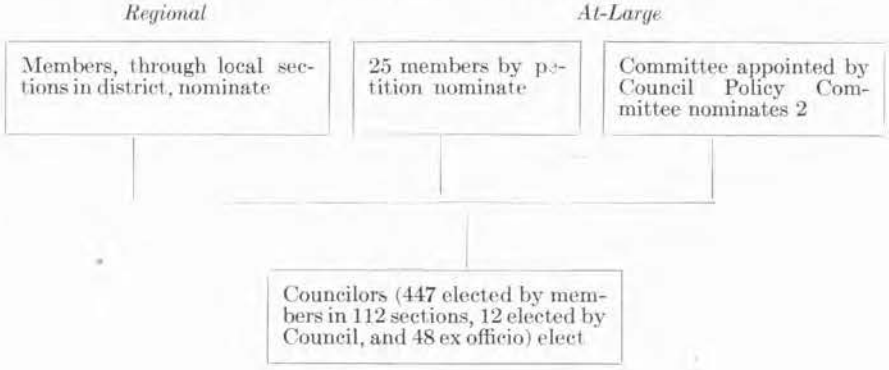
Directors-at-Large. Article IV, Section 2, of the Constitution specifies that there shall be four Directors-at-Large, chosen for their business experience and ability. One is elected each year to a four-year term.

At the fall meeting of the SOCIETY or before October 1, the Council Policy Committee appoints a committee of six members, which nominates two candidates for Director-at-Large. Any group of twenty-five members in good standing may nominate others by petition. All nominations must be received by the Secretary not later than November 20.

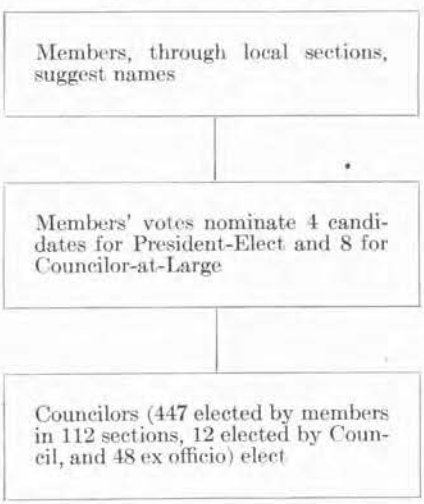
Election. Not later than December 1, the Secretary mails to each Councilor a ballot containing the names of the four nominees for President-Elect selected by popular ballot, the eight nominees for Councilor-at-Large similarly chosen, all nominees for Regional Director designated by the local sections, the two nominees for Director-at-Large proposed by the committee, and all candidates for that same post nominated by petition. The Councilors then choose one President-Elect, who serves in that post for one year and then succeeds to the presidency, four Councilors-at-Large to serve for three years, one Regional Director for each district in which there is a vacancy (normally two) to serve for three years, and one Director-at-Large to serve for four years.

At present, the Council consists of 447 persons, elected by the members to represent the 112 local sections, 12 Councilors-at-Large, 18 division chairmen, 5 officers, 10 other directors, 3 editors, and 12 past-presidents, not included in any of the other categories.

Election of Directors



Election of President-Elect and Councilors-at-Large



Deadlines to remember.

October 5—Suggestions for President-Elect and Councilors-at-Large (from local sections)

November 20—Nominations for Regional Directors (from local sections) and Directors-at-Large (by petition)

November 22 (about)—Return of nominating ballots for President-Elect and Councilors-at-Large.

Help Wanted

Do you use *Chemical Abstracts?* Isn't it "swell" to have someone offer you on a silver platter a bibliography for the research you are about to undertake? But did you ever stop to think that 400-500 ACS members who are combing the literature under the supervision of General E. J. Crane were making this possible? The $5.00 or $5.50 or $6.00 which you pay for your subscription doesn't begin to meet the cost of producing *CA* which when last calculated was $14.00 per volume.

If you feel that you would like to repay a part of your debt to this extremely useful publication and devote to it some of the hours it has saved you, write to the editor in Columbus, Ohio, and volunteer. There is no fixed term of enlistment. You will be paid for your work, not a large amount but enough to give you some return for the effort expended.

Alden H. Emery

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U.S.I. CHEMICAL NEWS

September ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

Reports Increased Yields and Speeds of Organic Reactions

Excellent Results with Use of Hydrotropic Salts Is Claimed

Many types of organic reactions may be accelerated and their yields increased by the use of hydrotropic salt solutions, according to the claims made in a recently published technical paper. The authors cite one case in which the yield was stepped up more than sixty per cent while appreciably cutting the reaction time.

Hydrotropic solutions are those aqueous salt solutions which effect decidedly greater solubility of slightly soluble substances than does water at the same temperature. Strong solutions of potassium iodide, for example, dissolve many times as much iodine as pure water. Typical hydrotropic salts are: alkali or alkaline earth salts of the sulphonates of toluene, xylene, or cymene, the alkali benzoates, thiocyanates, and benzoates, and even such common salts as the alkali bicarbonates, oxalates, and thiocyanates.

An excellent example of the effectiveness of hydrotropic solutions is found in the Cannizzaro reaction, the authors state. As ordinarily performed, this reaction is carried out by emulsifying benzaldehyde with caustic soda, and permitting the reactants to stand for one day. Normal yields in this reaction are usually about five per cent of the theoretical. When a saturated sodium cymenesulphonate solution, however, is substituted for most of the water, the yield is reported to be increased to 72.5 per cent and the reaction time slashed by several hours.

Extra Copies Available Of Illustrated U.S.I. Booklet

"U.S.I. in the World of Chemistry" is an interesting 48-page booklet which tells the story of U. S. Industrial Chemicals, Inc.

Full color pictures and charts show how solvents, alcohols, resins and other chemical building blocks "flow" into the everyday commodities of commerce. Copies may be obtained by writing to the New York office of U.S.I. on your letterhead.

Predicts Great Advances In Animal Nutrition

Tremendous strides will be made in the field of animal nutrition in the near future, according to a paper published recently by an authority on food and farm chemurgy. The progress expected, he asserts, will be made not so much in isolated fields, such as minerals, vitamins, enzymes, amino acids and hormones, but in fields which involve the physiological inter-relationship of all these products. The article reviews recent work in animal nutrition and farm chemurgy, and predicts future developments.

THE MONTH IN DETERGENTS

Photomicrographic movie techniques are used to study detergent action . . . A skin cleaner for use under conditions where carbon black, graphite, or pigments are handled is patented . . . The U. S. Government publishes new specifications on cleaning compounds containing synthetic detergents . . . A new method for evaluating the detergent efficiency of alkali cleaners is announced . . . A western company markets a new electronic soap dispenser . . . Mixtures of detergents and disinfectants containing quaternary ammonium compounds are said to be practical . . . A soap is made available for use in hard water, sea water, and acid solutions . . . German development of a valuable class of non-acid and non-alkaline detergents is revealed . . . A new synthetic detergent is described as a sulfonated fatty condensate soluble in water at all temperatures . . . An extremely mild felt-washing cation-active compound is made . . . A U.S. scientist perfects a rapid colorimetric method for the determination of fatty acids.

New-Type Recording Discs Preserve Historic Events

Instantaneous recording blanks, designed for high-fidelity sound reproduction, now make it possible for listeners to hear historic events exactly as they occurred, it was announced recently. These discs have captured a durable sound record of man's first contact with the moon, the atomic tests at Bikini, and other important contemporary happenings.

Much of the credit for the success of these new-type discs goes to a special coating based on nitrocellulose, the manufacturer states. This coating, on which the sound-track is inscribed, is said to guarantee excellent sound properties, and to insure complete freedom from deterioration. Unlike other discs which dry out and harden, these discs are reported to remain unchanged by age.

These new-type discs are supplied for reference recordings, for amateur or home recordings, for talking books, and for every recording use.

Sulfonamides Essential In New Hormone Process

An anterior pituitary-like hormone may now be separated from pregnancy urine by a new process involving the use of sulfonamides, according to the claims made in a patent granted recently. The sulfonamides, widely used as bacteriostatic agents, are employed in this process because of their alleged ability to absorb the physiologically active hormone.

According to the patent, ortho- and para-toluene sulfonamides are added to pregnancy urine in alkaline solution. The urine is then brought to a pH of 2-5 by the addition of a mineral acid. This precipitates the sulfonamides which carry the absorbed hormone down with them. Acetone dissolves the sulfonamides, leaving the anterior pituitary-like substance as an undissolved residue.

Use of Diethyl Carbonate Is Up In Many Fields

U.S.I. To Boost Production To Meet Increasing Demands

Used in special-purpose lacquers and as a raw material for a wide variety of chemical syntheses, diethyl carbonate is now in great demand in many industries. Requirements for this versatile chemical, which have increased steadily since the end of the war, have made it necessary for U.S.I., the only commercial manufacturer of diethyl carbonate in this country, to step up production, and to put plans into operation for expanding its manufacturing facilities.

Has Many Applications

Originally used for lacquers which require a pure neutral solvent—lacquer for radio tube cathodes is an example—diethyl carbonate is now employed in many diverse types of organic syntheses. These range from the manufacture of comparatively little-known com-

Radio tube cathodes are impregnated with lacquer to prevent bad reception caused by current leakage. The lacquer requires a neutral solvent. Diethyl carbonate—as nearly a neutral solvent as it is possible to make—is ideal for this purpose.

pounds such as ammeline (2-hydroxy-4, 6-diamino-1,3,5-triazine), to the preparation of pharmaceutically-important barbiturates.

Diethyl carbonate may be employed in Claisen condensations to react with esters of aliphatic acids, with esters of aryl substituted aliphatic acids, and with ketones and cyanide derivatives. It may also be reacted with a Grignard reagent to give the next higher acid, and with primary and secondary amines to give the corresponding substituted ureas. Among the other products produced with the aid of diethyl carbonate are: sodium ethyl carbonate, urethan, urea, and carbohydrazide.

Neutral Solvent

Diethyl carbonate is considered as nearly

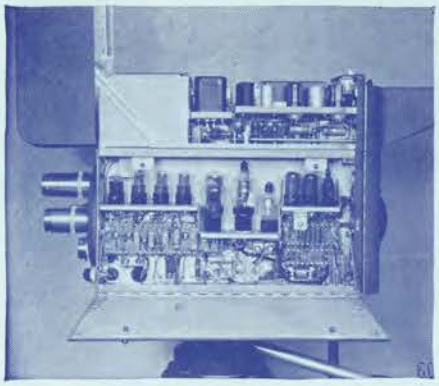
(Continued on next page)

September ★ **U.S.I. CHEMICAL NEWS** ★ 1946

Diethyl Carbonate

(Continued from preceding page)

a neutral solvent as it is possible to make. It is a medium evaporating solvent, characterized by the desirable features of mild odor and high stability. It is useful wherever a pure neutral lacquer solvent is required.



This new television camera is claimed to be as sensitive as the human eye. To prevent current leakage, cathodes in the tubes are impregnated with a lacquer containing diethyl carbonate. *RCA photo*

Starch Broken Down By Improved Method

The use of thymol as a precipitant is the essential feature of a new method for separating the amylose and amylopectin components of starch, according to a technical article published recently. This method is claimed to avoid the difficulties found in the older methods of breaking down starch.

The authors state that a sufficient quantity of sodium chloride must be added to the starch solution before the powdered thymol is stirred into the liquid. Upon standing, the thymolamylose complex precipitates. It is then washed with absolute ethyl alcohol and dried in a vacuum.

The amylopectin component is obtained by concentrating the mother liquor and treating with methyl alcohol. The precipitate is washed and dried with ethyl alcohol and ether.

Makes Lustrous Filaments From Polyvinyl Alcohol

A British patent issued recently describes a method for the manufacture of lustrous artificial filaments and threads from polyvinyl alcohol. These products may have wide applications in the textile industry.

According to the patent, the polyvinyl alcohol is first dissolved in water to give a non-gelatinous solution having a viscosity of about 3 poises at 25 degrees C. The solution is then ejected through a multi-hole jet into a coagulation bath, consisting of 94 per cent alcohol and 6 per cent water. By this means a thread is formed. The thread is then treated in a second bath and dried.

New Catalyst Ups Yield In Friedel-Crafts Reaction

A process yielding maximum amounts of ethyl benzene by the utilization of an improved catalyst in the standard reaction involving ethylene and benzene is described by a Louisiana inventor. According to his patent, the reaction is conducted in the presence of the usual Friedel-Crafts type catalyst, such as aluminum chloride, plus a suitable non-metallic halide. Among the halides used are ethyl chloride, hydrogen chloride, carbon tetrachloride, and chloroform. Yield increases up to 47.5 per cent have been reported.

Blood Is Source Of New Medical Plastics

A new-type protein plastic can be manufactured from blood plasma, according to the claims made in a patent issued recently. This plastic is said to be suitable for a wide variety of medical and surgical uses, since it tends to be absorbed by the animal body.

In the manufacture of the protein plastic, as described by the inventors, fibrinogen is first precipitated from the plasma by cooking to about zero degrees C. and adding ethyl alcohol. The fibrinogen is then mixed with varying amounts of other proteins such as albumin or globulin. A plasticizer, such as ethylene glycol, is added. The result is a pasty mass which can be molded under pressure and cured by heat.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

An ultra-fast cold-setting glue is alleged to be the only type of resin glue that can be handled and machined after 20 to 30 minutes clamping, instead of the usual 6 to 8 hours. **(No. 104)**

USI

A time-saving stain filler, described as a stain that incorporates a wood filler, is said to dry in one hour. It is available in several standard wood colors, the manufacturer states. **(No. 105)**

USI

To convert fractions of an inch into decimals or millimeters is the function of a new instrument, described as a plastic disc 5¾ inches in diameter. It is claimed to be non-warping and easy to use. **(No. 106)**

USI

To water-, mildew-, and flame-proof any fabric, a new chemical is announced which the manufacturer claims can be applied by dip, spray, or brush, and which will not affect the color of the fabric. **(No. 107)**

USI

To apply DDT to hard-to-reach spots, such as tile cracks and bath tub rims, a DDT crayon is offered which is stated to leave a streak of DDT which instantly eliminates insects without harming dogs or cats. **(No. 108)**

USI

A new descaling agent, containing additional rust-inhibiting and cleaning agents, is particularly recommended by the manufacturer for eliminating hard-to-remove oxides. **(No. 109)**

USI

A new filter medium, described as a corrosion-resistant, strong, ductile, porous stainless steel, is said to be applicable to all types of existing filters. The manufacturer suggests its use with a wide variety of acids, alkalies, and salts. **(No. 110)**

USI

Temperature-indicating crayons, claimed to make a chalklike mark below their indicating temperature but to melt and glisten when it is reached, are now available. Temperatures as high as 1600 degrees F. may be measured with the crayon grades available, according to the manufacturer. **(No. 111)**

USI

A versatile detergent is claimed to be useful as a textile washing agent, a waterproofer for fabrics, an emulsifying agent, and a thickener for cotton printing solutions, cosmetics, food stuffs, and ice cream. **(No. 112)**

USI

A new carnauba substitute makes possible self-polishing floor waxes that give higher gloss and better wearing qualities than carnauba, according to the manufacturer. **(No. 113)**

USI

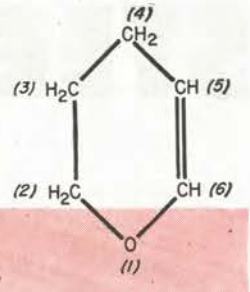
Two new natural riboflavin feed ingredients, said to be obtained from vegetative fermentation operations, are reported to contain vitamins of the B complex. **(No. 114)**

USI

A new degreasing agent, said to be harmless to paint, lacquer, and metal, is claimed to leave a film that protects the material from finger prints. **(No. 115)**

NEW CHEMICALS from Du Pont

DIHYDROPYRAN

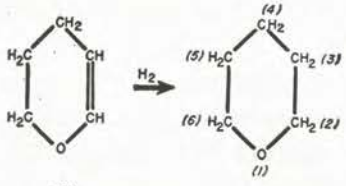


An Important New Intermediate

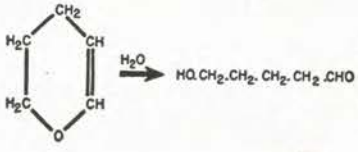
DU PONT is pleased to announce the availability of dihydropyran for research and development purposes. The reactions of this versatile chemical and those of its primary reaction products should lead to important commercial applications. Through reactions of the double bond, a great variety of compounds can be made, and fissure of the ring opens the door to alpha-omega disubstituted derivatives of pentane and heptane. The following equations illustrate only a few of the things which can be done with dihydropyran. Additional information is given in our New Products Bulletin No. 18.

PHYSICAL PROPERTIES

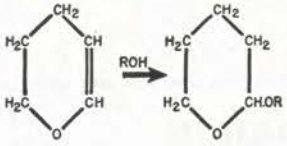
Appearance	Colorless, mobile liquid
Odor	Ether-like, penetrating
Molecular Weight	84.114
Boiling Point	86° C. at 760 mm.
Specific Gravity, 20° C./4° C	0.923
Index of Refraction, N20/D	1.4400
Flash Point	4°F.
Solubility	
Water	3.0 gms. in 100 cc. at 20°C.
Organic Solvents	Soluble in most common organic solvents.



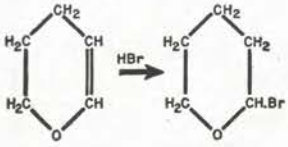
HYDROGENATION yields tetrahydropyran, a powerful solvent and chemical intermediate itself.



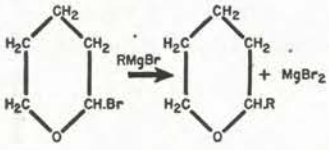
HYDROLYSIS with dilute mineral acid solutions gives delta-hydroxyvaleraldehyde.



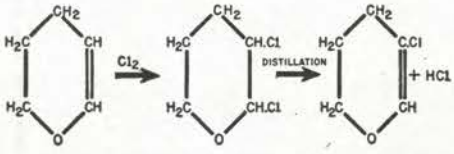
MONO AND POLYHYDROXY compounds react with dihydropyran to form unique cyclic ethers.



HYDROGEN BROMIDE yields 2-bromotetrahydropyran.



THE GRIGNARD REACTION can be used in the preparation of alkyl and aryl tetrahydropyrans from 2-bromotetrahydropyran.



CHLORINATION gives 2, 3-dichlorotetrahydropyran, and distillation of the latter results in evolution of hydrogenchloride with the formation of 5-chlorodihydropyran.

POLYMERIZATION AND COPOLYMERIZATION. Refluxed in the presence of benzoyl peroxide, dihydropyran slowly polymerizes to give a tacky, low-melting polymer that is soluble in methanol. Harder polymers can be obtained by polymerizing in water suspension. Dihydropyran is also of interest as an ingredient in copolymerizations with other monomers.

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CHEMICAL AND ENGINEERING NEWS

WALTER J. MURPHY, Editor

That Which We Seek

RECENTLY we received an "off-the-record" letter from a member of the SOCIETY discussing the professional and economic status of the chemist and so much of what he says is relevant to the number one problem facing the profession today that we would like to quote from it rather extensively.

"To my way of thinking," he states, "chemists want primarily four things: justice, status, security, and, a few of them, opportunity. The order of importance, of course, depends upon the individual." He then goes on to elaborate on these four points as follows:

1. Justice. All of us, no matter whether we be chemists or bottle washers, want to know that we will have our day in court. The knowledge that no matter what happens we will get due consideration for raises (not that we always get one); that if we do a good piece of work, we will get a merited "well done" and the monetary reward that goes with it, if any; that no matter what happens, we will be considered for promotions when such jobs are available.

2. Status. It seems to me that all chemists want professional status, and to me professional status means the feeling of belonging. The feeling that when we say "I am a chemist" it really means something. How this is to be brought about I do not know. I do have the feeling that if we can find the solution to this problem union agitation among chemists would become a minor issue and disappear. Chemists, like all other persons, like to feel that they belong to something that is a little bit exclusive. Isn't this, after all, what unions offer? In other words, they can say "I am a union man. I belong." "See, I am important." "Me, I got me some status." If we, as chemists, do nothing else, let's get the feeling that we belong to a profession.

3. Security. Every modern industrial establishment is fully aware of every individual's desire for continuous employment. The wide-awake chemical manufacturer has retirement, health, and life insurance policies. Some have other benefits. To us poor mortals, the one great fear in life is that we shall have nothing to carry on with after retirement or sickness. Security for each of us and our loved ones is deep-rooted in our very souls. We want it; yes, but not at the expense of decadence. Let's work for it and not get the erroneous philosophy that it should come to us on a silver platter. There is true security, but security in which the attitude "let George do it" predominates. Beware of politicians bearing gifts.

4. Opportunity. Some of us, though not all, want opportunity, and here I do not mean supervisory responsibilities. The attitude that the success of a man working in industry should be gaged by the number of people who are under his direction; that the size of his salary should be determined primarily by the same criterion; that the chemists who do not rise to executive positions are failures and incompetent just doesn't make sense to me. One overlooks the fact that most chemists chose their profession because they like it. They don't care about becoming executives and they know chemists make very poor executives anyway. In too many cases management loses a darn good chemist and gets a mediocre executive. Why?

The writer in support of these statements continues:

It seems to me (and I am only a beginner) that there are three, perhaps more, co-equal fields and that outstanding men in each should be equally rewarded. There is a field for those who have the ability to lead men. This group we know as executives . . . the men who have such titles as Vice President in Charge of this or that. They are the men who can best work with people. Then there are the men who work with their hands. We call these engineers—the builders—the men who play with materials and machines. These are the men who produce material things. But there is also a third group—the idea men—the creators. These are the men who delight in exploring the unknown. By so doing they have added to our comforts and to the standard of living of man. I believe that chemists fall in this latter group.

Each group, I believe, has its place, but they are interdependent, one on another. Without the creative genius of the idea man, the engineers and executives would not have production and employment. Without the engineer and executive, the idea man could never see the results of his research in practical application. It seems to me that the time has come for management to recognize these three as equal partners. Then the criterion of success would not be based upon the number of persons under one's supervision but on the contributions individuals make toward the success of an enterprise.

Very likely few readers will agree in toto with the analysis of the problem and the conclusions of the author of this letter, yet many will agree to the correctness of most of them.

One of the principal difficulties that arises in any discussion of this sort is the almost universal habit of stating generalizations and then calling upon specific examples to prove such contentions. One can usually find a plethora of examples to prove anything. Next, we are prone to think in the terms of *The* chemist. There is no such thing as *The* chemist or "the average chemist". No two members of this SOCIETY of more than 47,000 individuals are exactly identical in training, experience, temperament, ambition, initiative, creativeness, individualism, leadership, perception, and persistence. We might add also that no two have exactly the same degree of luck. We vary all over the lot in our conservatism, or to put it in another way, our willingness to gamble, to take a chance. No two have the same degree of acceptance of responsibility. We once heard the president of one of the largest chemical companies in this country state that he had only three men in his entire organization who would not hedge somewhere along the line on the matter of responsibility.

The extroverts and the introverts are such only to certain degrees which vary in intensity with each individual. Men work and are inspired to achieve success for a wide variety of reasons, although admittedly the majority place monetary reward at the top or very close to it, and rightfully so. In discussing the problem as a whole one can look at it from a long-term point of view or a short one; one can view it objectively or with a narrow attitude that is affected by purely personal reasons; the beginner often sees the picture differently from the veteran; the analyses of the not too-successful are not likely to coincide with the conclusions of those who have achieved success and perhaps fame.

One cannot contemplate the contents of the letter quoted without realizing that most if not all the inequalities complained about are not by any means exclusive to the chemical profession. Every profession, every white-collar worker, indeed most laboring men would view these statements as a bill of particulars. We know many men and women in executive and administrative posts who have similar viewpoints.

The author of this letter has not offered a positive solution to the problems described—neither have we. It is one with many facets. Let us not delude ourselves with the thought that there is an easy road to Utopia. The main responsibility rests with the individual himself; to a lesser degree with his government, with his professional society or labor union, with his schools, with his immediate superior, with his employer. When each plays a proper role, we can hope for a better world not only for chemists but for most human beings that inhabit this earth.

SHOULD CHEMISTS

yes!

Rebuttal by GUSTAV EGLOFF

IT HAS been gratifying to see the numerous letters printed in CHEMICAL AND ENGINEERING NEWS as a result of the publication of the articles for and against licensing of chemists which appeared in the Feb. 10, 1946, issue These letters indicate a keen interest in the subject It is only by complete airing of the topic that sound conclusions will be reached

The author of the article against licensing is unable to see the advantages in state licensing of chemists, either for the protection of life, health, and property of the public, or the improvement of the professional, economic, and social status of the chemist. The assumptions on which most of the arguments against licensing are based can be refuted by considering facts relating to each specific case.

The article in question states that the the first move for licensure was instigated by a small group in New York City, "the reason for whose acclaim is, I think, but little obscured". This group in the American Institute of Chemists sought state licensing as a cure for flagrant misrepresentations of competency by many persons calling themselves chemists. These self-styled chemists were casting a slur on true representatives of the chemical profession by encroaching upon the fields which properly qualified chemists should occupy. A train of abuses had been observed over a long period of years in the use of the term "chemist". The originators of the move for licensing in New York had also observed the success of the engineers in the passage and the administration of a New York Licensing Act, which is now judged by top men in the engineering profession to be the best of any state. Although the article of reference directs no definite accusation at the small group in New York City, it leaves the impression that their motives were dictated primarily by selfishness and not by regard for the general good of the chemical profession. Nothing could be further from the truth, since the pioneers for licensure in the New York Chapter of the American Institute of Chemists, all of whom were members of the AMERICAN CHEMICAL SOCIETY and many of whom were licensed chemical engineers, were men of already established reputations who had little to gain personally from the passage of a licensing act other than the promotion of the general welfare of chemists and protection of the public.

The statement that 75% of the engineers "would gladly withdraw their necks from the yoke" imposed by state registration is controverted by statements of members of the National Society of Professional Engineers and the American Association of Engineers. Leading members of these societies detect practically no sentiment against licensing of engineers now that it has been established. The favorable attitude of the rank and file of engineers is reflected by the high percentages of registration in states where the laws are permissive rather than compulsory—for example, West Virginia and Massachusetts. Qualified engineers have been quick to perceive and act on the new opportunity presented for improving their professional status and increasing the unity and solidarity of the engineers as a group. As of June 30, 1945, there were 85,149 engineers registered in 47 states and Alaska, Hawaii, and Puerto Rico.

Resolution Unrepresentative

The resolution opposing general licensure of chemists passed by the Council of the AMERICAN CHEMICAL SOCIETY in 1939 does not necessarily represent the sentiment of the average chemist today in the matter of state licensing. The resolution was passed by the Council without giving the members of the SOCIETY an opportunity to express their opinions in the matter. The Council refused to accept the resolution of the councilors of the New York Section, the largest ACS section, endorsing state licensing. Those conducting the council meeting also refused to listen to the accredited counselors of the New York Section in favor of their resolution. This action therefore expressed the sentiment of the officers of the Council rather than that of the rank and file of the SOCIETY. It may be true that the average member has not given much consideration to licensing; but before any statements are made purporting to represent the opinion of SOCIETY members, they should be fully informed and given an opportunity to examine the situation and express their opinion by voting, as has been done by a number of local sections. The votes in the Ohio and Chicago Sections have been noted (*1*). Since then the New York Professional Chapter of Alpha Chi Sigma resolved in May 1945 to support:

1. Any and all measures which will tend to strengthen, define, and establish chemistry as a recognized profession
2. Legal systems for the licensing of chemists comparable to those which exist for other professions

The Sacramento, Calif., Section of the AMERICAN CHEMICAL SOCIETY has also gone on record in favor of licensing.

Fees Cover Costs

The assertion that "state legislatures are not averse to the creation of new taxes and new jobs" does not apply to licensing. State licensing boards are composed of high-ranking members of a profession and not political appointees who have no knowledge of professional requirements. States do not establish professional licensing acts to extract revenues. The chief concern of the departments having to do with licensing is that revenues be sufficient to pay for the operation and enforcement of licensing acts. Annual renewal fees, always small, are usually canceled when sufficient money is on hand to cover costs. In the case of physicians, a majority of the states do not require any renewal fees. In a few states such as California and Minnesota, fees of $2.00 a year are required. In the dental profession most states require annual or biennial fees of the order of $1.00 or $2.00. There are no annual fees required from members of the legal profession. In the case of engineers, depending somewhat upon the time the licensing act has been established in a state, renewal fees vary from nothing to $5.00 a year, averaging about $3.00. The states of Maryland and West Virginia have no renewal fees for engineers. Since 1936 the registration of engineers has been operated at a loss in New York State.

Neither politicians nor the lay public have ever started agitation for state licensing of any profession. The movement has always originated in the professions themselves, which have sought to establish legal backgrounds defining a field of work and the type of person qualified to do it. Licensing has been used for the purpose of elevating professional standards and protecting both the public and the profession. Now-licensed professions often had difficulty in convincing lawmakers that licensing was necessary.

Standards of Profession Legally Regulated

In the section headed "Licensing No Help", the author of the opposition article first raises the contention that since many subprofessional groups are state-licensed, licensing of professions does not give them any greater status in the eyes of the public. In every licensing act the minimum requirements for licensing of a trade or profession are very definite. The mere fact that occupations requiring varying levels of knowledge or skill are commonly licensed is no argument that they are in any way related, since their functions are entirely different. An engineer is licensed as engineer, and not as a plumber or a truck driver. The public has never considered that licensing of various occupa-

BE LICENSED?

no!

Rebuttal by CHARLES L. PARSONS

IN preparing my rebuttal to "Should Chemists Be Licensed?—Yes!" by Dr. Egloff [CHEM. ENG. NEWS, **24**, 310 (1946)] to which I have been asked to frame a reply, I find little in his article to rebut except his personal opinions to which he has every right, as I have an equal right to believe them quite unfounded, incorrect, and factually unprovable.

The legal situation is, however, open to factual demonstration as court records are open. Fortunately a capable lawyer, A. J. Nydick, who is also a chemist and a member of both the AMERICAN CHEMICAL SOCIETY and the American Institute of Chemists, has interested himself in the matter and has written a letter to the editor [CHEM. ENG. NEWS, **24**, 1980 (1946)] and delivered an address before the Pennsylvania Chemical Society [CHEM. ENG. NEWS, **24**, 2170 (1946)] which should be read by all interested parties. E. L. Luaces [CHEM. ENG. NEWS, **24**, 852 (1946)] states "there are scores of instances, and Dr. Egloff made reference to some of them", where unlicensed engineers have been prohibited by law from practicing. However he cites only one instance, that of Case 555,023 (unappealed) in Cuyahoga County, Ohio, where Designers for Industry were enjoined. The reason that I had been "careless in my search" was because this case was first published in *The Engineer & Scientist* in Cincinnati in March 1946, some three months after my own article, wherein I was "careless", was written and one month after its publication in CHEMICAL AND ENGINEERING NEWS [**24**, 311 (1946)]. I have, to date, found no other case authenticated by a reference which I can confirm. I have been told that a firm of plumbers in some southern state submitted a bill for "engineering services" which they could not collect because of its wording, but I have no confirmation of this not unusual type of occurrence. Before preparing my article, I took the precaution of writing the National Headquarters for Engineering Licensure, asking if they could cite a case and if they themselves ever undertook to stop engineering practice by unlicensed engineers. I received a reply giving no reference but stating that they took such action "whenever feasible". I wrote again telling them I was very anxious to get the truth of the situation and requesting them to cite even a single case where they had found it feasible to bring action or secure an injunction. Apparently they were unable to do so, for I received no reply. I have still to find a single case in which any state has succeeded or seriously attempted to enforce its own license laws for engineers. States are interested in revenue from, rather than enforcment of, licensing laws. Even in the Ohio case just mentioned, it was not state officials that brought the suit, but one of the engineering organizations whose very existence depends on licensure propaganda. Indeed I maintain that the chief "raison d'être" for licensure agitation, and the one that keeps it alive, is the "saving of face" for the proponents. So long as any licensed engineer of any type, such as mechanical, civil, electrical, or automotive, can legally compete on chemical engineering projects without reference to his individual competency, licensure is, and always will remain, under any law so far proposed and favored by Dr. Egloff and those who are with him, a joke. I know many licensed chemical engineers, who have paid the tax and bought their seals, who have never once used their seals and never once been asked in court or by a prospective employer whether they were licensed or not. Also I have yet to find an employer who cared.

I am confident that a large majority of chemists and chemical engineers who have made any careful study of the question are opposed to licensure. If licensure were optional, and not on a "closed shop" basis, few would pay the tax simply to get a state license, like a plumber or beautician, to hang on the wall in hopes of hypnotizing the uninformed. I am confirmed in this opinion by many conversations with engineers and quote from one of the country's most prominent mechanical engineers, who has consistently refused to take out a license though himself conducting a lucrative consulting practice. On reading my original article, he wrote me as follows:

I have read with deep and appreciative interest and approval your most forceful and timely article. You have presented the basic fallacies of licensing. As you well know, I have from the very outset opposed the licensing of engineers. I have yet to see any pronounced benefits deriving from it, either in terms of professional or public interest. It is a regimentation process fostered upon engineers and others without any compensating advantages. It is actually woefully misleading the public; because charlatans and incompetents do obtain licenses the public is warranted in believing such are competent and responsible, but such is not the case. Even the licensing of doctors and lawyers, although better safeguarded than for engineers, does not eliminate the charlatan and quack. All that is necessary is for a "professional engineer" to sign and stamp documents. He need not know what they contain or their soundness or accuracy. He merely performs the function of a "notary", without swearing the author as to the accuracy and competency of the contents; so again, it is "eye-wash".

Mr. ———, president of The ——— Company wrote me, in fact, as follows:

I want to suggest that you advise your friends that the licensing of engineers in the various states is, in my opinion, working a hardship on the profession and if continued, will in a short time render it impossible for an engineer, professional or otherwise, to move freely from one state to another to engage in work. The entire engineering profession is becoming a political football. We find it impossible to establish the home of our engineers in a number of states and have them work under the various laws attached to the states in the form of compensation and taxes, without the necessity of taking out a license in each state—The time has arrived for the engineering profession, as a whole, to put up a real fight to kill this licensing.

I am surprised that Egloff is advocating licensing. He should know better. Like many other proponents he paints a fascinating picture not in accord with reality. He implies that licensing has caused more unity of thought and action in the engineering profession, and greater public appreciation of engineers. This is tommyrot. There is no doubt in my mind that licensing has caused more cleavage than unity. Among the basic reasons why the American Institute of Mining and Metallurgical Engineers withdrew from the American Engineering Council was the licensing of engineers. The Mining Engineers wanted the Council to aggressively oppose the movement—the Council felt it should be neutral—the miners withdrew. There are other examples of cleavage arising from licensing. I am regretful that I cannot give more specific information re the Industrial Designers Case. However, I hope this letter will convey the message of ardent moral support. You are exerting the aggressive leadership in opposition which is fully warranted and badly needed. Keep up the good fight.

I have eliminated names solely because I do not want to subject my correspondents to attack by the engineering organizations whose existence depends upon licensure as truly as the success of labor unions depends upon their own closed shop procedure.

I also quote as follows, from a memorandum filed by an able lawyer in opposition to New York Assembly Bill. Introductory 711, PR 757 for the Licensing of Certified Public Chemists:

In the case of this Bill, its proponents cannot show that in the field of chemistry the people of this state are being imposed upon; that the people are the victims of incompetent or fraudulent practices; that their life, health, or property suffer damage by the conduct of incompetent or unfit or unscrupulous and designing chemists. At many times proponents of legislation to regulate professions, trades, or occupations have had to be admonished that such regulation is grounded on the police

tions placed them on a common level. If it is desired to carry this argument to absurdity, it might be said that dogs are licensed, as well as marriages and automobiles, which cases obviously are not comparable with licensing of professions. Licensing is a means of regulating standards of practice in different fields of activity.

Examples have been cited which prove that licensure does protect the public and that the general public is not at present protected against the operations of pseudochemists (*1*). The public would shrink from asking the opinion of subprofessional lawyers in matters of legal importance. Similarly, only the ignorant consider entrusting their health to a quack physician. The public must be made to realize that similarly life, health, property, and investments are endangered when incompetent chemists are employed and decisions are based on their advice. If chemists were duly registered, the public would know that one representing himself as a chemist could be depended upon for correct chemical facts and counsel.

Requirements for Licensure

The question of the "grandfather" clause in proposed chemists' licensing bills calls for special comment. In initiating professional licensing, it has always been necessary to grant licenses without examinations to those, who, upon investigation, were deemed to be established in the profession at that time. Such provisions have been present in all state licensing acts, and are necessary because it is unconstitutional to deprive anyone of the opportunity to make his living by continuing the practice of his business in which he has functioned over a period of time without running afoul of the law. It is not mandatory upon state boards to license those whom they consider unqualified to practice as professionals, even when they have been so representing themselves. Thus, while a contractor would still be allowed to continue his business, he would be enjoined from calling himself an engineer. Under a chemists' licensing act, only those who were duly qualified by education and experience would be permitted to register and use the term "chemist". Even after licensing, when facts indicate that a licensed professional is incompetent or unethical, the state boards are able to suspend or revoke his license so that malpractice can be stopped. This is exemplified by the revocation of 29 engineering licenses in California up to Oct. 15, 1945.

The opponent of licensing states, "unless a licensing bill assures competency, it is a fraud on the public and also on the profession". The reply to this is that all chemists' licensing acts are specifically aimed at assuring competency of licensees. They prescribe minimum educational requirements high enough to eliminate unqualified applicants.

As to whether every senior grade member of the AMERICAN CHEMICAL SOCIETY could be licensed "immediately and without examination under any bill for licensure of chemists so far introduced in state legislatures", it is true that full membership in the SOCIETY is now carefully guarded and that a large percentage of the senior grade membership could qualify without difficulty under proposed state licensing acts. Present membership requirements state, "The membership committee may endorse for full membership only reputable persons who have received an adequate collegiate training in chemistry or chemical engineering or its equivalent, and have been actively engaged in some form of chemical work for at least five years; except that only two years of experience will be required from chemists or chemical engineers graduating from institutions, the adequacy of whose courses has been specifically accredited by the AMERICAN CHEMICAL SOCIETY." However, prior to the change in the SOCIETY's bylaws in 1933, the rule on membership stated that "any person interested in chemistry, properly recommended by members of the SOCIETY, may be elected a member". Under this requirement, which was somewhat analogous to a "grandfather" clause, many members were admitted who had neither formal chemical training nor chemical experience. A good many of these members have had no real chemical experience since they were admitted to membership and could not qualify under any of the alternative provisions in the proposed state acts, and many of them would not care to be licensed. All bills now under consideration for the licensing of chemists contain requirements at least as high as or higher than the present requirements for senior grade membership in the AMERICAN CHEMICAL SOCIETY. The point to be borne in mind in connection with state licensing is that it will give legal status to qualified chemists, which is not attainable by membership in any scientific or technical society, however high its requirements.

In comparing the type of professional status acquired on the one hand by membership in the professional societies and on the other hand by state licensing, the chairman of the Legislative Committee of the AIChE reports as follows:

> The tagging and definition of the profession cannot be left to individual opinion, nor to the joint opinion of self constituted organizations such as our national engineering societies and their membership requirements. Legal recognition is required. The strength of the legal profession, the medical profession, and the architects is based on such legal recognition afforded by the laws of our several states. For the engineers, the mechanism also exists in the engineering registration acts which are almost universal today in the United States. . . Licensing is here to stay and will grow with the years. It is our answer to the question of legally establishing professional status and we should take advantage of it (*2*).

As to the assertion that "registration may be regimentation", the experience of the licensed professions furnishes complete refutation. Physicians and lawyers and other licensed professionals certainly do not feel that they are regimented; while all are state-licensed without exception, they do not all operate on a common level. Each profession has many specialized fields of professional practice, and the high esteem in which outstanding members are held by both the lay public and fellow members of their professions proves the absence of any feeling of regimentation. The minimum requirements for licensing may be compared to the minimum requirements for United States citizenship. Once having met the basic requirements, citizens are not restrained from business, economic, or social advancement. Meeting minimum requirements is not equivalent to regimentation, either in the case of technical society membership or state licensing of professionals.

The statement that "it would be the incompetent who need it for advertising purposes to whom licensure would be worth the annual fee" infers that only incompetent or unethical individuals are interested in licensure and that it is not even worth the annual fee to others. This is a slur on all those chemists who have been prompted to do something in the interest of protecting the public and whose purpose is to raise the standards of a profession which is daily becoming of more and more vital importance.

Doubtless among all applicants for licenses there will be some incompetents who may seek admission under the grandfather clause, but such abuse of the clause is unlikely since the licensing of "grandfathers" as professionals is in all individual cases determined by the state examining boards. Rather, it is probable that the incompetents will be found among the objectors to licensing because they are afraid they will be unable to obtain it.

Furthermore, under the law, any error in licensing is correctable by suspension or revocation of a license when the licensee subsequently exhibits incompetency or becomes guilty of malpractice.

The Supreme Court decision in 1896, which stated that a chemist was a professional man, is cited by the opponent of licensing. Unfortunately, this decision has evidently not established a precedent which governs the rulings of other courts. The chemist still has no legal standing. The Federal Government does not recognize the chemist as a professional. In a recent federal census of businesses, no practicing chemist was permitted to claim professional status. A chemist was listed as being in a "service trade", along with garages and beauty shops. Two laboratories of acknowledged standing in Los Angeles were so classified. The owner

power of the state for the public benefit, and that it is not designed to vest in any special class of practitioners a monopoly in their particular vocation.

Most scientists, whose achievements are known in the profession, trade, industry, and elsewhere, and who enjoy the utmost respect for their professional standing, will probably not apply for certification. Indeed, the present bill, if enacted into law, will result in applications for certification by persons who are not well known, and certainly by the just barely competent ones who hope to gain professional stature merely because they will be able to point to the possession of a certificate issued by the State.

I question whether the proponents of state licensing, including Dr. Egloff, realize that articles written by them supporting such plans, if read by members of state legislatures, constitute the most damning evidence that can be introduced against licensing. There is but one justification and one only, for state licensing whether it be for chemists, plumbers, electricians, or beauticians. Is the public safety and welfare in jeopardy because a given profession or trade primarily serving the public is overrun by incompetents and the public is unable to judge satisfactorily between the competent and incompetent?

Public Welfare Not Primary Goal

Proponents of state licensing for chemists make a very feeble attempt to show that the public is in serious danger because chemists remain outside the licensing fold, but they do so with their tongues in their cheeks because they know full well that their advocacy of licensing is based primarily not on any concern for the general public's welfare, but on the premise that by some miracle licensing will give greater recognition to the profession and will automatically increase the salaries of its members. They choose to ignore that the overwhelming majority of chemists are privately employed and that employers are fully capable of selecting competent individuals. In this respect the chemical profession differs from the medical, dental, and the legal professions, and it is simply preposterous to try to show that the chemical profession in this one respect is comparable to professions whose members in large numbers offer their professional service to the lay public.

What state legislature is going to single out this or that profession or trade, and provide a system of state licensing, when it is perfectly obvious the intent is to secure special consideration, greater glory, or greater emoluments? Some state legislatures where the state treasury is in need of financial bolstering may take the attitude that if chemists are foolish enough to contribute sizable amounts to state funds, they are willing to provide a piece of paper of dubious value in return, but the large majority of state legislatures will not countenance discriminatory legislation designed primarily to give special recognition to special groups. The plea of the chemists before the state legislatures could and would be followed by other groups, both professional and nonprofessional in makeup, each seeking just what the chemist who asks for state licensure so uselessly seeks—aid from the state legislature in securing higher pay.

It is most unfortunate that licensure is being sold the young chemist on the basis that state recognition will secure for him greater professional recognition and higher salaries. The older men in the profession should know better, for state licensing will not achieve these worthwhile objectives. Doctor, lawyers, dentists, engineers, etc., are state licensed, yet the incomes of men in these professions vary widely and recent data presented in CHEMICAL AND ENGINEERING NEWS show that the chemist financially is as well off as the members of professions which have paid state licensing fees for years.

No one, not even Dr. Egloff, has been able to provide any tangible evidence that state licensure has improved the financial rewards in the professions where licensing prevails. There are successful doctors, dentists, lawyers, etc., men whose incomes are substantial. There are also men in these professions whose incomes are extremely modest. In my experience I have met many doctors, lawyers, dentists, and engineers whose incomes have been high; likewise I have met men in these professions who, for one or many reasons, have failed to achieve substantial financial rewards, yet can "boast" of a state license. A diploma of state registration is not the open sesame to better incomes. Dr. Egloff may play down this angle of the question in his presentation, but I am not so naïve that I do not know that in informal discussions of the question the most important bait offered to the young chemist is that licensing means higher incomes. I wish it were so; I might be for licensing if there were any real relationship between licensing, improvement in professional standing and higher incomes, but I do not believe in kidding either myself or the younger members of the chemical profession. Recognition, and with it professional monetary rewards, come only the hard way in any profession, whether it is state licensed or not. Let us be honest and truthful with the young members of our profession. In the long run it is straight-from-the-shoulder advice that they want—not empty, high-sounding promises that will but lead them down the proverbial blind alley.

To summarize, what Dr. Egloff and others are doing is simply an attempt to set up a two-sided plea. On the one hand they attempt to sell licensing within the profession on the basis that it will increase professional recognition and monetary rewards. On the other, they would attempt to sell state legislatures that the public is in great danger. Neither of these two premises are based on facts.

AIChE Questionnaire

The American Institute of Chemical Engineers through the medium of John M. Weiss, chairman of their committee on professional legislation, himself an active and vocal proponent of licensure, recently sent a most interesting questionnaire to all members of the institute and received 3,254 replies. His summary, with quoted replies from most of the states where there is real activity in engineering licensure, is published in the AIChE *Bulletin* of July 15, 1946, pp. 18–28. The results are worthy of critical study. To me the outstanding feature is the fact that only about one third of the active and associate members of the institute have, law or no law, thought it worth while to take out licenses as professional engineers and less than one tenth of the junior members, much larger in numbers, have done so. In compiling the "fors" and "againsts" by states he includes as "fors" a very large number whose reasons for approval are accompanied by an "if" which completely negatives their agreement since the conditions they require exist in no existing or proposed licensure law. Nevertheless, they are recorded as favorable in the summary. For example, a goodly portion, which may be a majority, are in favor

"If"

(a) *If* confined to those engaged in the profession.
(b) *If* licensing and examination are in a specific field.
(c) *If* examination is on chemical engineering principles and applications—not designing bathhouses.
(d) *If* not a "must" for holding a job
(e) *If* annual fee is not so high as to be a racket.
(f) *If* not political and another means of raising revenue.
(g) *If* for consultants and practicing chemical engineers—not for teachers or company men.
(h) *If* licensed by American Institute of Chemical Engineers only.
(i) *If* by competitive examination only. Absolutely no "grandfather clause".
(j) *If* standard license acts and reciprocity clause between states which is now lacking.
(k) *If* only for consultants in public service.
(l) *If* each class of engineer is separately licensed.
(m) *If* licensing is uniform in all states. It must be free of all political control and should include renewal examination at reasonable intervals.
(n) *If* not compulsory.
(o) *If* mandatory license in all states.
(p) *If* license is for particular branch only.
(q) *If* handled properly.
(r) *If* schools have a sort of internship.
(s) *If* requirements are strict enough. Otherwise it is a joke.
(t) *If* made more desirable. As it is there is no incentive—no advantages to be desired.

of one referred the census enumerator to the Supreme Court decision of 1896, but without avail. A profession is not legally established until recognized by the states, which alone can pass and enforce professional licensing laws. Similarly, courts would be under no constraint to admit a chemist's professional status because of the inclusion of chemistry in the dictionary definition of a profession.

The article against licensing states that "unlicensed chemists have exactly the same standing in the courts as licensed chemical engineers". This statement ignores the fact that courts have repeatedly ruled that lack of a state license disqualifies experts offering engineering testimony. In a hearing by the U. S. Post Office Department in 1939, the testimony of a chemist was not considered as having any value, in spite of educational qualifications, because he was unlicensed. In this case licensure would have been the determining factor in regard to the competency of the witness.

In the article opposing licensing, the case of "a prominent engineer, member of a well-known firm of consulting engineers, and head a few years ago of the National Council of Engineers", needs clarification. The "National Council of Engineers" was actually the American Engineering Council, a transient organization since disbanded. The article states that the "prominent engineer, who had never taken out a license because he did not believe in licensing", was opposed in court by a licensed engineer. The latter was found on examination to have practiced only as an electrician, though he had become licensed as a professional engineer. The judge ruled out the electrician as an expert and accepted the testimony of the prominent, but unlicensed engineer. Even though the electrician had been licensed as a professional engineer, he still was not qualified to "build the Brooklyn Bridge or the Empire State Building, or to function as a chemical engineer . . . " His difficulties would be many if he were to assume responsible charge of such projects. Correct status of experts is most frequently determined on a basis of particularized training and experience, and the electrician who acquired an engineering license under the grandfather clause would have to be similarly considered. Licensure, however, may be the deciding factor in the case of two experts of approximately similar qualifications.

Exact data as to how many engineers and how many chemists have been coerced into joining labor unions are difficult to obtain, but in the opinion of a high official in engineering societies, the ratio of 20 engineers to one chemist is far too high. It would be of interest to know the source of this information, and what proportion of the engineers were licensed professionals. In any event, the actual statistics would depend largely upon just who are included under the titles "engineer" and "chemist". There are about 700 recorded types of engineers, only a few of which come under the established definitions of engineering societies and state licensing acts for engineers. At present, with no legally established definition of a chemist, this term might also include a large number of persons who are merely self-designated and without fundamental training or any broad experience. There are many types of unions, and although some engineers have been inveigled into allying themselves with strictly labor organizations of a subprofessional character other engineers have organized professional groups for bargaining with management. Professional engineers are extremely active in working for amendments to the Wagner Act, which will permit licensed professional employees to bargain separately either as individuals or in groups. Licensed engineers have a much stronger position in pressing for amendments to present labor laws than chemists who have no legal professional status. State licensing elevates a profession out of the skilled trades classification, makes a member more conscious of his professional status, and less likely to resort to trade union practices to attain his objectives.

Specialized Licensing Unnecessary

As regards the right of a licensed professional chemist to practice in any field from "peanuts to plutonium" anyone, trained or untrained, can practice in all chemical fields at the present time in the absence of licensing regulations, and without any legal restraint whatsoever. The effect of licensing will be to make the chemist responsible for his actions in whatever field he chooses to practice. Legal permission to practice in a number of fields is a necessary feature of all legislation having to do with professional licensing. This is characteristic of acts licensing physicians, lawyers, and engineers, although no member of any of these professions is specially qualified in every branch of his profession. In practice the physician who specializes in a particular field does not invade the provinces of specialists in other fields. The medical profession includes such specialties as:

Internal medicine	Plastic surgery
Surgery	Neurology and psychiatry
Pediatrics	Urology
Obstetrics and gynecology	Orthopedic surgery
Ophthalmology	Radiology
Otolaryngology	Pathology
Dermatology and syphilology	Anesthesiology
	Neurological surgery

In the legal field attorneys specialize in such diverse matters as taxes, corporations, crimes, real property, patents, wills, domestic relations, international law, administrative work, etc. A divorce lawyer would not serve as an expert for a corporation in regard to its income tax. A licensed engineer is legally permitted to practice in a variety of engineering fields, but this seldom acts to the detriment of the client or the public. Practice in poorly understood fields is curbed by practical considerations of inability to function effectively and the prospect of prosecution for malpractice. A chemical engineer would not build bridges or design airplane engines. Under state licensure legal recovery of damages can be much more easily achieved where evidence shows that an engineer was not legally qualified to assume responsibility. Licenses are definitely revocable for incompetency or malpractice. Legal limitation of chemists' practice to small fields is as unnecessary as in other professions.

As to the universality of chemistry, the same term may well be used in connection with other professions. Thus, law might be considered as the "handmaiden" of national, international, state, municipal industrial, corporate, and individual activities, and yet this has not acted to deter attorneys from being licensed. The law does not prevent anyone from signing a lease on his own responsibility, although such a transaction is subject to legal requirements. There are legal considerations in the hiring of employees for different types of work, but this does not say that a lawyer is the only one who can hire or fire. In a sense, a person recommending headache tablets or cough syrup might be considered as practicing medicine, but he does not have to be licensed. He may also recommend a nostrum for family consumption, but this still does not make him a physician. The method of distinguishing licensed chemists from those practicing minor routine phases of chemistry is through educational and experience requirements, which assure ability to approach chemical problems on a basis of fundamentals, a knowledge of which is lacking in the lay technician.

The argument that the chemist does not contact the public and therefore the public needs no protection from chemical malpractice is unsound. Certainly the public needs protection from individuals who set themselves up as chemists and perform analyses and experiments for a fee, irrespective of their qualifications for rendering judgment on a chemical project. Neither is it true that employers do not need protection against those who misrepresent themselves as chemists, this being particularly so in the case of small corporations and businessmen. An employer of chemists who is not a chemist cannot protect the public from malpractice of his employees. In addition to the need for licensure of clinical analysts which is admitted by the AMERICAN CHEMICAL SOCIETY councilors' action in 1939, the same need is evidenced in the case of those doing analyses in connection with other phases of medical practice, nursing, pharmacy, bacteriology, veterinary medicine, etc., as enumerated in the opposition

Egloff . .

article. It is difficult to understand why the public is less endangered by an improper analysis and appraisal of water supply, sewage structural materials, foods, etc., than by errors in clinical analyses.

The opponent of licensing states: "The M.D. degree is therefore comparable to the Ph.D. degree. If the proponents of licensing can induce chemists to favor a similar bill with the requirement that to be licensed a chemist must have a Ph.D. degree from a college approved by the AMERICAN CHEMICAL SOCIETY, certainly few could consistently object." Our opponent, while generally opposed to licensing of chemists, tends to the view that licensing of chemists would be good if it were limited to those having Ph.D. degrees. The proponents of licensing see no reason why Ph.D.'s in chemistry should be the sole beneficiaries, or why trained and experienced chemists having B.A., B.S., or M.S. degrees should be ineligible for licensure. In the proposed chemists' licensing acts, a Ph.D. degree is not required, although experience credit is given for graduate work leading to advanced degrees. Proposed licensing bills recognize that requirements are proper basic training and adequate chemical experience.

It is stated in the opposition article that "no law has ever controlled misuse of the term 'engineer'; no state or engineering organization has ever succeeded in preventing use of the title 'engineer' by the incompetent or the unlicensed, except when signing state or municipal documents". The engineering licensing acts have already stopped both individuals and corporations from misusing the terms "engineer" and "engineering". A typical case showing the effectiveness of state licensing acts in controlling the use of these terms is that of the State Board of Examiners for Architects and Engineers *vs.* Standard Engineering Company, 7 S.W (2d) 47, 157 Tenn. 157 (1928). In this case the state board brought action against the firm for the use of the term "engineering" because neither the corporation nor any one of its employees was registered under the State Architects and Engineers Act of Tennessee. The defendants contended that they were in fact plumbers and not engineers, and therefore they were not practicing engineering. They contended that enforcement of the registration law would deprive them of their property without "due process". Their stationery had the title "Engineers and Contractors for Plumbing and Ventilating Systems, Power Plant Equipments". The court held that the enforcement of the statute did not confiscate property or jeopardize their business, and the defendants were prohibited from the further use of the terms "engineers" and "engineering", since they were not engineers nor practicing engineering within the meaning of the law.

A court action in Ohio which restrained unregistered persons from using the terms "engineer" and "engineering" was cited by E. L. Luaces in CHEMICAL AND ENGINEERING NEWS of March 25, 1946, the case of Kammerer *vs.* Designers for Industry, Inc., *et al.* As a result of the court action, the defendant, Designers for Industry, Inc., was perpetually enjoined from practicing engineering, from using the term "engineer", and from advertising any professional engineer employed by defendant in a manner which would constitute misconduct.

Furthermore, damages have been assessed by courts against persons who falsely called themselves architects. In the case of Keenan *vs.* Tuma, 240 Ill. App. 488 (1926), Keenan first secured judgment in a lower court for $500 for a balance of services rendered in construction of a cafeteria. The judgment was appealed by Tuma, the owner of the cafeteria, on the ground that Keenan was not a registered architect in Illinois, and therefore his contract which represented him as an architect was void. The judgment in favor of Keenan was reversed by a higher court because the services rendered by him involved the practice of architecture, and he was not a registered architect.

It is not correct to state that a license once obtained in any profession is a perpetual guarantee of right to practice. Under engineering licensing a license can be revoked at the discretion of the state board for a number of causes, particularly if it can be shown that the applicant has been adjudged guilty of practice not in conformity with the law. In the engineering profession, cases are on record wherein engineering licenses have been refused to trained and experienced engineers because they had not been engaged for some years directly in the practice of engineering. The same should be true in the case of chemists who abandon the practice of chemistry.

We are pleased by the interest shown in the subject of licensing of chemists and are hopeful that the discussions pro and con will be helpful in formulating an "ideal licensing act". The Professional Status Committee of the AMERICAN CHEMICAL SOCIETY, Chicago Section, is working on such an act.

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(2) *Trans. Am. Inst. Chem. Engrs.*, **41**, 1 (Feb. 25, 1945).

Parsons . . .

(u) *If* confined to private consultants.
(v) *If* federal and not state matter.
(w) *If* licensing permits adequate evaluation of an engineer's capacities in his particular field.
Etc., etc.

I quote but three of the reasons given for opposition to licensure:

Against—Except in the bona fide interest of safety, for example, physicians, automobile drivers, I am opposed to licensing on principle. This is just another attempt to extend the practice of unjustified government interference with the individual. Even if the argument in regard to "improved professional standing" had any basis in fact, that would only emphasize the point that the objective sought is no legitimate government function. Licensing legislation is essentially repressive. It seems to be based on the dangerous theory that the individual has no inherent right to do anything unless and until he gets expressed permission from the Government. The theory has already been applied to a number of trades and professions where there is no other excuse than that the politicians desire to collect tribute and that some of the insiders wish to exclude competition.

Against—The country is short of a great many commodities, but I am convinced that we are suffering from a tremendous oversupply of legislation. Although each bill proposes to protect society, its net result is chiefly a decrease in those rights and liberties which this country has long enjoyed. The medical profession has licensed physicians for a long time, but you can find chiropractors and osteopaths in almost any community. A licensed civil engineer must approve plans and specifications in many states, but all too frequently he is a rubber stamp and the actual design is done by an unlicensed draftsman. I see no need for licensing chemists or chemical engineers, and I believe that membership in any organization, whether church, political party, labor union, or professional society should be on a strictly voluntary basis.

Against—Status of engineers who are really competent seems to have been adequately appraised in the past by employers without reference to licenses—and in the case of consultants by their general reputation. Licensing will assist politicians and lawyers, not engineers.

Many have joined under compulsion. I know of 20 in one prominent laboratory whose manager thought it good insurance against injunction to pay the tax and take out a license while the "grandfather clause" door was still wide open and entrance free from effort or competency tests.

Confusion of Definition

I am anxious not to rehash my original article of last February, but I cannot refrain from again emphasizing the fact that engineers far more than chemists have been influenced or coerced into labor unions in spite of the false claim that they are protected by licensure. Also I wish to emphasize that the term "engineer" is far more loosely used than the term "chemist"

(*Continued on page 2375*)

A. G. Stern, chairman of the Northern California section, delivered the welcoming address

Authors of some of the papers presented at the New Western Chemical Industries symposium: standing, I. E. Levine, E. O. Ericsson, A. C. Byrns, and H. H. Smith; seated, R. W. Moulton, Wilhelm Hirschkind, honorary chairman of the meeting, and P. M. Huemmer

American Institute of Chemical Engineers at San Francisco

A Staff Report

"New Chemical Industries in the West" was the theme of the American Institute of Chemical Engineers' convention held at the Palace Hotel, San Francisco, August 25 to 28. Six hundred seventy-five chemical engineers from all parts of the United States participated in a four-day program comprising presentation of technical papers, symposia, and inspection trips to Bay Area chemical plants. This was not only the first AIChE meeting on the West Coast but the first meeting in the West since 1924, and the largest regional meeting ever held by the Institute.

Western Chemical Industries

One of the highlights of the meeting was a symposium at which thirteen papers described new western chemical industries. The West is abundant in raw materials which form the basis for chemical manufacture. Consequently, this industry had an early start, particularly in respect to refining a number of raw materials which were not only the first, but in many cases the only source in the United States. The development of the Pacific Coast industry as a function of the regional raw materials was traced by W. Hirschkind of the Dow Chemical Co., Pittsburg, Calif. Some of the chemicals mentioned were salt, cream of tartar, magnesium compounds, and bromine.

Penicillin. A very different type of chemical, penicillin, is being produced at the rate of 100 billion Oxford units per month at the Cutter Laboratories in Berkeley, Calif., which is the only manufacturer west of Chicago. Terrence H. M. Taylor stated that four different penicillins have been isolated from corn steep liquor fermentation by *Penicillium notatum* or *Penicillium chrysogenum*. At present, penicillin G is considered the most desirable, and production of this material is aided in the fermentation process by the use of the proper strain of mold and the addition of a precursor such as phenyl acetic acid.

The original Cutter plant was designed for making one billion Oxford units per month, the penicillin being grown in bottles. By growing the mold in large tanks and by using a different strain of mold, the plant capacity is being increased to over 100 billion Oxford units per month. By eluting the penicillin from the absorbent carbon with acetone, which is readily recoverable, the total volume of liquid handled per day by the subsequent purification equipment is substantially the same for 100 billion Oxford units per month as for one billion. At present, the carbon acetone and batch solvent extraction process is being eliminated in favor of a continuous countercurrent solvent extraction method. Greater penicillin recovery at lower cost is expected to result.

Penicillin is only the forerunner of a new antibiotic industry. There are at present streptomycin, tyrothricin, bacitracin in various stages of development, and the field is virtually limitless. The manufacture of antibiotics requires temperature-controlled fermentation conditions. The uniformly cool climate prevalent in this region facilitates air-conditioning operations.

Phthalic Anhydride. Until Standard Oil of California, producing for its chemical subsidiary, the Oronite Co., entered the field, there was no producer of phthalic anhydride west of the Mississippi. This important chemical is used to make alkyd resins, plasticizers, and insectifuges.

The unique process, whereby phthalic anhydride is produced from a petroleum-derived raw material, *o*-xylene, instead of from coal-derived naphthalene, was described by Irving Levine of the California Research Corp. Vaporized *o*-xylene is mixed with an excess of filtered, compressed, preheated air. The mixture passes through a tubular heat exchanger with vanadium oxide catalyst inside the tubes and molten salt outside. The reaction gases are cooled and then passed into an air-cooled condenser where the phthalic anhydride crystals are deposited. Further purification is accomplished in batch stills in series.

Los Angeles Rubber. The chemical industry of the Los Angeles area was greatly stimulated by the requirements of World War II. Synthetic rubber still is needed in tremendous tonnages. Because one of the chemical raw materials, styrene,

could be obtained from petroleum, six plants for the production of Buna S rubber are operating in Los Angeles County.

These plants comprise the only group of synthetic rubber factories in the United States which transform petroleum raw materials to finished products in a given integrated area. Of these, the Los Angeles styrene plant, operated by the Dow Chemical Co. as agent for the Reconstruction Finance Corp., is the only one located in an area where both raw materials, benzene and ethylene, are immediately available from petroleum processing.

According to H. H. Smith of Dow, the present West Coast demand for styrene is about 1,000,000 lb. per month (95% for polystyrene, 5% for monomeric styrene). The manufacturing process involves the separation of ethylene from the feed gas by a low-temperature, high-pressure distillation system. Benzene, derived from the cracking of aromatic petroleum, and the ethylene are combined in reactors in the presence of aluminum chloride. Ethyl benzene of better than 99% purity is separated by distillation and sent to the styrene system.

Here the ethyl benzene is vaporized and sent to a reactor where it contacts the catalyst for 0.5 second at a temperature of approximately 625° C. The product vapors are heat exchanged and then condensed to give oil and water phases. A series of distillation columns removes the styrene at a purity of about 99.5%. This may then be sent to another plant for making into Buna S.

The Union Oil Co. of California has developed a process which can be used to refine any type of crude petroleum wax. This process, described by P. M. Huemmer, employs methyl ethyl ketone as solvent. The first commercial plant was put into operation at the company's Oleum refinery in 1941 and has been operating continuously since that time supplying the armed forces and war industries with sorely needed high melting point waxes. At present, it is the only plant on the Pacific Coast producing fully refined waxes from the crude material. These waxes are used in the processing of explosives, protective coatings, wax paper and cartons, candles, carbon paper, magazine color prints, and paint for ship bottoms.

Magnesium. Sea water, natnral gas, petroleum coke, and dolomite are the raw materials used at the Permanente Metals Corp., Permanente, Calif., to make magnesium. A. C. Byrns discussed the process used at this plant since 1941 which has yielded 19,000,000 lb. of the metal and about 80,000,000 lb. of the special incendiary material known as Goop.

Essentially, the carbothermic process comprises reduction of magnesium oxide by carbon to give an equilibrium mixture of magnesium vapor and carbon monoxide. The mixture leaving the furnace is shock-chilled with a stream of inert gas to reduce the temperature rapidly and to minimize the reverse reaction. The crude dust obtained by shock-chilling is essentially a smoke which is agglomerated and filtered. The dust is briquetted, the magnesium sublimed under vacuum in large batch retorts, and the recovered pure metal melted and alloyed as desired.

The plant site at Permanente was chosen so that natural gas could be used as shock-chilling agent instead of hydrogen, which was used in the original process development. This eliminated the expensive purification system to remove the carbon monoxide.

Lithium from Brine. In recent years, several important chemicals have been extracted from seawater by commercial installations. Bromine and magnesium are notable examples. R. W. Mumford of the American Potash and Chemical Corp., Trona, Calif., described the process whereby salts of lithium are being recovered as concentrates from Searles Lake salt crystal beds.

These crystals were formed thousands of years ago when glacial mountain streams dissolved salts out of the rocks, flowed into a basin, and the water was evaporated by the sun. The salt crystals contain voids filled with brine, and it is this brine which is processed at the Trona plant to recover the lithium salts contained therein. In order to give some conception of the concentration and separation steps involved, the speaker stated that 17,500 tons of brine are pumped through the plant each day to yield 2 tons of lithium oxide.

Other metal salts in the brine are also recovered and processed as salable by-products. The advantage of using brine as the starting material instead of mineral deposits is that the former represents a large, readily available, chemically uniform source.

The Navy jet and rocket programs called for large quantities of potassium perchlorate and in a hurry. Because before World War II most of the perchlorate was of foreign manufacture, new producing units had to be built in this country. The first West Coast plant was constructed in Los Angeles in 1941. Joseph C. Schumacher of the Western Electrochemical Co. described the process used at this plant.

Today, potassium and sodium chlorate are being produced at a rate one hundred times that of the original installation to satisfy a world demand for these West Coast products as vital in peace as in war.

Winery Chemicals. With the tremendous expansion of the California wine industry in recent years, more attention is being given to marketable by-products. It is estimated that at present there is an annual loss of over $4,000,000 in grape pomace, the solid residue after fermentation.

E. K. Metzner, Los Angeles chemical engineering consultant, discussed his process whereby tartrates and alcohol are recovered from the pomace and the solid residue can be sold as fertilizer and cattle feed. Residual alcohol from the fermentation operation is steamed out of the pomace, which then passes to the tartrate extractor and into a washing battery to remove adhering tartrate solution. A continuous press removes excess moisture, so that the pomace is conveyed to the stockpile free of alcohol and tartrates. The tartrate solution is settled and the supernatant liquid transferred to another tank where the addition of calcium chloride and lime precipitates calcium tartrate. This is then washed, dried, and bagged for shipment.

The production of phosphate fertilizer by olivine-phosphate fusion was described by R. W. Moulton of the University of

Standing, G. W. Carter, T. H. M. Taylor, H. G. Staaterman, R. W. Mumford; seated, E. K. Metzner, J. R. Callahan, chemical and metallurgical engineering symposium chairman, and J. C. Schumacher—authors of symposium papers

Speakers in the symposium on Chemical Engineering Education in the West: Mott Souders, Jr., W. T. Nichols, H. K. Benson, and C. G. Kirkbride

Washington. Manganese Products, Inc., of Seattle, is preparing to go into commercial production of this type of phosphate fertilizer. Olivine and phosphate rock are fed continuously into a three-phase electric arc furnace. The melting zone at the furnace bottom is at a temperature of about 1,500° C. Intermittent tapping sends the molten slag stream into a high velocity water spray. The molten slag must be cooled rapidly in order that the product show a high available phosphate. The finely granulated product is removed by chain rake, dried, and passed through rolls for final sizing. The finished product is slightly alkaline. The high acid-soluble magnesium content makes this fertilizer particularly effective on soils having a magnesium deficiency, which is the case in many parts of western Washington and Oregon.

Dimethyl Sulfolane. The interesting unreactive solvents sulfolane and dimethyl sulfolane were discussed by H. G. Staaterman, of the Shell Chemical Co. The sulfolanes contrast with the more conventional solvents because they are so unreactive that they are noncorrosive and do not polymerize or decompose in the presence of traces of acid or base. They possess high specific extractive power for liquid-vapor and liquid-liquid systems, and can separate mixtures of components having different degrees of polarity and saturation. They can be used in the refining of petroleum fractions, particularly separating aromatics from the base stock, and also for the refining of vegetable oils.

Alcohol from Sulfite Liquor. The Puget Sound Pulp and Timber Co. is operating at Bellingham, Wash., the only plant in the United States which used sulfite waste liquor as the raw material for alcohol production. E. O. Ericsson stated that the process of manufacture, in general, is similar to other fermentation processes for the production of ethanol.

During the previous wood cooking process, acid hydrolysis of the hemicelluloses yields a concentration of about 2.5% sugars in the recovered sulfite waste liquor. Part are nonfermentable pentoses and the remainder, about 1.8%, are fermentable, being principally glucose, mannose, and some galactose. Yeast is added to the liquor and the sugars are converted to alcohol, which is then separated, concentrated, and purified by distillation. The product is similar in kind and quality to alcohol produced from molasses or grain.

Coal Logs. The distillation of coal at low temperatures in a process designed to suit western coals and economic conditions soon will be available for commercial application. It will be feasible to manufacture economically radical types of smokeless fuel, coke, and coal tars in a compact, inexpensively built and operated system, according to George W. Carter, of Coal Logs Co., Inc., Salt Lake City, Utah.

The processes permit the continuous heat treatment of coal in two steps to produce both low- and high-temperature cokes. In the low temperature section, a bed of slack coal $^1/_2$ to $1^1/_2$ inches thick enters one end of a vibrated horizontal retort. After reaching the discharge end, the coal attains a finishing temperature of 400–500° C. At this temperature, bituminous coals are in the proper condition to be compressed and extruded to produce strong cylinders of solid smokeless fuel or coal logs. Recovery of liquid tars is accomplished by means of a slight vacuum in the carbonizing chamber. To make high-temperature coke, the previously formed coal logs are fed continuously from the extrusion unit through a heated chamber to raise the end temperature to 800–1000° C. Since the majority of western coals are of the noncoking variety, this process should have great economic importance.

Education Symposium

Over one hundred college professors and practicing engineers exhibited considerable interest in the Symposium on Chemical Engineering Education in the West with C. G. Kirkbride, Texas A. & M., as chairman.

Mott Souders, Jr., of the Shell Development Co., started the meeting by presenting data compiled from a questionnaire which he sent to 340 AIChE members in the eleven western states. The fact that 275 persons filled in and returned the postal card questionnaire indicates the interest and willingness with which practicing chemical engineers discuss their educational background.

According to the questionnaire replies, 67% of the members received bachelor degrees in chemical engineering; 10% attained the baccalaureate degree in chemistry and then an advanced degree in chemical engineering; 20% did all their work in chemistry; 2% were in other fields.

Concerning the source of degrees: by a ratio of 2 to 1, the bachelor degrees in chemical engineering were earned at eastern colleges. However, those who received bachelor degrees in chemistry did so at western schools in the overwhelming ratio of better than 5 to 1. Those with advanced degrees in chemical engineering were from eastern colleges at a ratio of $3^1/_2$ to 1.

These statistics show unmistakably that eastern colleges supply the great bulk of chemical engineers. This fact emphasizes the shortage of chemical engineering educational facilities in the West.

When questioned concerning their present activity, 54% of the members were engaged in development and design, 21% in plant operation, 8% in teaching, 8% in administration, and 9% in other technical work.

Another section of the questionnaire dealt with the educational preferences.

James G. Vail, Philadelphia Quartz Co., presiding at technical sessions

Almost three quarters of the group stated that technical schools should emphasize more unit operations and humanities. Half of the repliers wanted more theoretical and industrial chemistry, and from one half to two thirds felt that they had endured too much laboratory chemistry and shop work.

The shortage of chemical engineers in the West, present educational facilities, and plans for meeting future problems were discussed by H. K. Benson, of the University of Washington, W. N. Lacey, of the California Institute of Technology, L. M. K. Boelter, of the University of California at Los Angeles, and W. M. Latimer of the University of California at Berkeley. W. T. Nichols, of Westvaco Chlorine Products, a director of the AIChE, discussed the questionnaire results from an industrial point of view.

Technical Papers

Included among the technical papers presented under the presidential guidance of James G. Vail was a discussion of the production of synthetic ethyl alcohol from ethylene. C. M. Beamer, of the Louisiana Division of Standard Oil of New Jersey, in giving the facts about this method, indicated that this synthetic alcohol had fewer impurities than beverage alcohol made by the standard fermentation processes. Mr. Beamer saw a great demand for alcohol during the next few years and predicted that for economic reasons industrial alcohol would in the future be produced by this method, all grain alcohol being used for beverage purposes. He also expects manufacture of alcohol in the near future from sawdust, from paper-mill waste liquors, and by the Fischer-Tropsch process.

John Anderson, of the Shell Development Co., Emeryville, Calif., gave a paper dealing with the production of cumene by vapor and liquid phase alkylation processes. Commercial production of cumene (isopropylbenzene), hardly significant prior to the spring of 1942, was an outstanding contribution to our wartime aviation gasoline program. Used as a blending agent, cumene was made commercially by two Shell-developed catalytic processes. Most widely used because of easy adaptation of existing Universal Oil Products propylene polymerization units was the vapor phase alkylation process. This method employed a phosphoric acid-kieselguhr catalyst. The liquid phase process, on the other hand, using sulfuric acid as a catalyst, was used in one of the world's largest cumene plants.

Catalytic desulfurization of refinery stocks of high sulfur content was discussed by R. G. Fairfield of the Union Oil Co. of California. From crude containing 5.0% sulfur, acceptable motor fuel is produced, according to Mr. Fairfield. Fundamentally, this process consists of converting combined sulfur to hydrogen sulfide by allowing it to come in contact with cobalt molybdate as a catalyst in the presence of a recycle stream of hydrogen. Sulfur content of the product ranges from 0.5% to less than 0.1%.

A. W. Fairbairn of the Shell Development Co., San Francisco, told of work leading to the commercial production of allyl alcohol, employing continuous hydrolysis of allyl chloride and using aqueous sodium hydroxide as the medium for the hydrolysis. Under optimum conditions yields of allyl alcohol in excess of 90% of theoretical are possible, the major by-product being diallyl chloride.

Plant Trips

Large groups participated in plant inspection trips through the Standard Oil of California Richmond Refinery, University of California, Pittsburg plants of Dow Chemical Co. and Shell Chemical Co., Western Regional Research Laboratory, and California and Hawaiian Sugar Refining Corp. in Crockett.

Committee on women's activities: Mrs. C. R. Nelson, Mrs. F. J. Larkin, Mrs. W. Hirschkind, Mrs. J. A. Samaniego, Mrs. A. G. Stern, and Mrs. Mott Souders

Local committee chairmen for the meeting: C. R. Nelson, general chairman; A. V. Caselli, entertainment; Mott Souders, Jr., chemical engineering education symposium; J. A. Samaniego, arrangements; and A. G. Stern, hospitality and registration

Record registration

The American Book Center for War Devastated Libraries

KENNETH R. SHAFFER[1], Library of Congress, Washington 25, D. C.

THE purpose of this very informal report is to present, in concise form, the facts and figures of the American Book Center program to date.

Sponsorship

The center represents a joint interest and activity of many organizations which are concerned with the emergency need for printed information in war-devastated or war-isolated countries. The ABC is directly sponsored by the Joint Committee on Books for Devastated Libraries of the Council of National Library Associations, and as such represents the pooling of interest of American and Canadian librarians and libraries. Additionally, the center engages in programs and shares programs with many other kinds of associations and institutions. This joint activity is illustrated by its relationships with the Engineers Joint Council, United Nations Relief and Rehabilitation Administration, National Education Association, Library of Congress, and many others.

The center is incorporated under the laws of the State of New York. It is recognized by many government and nongovernment agencies as the coordinating agency for all activities centering about the supply and shipment of printed materials to devastated countries.

What the Center's Program Covers

The ABC program includes:

1. Foremost, the stockpiling of American scholarly publications, and the distribution of this stockpile to libraries of devastated or isolated foreign areas.
2. Shipping materials to foreign libraries for various organizations and institutions in the United States. (The center has shipped material for the Library of Congress, American Library Association, Engineers Joint Council, Columbia University, and many others).
3. Assisting, counseling, and providing information to more than 150 other agencies which are collecting materials to be sent abroad.
4. Serving as custodian of funds for the purcase of books for foreign libraries. Funds have been provided by agencies such as the Netherlands Book Committee the Phillips Exeter Academy, and others.
5. Making available to the public at large both in the United States and abroad, a body of information about library devastation and library conditions.

Operating Cost

To handle from 1,000,000 to 3,000,000 volumes of printed materials, the center requires an annual cash budget of from $100,000 to $150,000. This budget includes such items as salaries, shipping cases, transportation costs within the United States, and other necessary equipment and supplies. While the center has enjoyed the counsel and assistance of the United States Government, it receives no financial support from government funds. Private relief agencies, recognizing the immediate relation between printed information and foreign rehabilitation, have contributed basic support of the center. The center's operating budget to date has been met by contribution from the following:

American Federation of Labor
Congress of Industrial Organizations
General Motors Corp.
Book of the Month Club
Belgian American Education Association
Belgian War Relief
Harvard Yenching Institute
Church Committee for Relief of Asia
American Relief for Holland
United Yugoslav Relief
American Relief for Norway
United China Relief
American Friends Service
Greek War Relief Association, Inc.
Friends of Luxembourg
Chinese Government
Rockefeller Foundation
American Relief for Italy
American Relief for Poland

In addition to direct financial support, the center requires from $300,000 to $400,000 annually in the form of services and facilities. The largest item on the service budget is facilities for shipment of printed materials abroad. The importance of the center's activity in relation to its own rehabilitation and reconstruction programs has been recognized by the United Nations Relief and Rehabilitation Administration, and thousands of ABC cases of books have been shipped through UNRRA channels. Shipping facilities are also provided by other relief agencies, foreign governments, and educational organizations.

Through the generosity of the Library of Congress, the center has been provided with space where it can carry on its operations. This space includes a large receiving, allocating, packing, and shipping area, an additional area accommodating 200,000 volumes which houses the ABC unit responsible for completing periodical volumes from the scattered files received, and an office suite. Without the space and cooperation of the Library of Congress the center could have developed its program only with great difficulties.

It will be seen that the cost of operating the center in terms of cash resources and the equivalent of cash resources amounts to nearly $500,000 annually. The center's program is producing vitally needed printed materials whose value might conservatively be estimated at from $3,000,000 to $9,000,000.

National Organization

Through its sponsoring agency, the Joint Committee on Books for Devastated Libraries of the Council of National Library Associations, the center has direct support from the various library associations of the United States and Canada.

Recently chairmen were appointed to direct the center's activities in each state, in the principal cities, and in university and college campuses. Special subject chairmen have been invited to bring the ABC program to the attention of national associations and institutions within the various subject areas. A partial list of both state and subject chairmen appeared in the June 15 issue of the *Library Journal* as well as in other library periodicals.

Headquarters

The staff of the American Book Center comprises more than 30 packers, sorters, typists, and others doing specialized tasks.

During the past five months the center received more than 3,000 mail inquiries and during the same period letters going from the ABC office numbered in excess

IT HAS not been many months since all of us were making efforts to feed the hungry citizens of the world. Yet among these same peoples, intellectual starvation is rife today. As the armies of the belligerents swept over country after country, thousands of destroyed libraries were left in their wake. Many of our colleagues, out of touch with scientific progress for as much as seven years, have no reference works, books, or technical journals. They need our help!

From time to time we have publicized in these pages the critical needs of libraries in countries which have been devastated by the war. We have urged members to donate books and journals to the American Book Center. There is no way to know what response has resulted. To those who have donated, we give our thanks. To those who have procrastinated, we renew our request. The report which follows show that the ABC is functioning and provides a medium through which intellectual starvation can be relieved. Five tons of books and magazines are being shipped daily. Are your contributions among them?

ALDEN H. EMERY
Secretary

[1] Executive Director, A.B.C.W.D.L.

of 4,000. Approximately 3,800 inquiries by telephone were answered. In addition, the center has distributed more than 8,000 descriptive statements of the program to meet individual requests. News releases have been sent to more than 1,000 publications.

Sources

The ABC stockpile represents only gifts. No materials are purchased. The program limits itself to scholarly materials on nearly every subject and welcomes any material which represents an important contribution to its subject. Because emphasis is placed upon books and periodicals issued during the war years—upon the most recent scientific, technological, and other scholarly information—nearly three fourths of the materials received are in the form of periodicals.

Sources of the ABC stockpile include libraries, educational associations, publishers, learned societies and professional organizations, government agencies, individuals, and others. Materials come to the center from all parts of the United States.

Because of the acute paper shortage in this country during the war period, it is now impossible to buy files of the publications which the center is distributing abroad in wholesale quantities. Only by piecing together partial files of any given title can the center build a sufficient number of complete files of any periodical to meet the needs abroad.

Distribution

Thirty-four countries in the Far East and Europe have been named as recipients of the American Book Center program, and it is estimated that within those countries probably some 5,000 individual libraries and educational institutions are appropriate recipients. While much progress has been made in many foreign areas in reorganizing higher educational structures that were destroyed or dislocated during the period of the war, in many countries such as China, the Philippine Islands, Poland, and others, the dislocation still remains very serious. It is apparent that in a situation where information is difficult to obtain the center could not make direct distribution of its materials to many individual recipient institutions. With international transportation systems still badly damaged and overtaxed, the problems of shipping directly to individual institutions from Washington would alone present impossible difficulties.

In view of the situation, the center sends no materials (except when it acts as an agent for shipment for other bodies) to individual institutions abroad, but rather sends its materials to an agency which it has found or established in each country. Such agencies represent all of the libraries and higher educational structures of each country concerned, receive all ABC materials destined for each country, and, being on the spot with the latest information, can make the most intelligent distribution of ABC books and periodicals to the most appropriate institutions.

Through such channels the center is able to distribute the available material with the greatest equity and in consideration of on-the-spot information of educational facilities and their needs. There are 34 countries which are recipients of the ABC program: Australia, Austria, Belgium, Bulgaria, Burma, China, Czechoslovakia, Denmark, England, Finland, France, Egypt, Greece, Hungary, India, Italy, Korea, Luxembourg, Netherlands, New Zealand, Norway, Philippine Islands, Poland, Portugal, Romania, Siam, Soviet Union, Spain, Sweden, Switzerland, Turkey, Yugoslavia (Germany and Japan).

Receipts of Material

When the blueprints for the center were drawn in the Department of State nearly two years ago, a goal of 500,000 volumes was decided upon. Later when the center itself began to develop, this goal was raised to 1,000,000 volumes. During the three and one-half months of its activity, the center has found such an enthusiastic interest in its objectives and such tangible responses to its appeals that sights have been raised to a still higher goal of from 1,000,000 to 3,000,000 volumes before the termination of its activities.

The Cover . . .

Roger Adams

The AMERICAN CHEMICAL SOCIETY'S Priestley Medal, for distinguished services to chemistry, will be presented to the chairman of its Board of Directors, Roger Adams, head of the Department of Chemistry of the University of Illinois, on Sept. 11 at Chicago during the SOCIETY'S 110th meeting.

Harvard bred, Dr. Adams went to Illinois in 1916 and led his school to pre-eminence in organic chemistry during its revolutionary rise in this country following the war. Symbolic were his founding of "Organic Syntheses" (1921) and "Organic Reactions" (1929). With published contributions in the fields of catalytic hydrogenation, stereochemistry, toxic gases, anesthetics, and alkaloids sustaining the rate of one a month for the past 30 years, his command of organic structure and synthesis merits him the title "Tamer of Molecules".

As a major in CWS, Dr. Adams directed a research team on war gases during the first world war. As a member of NDRC, he directed the vast mobilization of the nation's chemical research for the Army and Navy during World War II. He was ACS president in 1942 and has been awarded the Nichols, Gibbs, and Richards Medals.

The center has received material from every state of the union and from Canada. It has been estimated that during the past three and one-half months an equivalent of 10,000 cartons of material have been received. An additional 10,000 cartons have been programmed for reception as soon as packing, transportation, and other facilities can be arranged. The reception of contributions has so accelerated that the center now receives an average of five tons of printed materials daily from participants throughout the nation.

The Committee on Aid to Libraries in War Areas of the American Library Association which stockpiled gift periodicals during the war period has turned over to the center an estimated 600,000 issues of scholarly periodicals published during the war years.

But the success of the program depends not upon large individual donations but upon an aggregate of thousands of donations of printed materials—large and small. Both the quality and the quantity of materials which the center is receiving has far exceeded every expectation.

Materials Shipped

The processing, packing, and shipping of materials have been systematized, so that the center usually ships abroad material which it has received only three weeks before. To date the center has shipped some 2,000 cases of processed materials abroad and shipments are accelerating so that a constant rate of from 30 to 40 cases (approximately 5 tons) of printed materials will be shipped daily.

Because the operating life of the center has been only a three and one-half month period, the distribution of materials has so far been uneven. China, for example, has received approximately 700 cases; Belgium has received approximately 70 cases; and Poland approximately 90 cases. Other countries have received shipments of varying sizes.

At the present time shipments have by no means been made to all of the recipient nations of the center. On July 1 shipments had been made to the following countries: Austria, Belgium, China, Czechoslovakia, Finland, Germany, Greece, Hungary, Italy, Netherlands, Norway, Philippine Islands, Poland, and Yugoslavia. Acknowledgments of the receipt of shipments are beginning to arrive.

Including preliminary distributions that were made during its organizational period, the center has shipped to date approximately 500,000 volumes.

Operations Unhindered

The operations of the center are fast approaching a crescendo. No major difficulties are anticipated that will interfere with the smooth running of the program. Having set its pace, the job of the center during the coming year is to receive as much material of superior quality as it possibly can and to expedite this material to the areas of need.

A Century of Oil-Shale Patents (1845 to 1945)

SIMON KLOSKY, Research Analyst, Oil Shale Research and Demonstration Plant Division, Bureau of Mines, Department of the Interior, Washington 25, D. C.

THE research and development program of the Bureau of Mines relating to synthetic liquid fuels includes a project for the compilation and study of all patents concerned with the treatment of oil shale and its products. Work on the project has been in progress for about a year, and more than 2,000 patents have been accumulated from official publications and from abstracts when the publications were not available. Help has been received from many individuals and organizations, which will be acknowledged in a later publication.

The number of patents, by origin, are distributed as follows: United States patents, about 800 with other patents in the English language about the same, and patents in foreign languages, about 700. It is proposed to publish abridgments of each patent in the form of an illustrated index to the art and to include some interesting facts such as those presented in this paper.

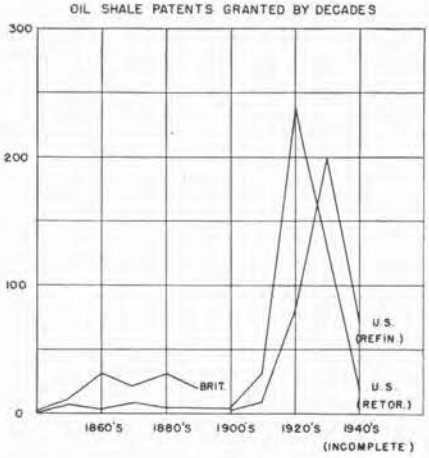
Early Work

A few early patents related to the treatment of boghead coal and shale oil, but 1845 brought forth the retort of Selligue in France (*63*), corresponding to that of DuBuisson (*15*) in England. This patent, particularly the English version, describes the retort used and the products obtained, including paraffin. The French shale-oil industry continued to develop (*22*) from 1845 to 1864 when petroleum was imported from the United States

The British patent granted to DuBuisson the right to "make, use, exercise, and vend, within England, Wales, and the town of Berwick-upon-Tweed, in all her Majesty's colonies and plantations abroad, and in the islands of Jersey, Guernsey, Alderney, and Man his invention", and anticipated the establishment of the industry in the British Isles, which began with the granting (*68*) of Young's British patent (*74*).

The establishing of an oil-shale industry in Scotland was a great stimulus to early inventors, and following Young's patent many kinds and types of retorts were patented in England. Gradually the stationary vertical reports, such as those of Young and Fyfe (*76*), Henderson (*26*), and Bryson *et al.* (*2*) (which is also called the Pumpherston), became the standard for the industry (*68*) and are still operated in several countries, although the original designs have been modified.

Although Young patented one of his processes in the United States (*75*), the



seeds for an oil-shale patent art in this country were sown in an unprepared field. The early discovery of petroleum discouraged geological surveys and developments of oil-shale deposits until after the start of the new century. However, with the advent of the first World War and a possible shortage of petroleum products, development work in the western states became quite active, as indicated by the number of patents which were issued. Processes that were attempted, on at least a pilot-plant scale are described by McKee (*43*).

The period of intensive development work in the United States culminated with the shutting down of the Bureau of Mines experimental plant at Rulison, Colo., in 1929. The retorts used in this work (the Pumpherston and N-T-U) and the results finally obtained are described by Kraemer (*36*). The N-T-U retort used in this work is patented by Wallace (*72*).

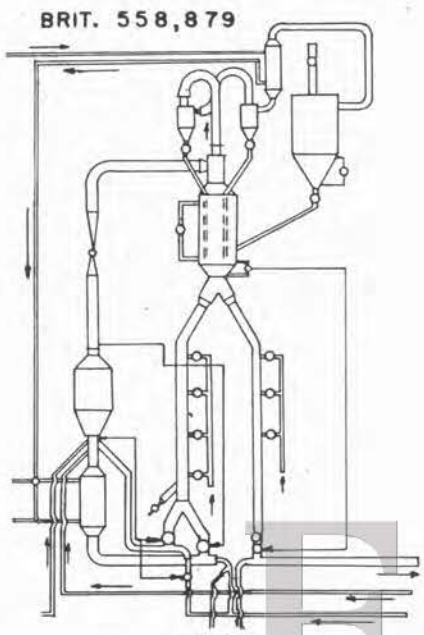


FIG. 1

The patent art moved forward, however, as American inventors, working on the refining of petroleum and conscious of the fact that one day shale oil might be available, included shale oil among the materials to be refined in many of the patents issued during the 1920's and 1930's, which related to cracking, desulfurizing, extracting, and hydrogenating oils. A few patents from this period are:

- U. S. Patent 1,826,138—to Lachman on Refining (*37*).
- U. S. Patent 1,969,732—to Dubbs on Cracking (*14*).
- U. S. Patent 1,955,253—to Russell on Hydrogenating (*61*).
- U. S. Patent 2,075,172—to Buell *et al.* on Desulfurizing (*3*).
- U. S. Patent 2,091,354—to Egloff on Cracking (*19*).
- U. S. Patent 2,168,330 to Ferris on Waxes (*21*).

A graphical representation of the early British development of oil-shale patents, by decades, is given in the figure, which also shows the more recent American development and how the interest changed from retorting to refining.

Besides the production of different grades of shale oil and paraffin waxes, utilization of the spent shale has always intrigued inventors. Cement was an especially interesting outlet, as shown by Leslie (*40*), Stone (*67*), and White (*73*). The Germans were also concerned about it (*33, 69*). Curties (*9*) wanted to make bricks, and Knibbs (*35*), molded articles. Very recently Meier-Grolman (*44*) described the production of mineral wool. Demme (*13*) wished to use spent shale as decolorizing carbon, and Day (*12*), as filter aid.

Recent Developments

Although 1930 marked the end of intensive development work on retorting in the United States, investigations were still carried on in other countries. The British continued to rely on the Pumpherston-type retort for home production, but they also developed the Davidson (*10*) rotary retort, which was tried commercially in Estonia and in South Africa. Other British patents of interest are those granted to Money (*45*), Holford (*27*), Osawa (*46*), and the International Catalytic Oil Processing Co. (*28*) (Fig. 1).

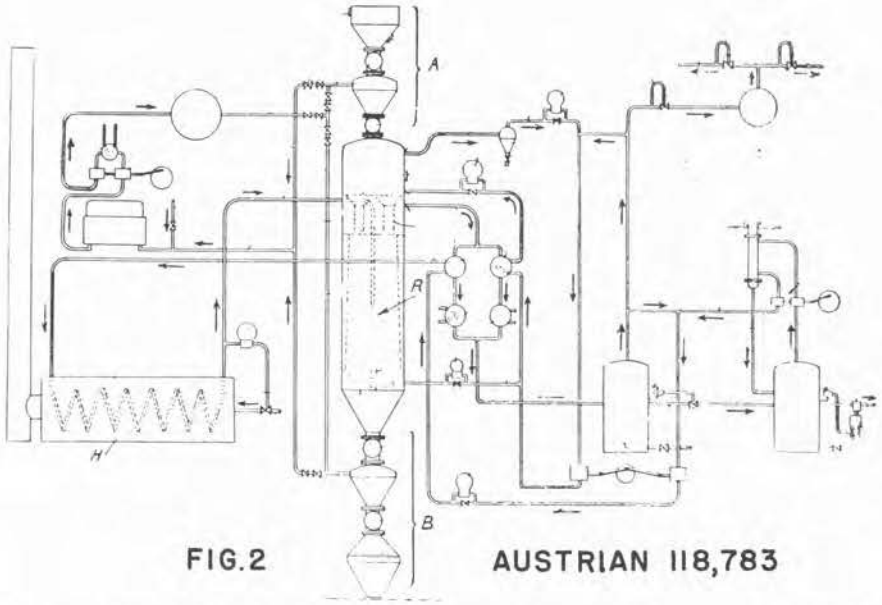
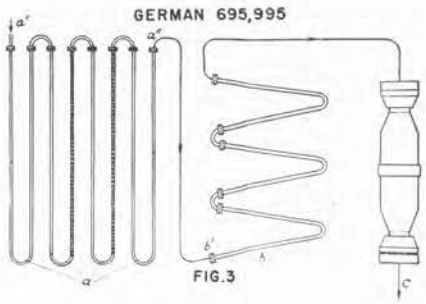


FIG.2 AUSTRIAN 118,783



The last illustrates the application of the suspended-catalyst cracking technique to oil-shale distillation. The appearance of this patent, which was accepted on January 26, 1944, completes the century that elapsed since the filing of the DuBuisson specification in 1845.

Some early development work was carried on in Australia, such as the Fell (*20*) retort, but with the approach of World War II the interest in oil shale increased, as shown by the patents granted. Among these were patents to Grey (*23*) for a continuous retort, to Hamey Gas Co. (*24*) for producing heating gas, and to Jacomini (*30*) (Fig. 2) for a retort to operate under pressure. In a recent publication (*60*) it is stated that the last retort is recommended for a trial on a plant scale in Australia.

In Germany, development work on oil shale followed different lines up to the outbreak of the last war. From a group of patents on hydrogenation of brown coal and shale, two to Pier *et al.* (*50*, *51*) (Fig. 3) have been selected which describe the pretreatment of the charge and pressure equipment. Considerable work on extraction under pressure also was attempted, which is illustrated by another patent to Pier *et al.* (*52*). Early in the recent war, construction of a plant to distill shale, which employs the N-T-U principle of operation, was begun but never finished. Later a pilot plant, using molten aluminum alloy as the heating medium, was erected by Otto and Co., but was not operated (*47*) (Fig. 4). However, the principal effort in Germany was put into distilling shale in piles (Meiler) or underground, as in the Carp process (*8*) (Fig. 5), which follows a technique similar to that proposed by Karrick (*34*). Probably other patents will issue later covering these activities.

In France, considerable interest was indicated in oil shale by the appearance of numerous patents. Among these was a patent to Marecaux (*42*) (Fig. 6) showing a novel retort; two to Petit (*53*, *54*), describing a retort and later a process; and two to Lantz (*38*, *39*) (Fig. 7) for a continuous retort, which was also patented in England by his assignee, the Société Chimique de la Grande Paroisse, Azote et Products Chimiques (*64*, *65*, *66*).

In Sweden considerable development work was also undertaken. The Grondal-Ramen kiln (*48*), also patented in England (*49*), was put into operation; and the Eesti Patendi kiln (*17*), which is also covered by a British patent (*18*), was erected in Estonia. Similar patents were granted to Carlsson (*6*) and Johansson (*32*) (Fig. 8), which are assigned to Aktiebolaget Industrimetoder (*1*).

In Italy there was also considerable interest in oil shale, as indicated by the number of patents issued in that country. Typical of the more recent retorts are those of Lucarelli (*41*), Piromali (*55*) (Fig. 9), and Caccioppoli (*5*) (Fig. 10).

Interest in the United States in oil shale as a source of hydrocarbon oils has lessened in recent years but has not disappeared entirely. This is shown by the number of recent patents. Illustrative of the various ways that oil shale (and shale oil) may be treated are the patents to Dunn on desulfurization (*16*), Hemminger on distillation (*25*), Roberts on cracking (*59*), Pray on a continuous retort (*57*), Ipatieff *et al.* on hydrogenation (*29*), and Records on retorting (*58*). Since the last two patents were issued very recently, they also serve to complete the century that passed since the appearance of Selligue's retort in 1845 (*63*).

Conclusion

An inspection of the patents that have been cited shows that the century separating the early retort of Selligue and the distillation unit of Records certainly produced a wide range of schemes for treating oil shale. The vertical retorts

FIG.4

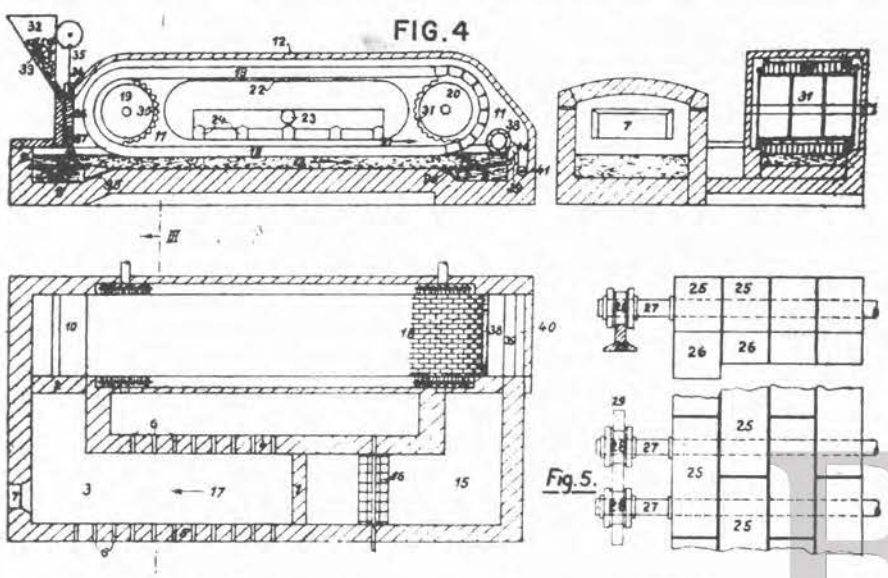
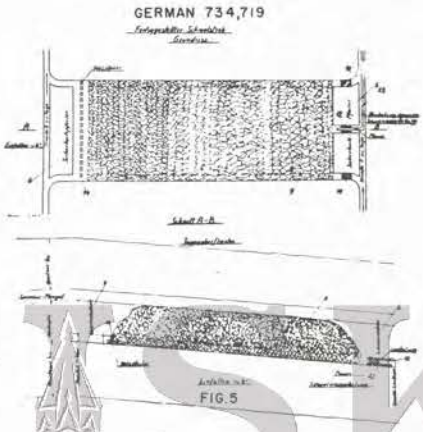
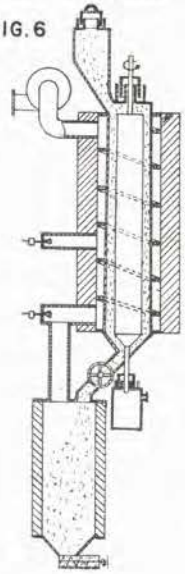


Fig.5.



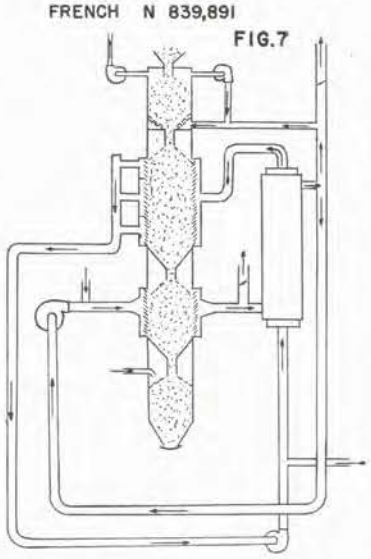
FRENCH N 819,485

FIG. 6



FRENCH N 839,891

FIG. 7



of the British are well established and have proved their usefulness on Scottish and French shale. Similarly, the Swedes continue to develop their tunnel kilns. The Australians pioneered the Fell modification of the Pumpherston retort. They are also considering adopting the Jacomini retort. The German approach before the war was almost entirely chemical; however, under war pressure they did not develop much that was original or exceptional. The French effort was almost all prewar, leading to new applications of old principles, as shown in the Lantz and Marecaux retorts.

As the British industry was established at a time of great industrial change in Britain, so it may now be opportune for the United States to develop from the storehouse of a century of patent art an industrial process suited to the characteristics of its shale and incorporating the best developments of the processing arts.

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ITALIAN N. 373,217

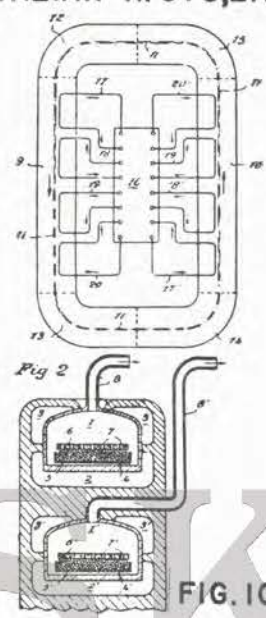

Fig. 2

FIG. 10

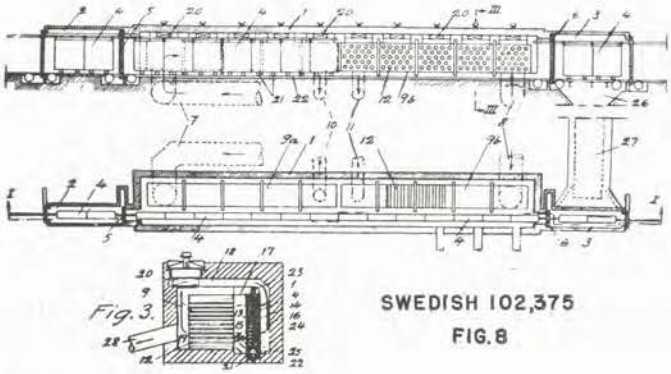

Fig. 3.

SWEDISH 102,375

FIG. 8

ITALIAN 369,907

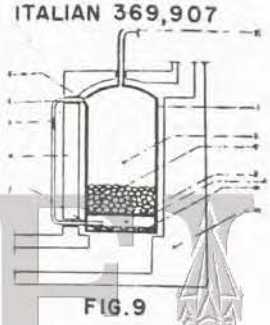

FIG. 9

Philosophy of the American Patent

WILLIAM M. WHITTEN, 2308 MacDonough Road, Wilmington, Del.

Full disclosure of his discoveries, made by the inventor, is the consideration in return for which a patent is granted...Without patents the world's store of technical knowledge would be static

THE patent is often referred to as a reward for invention. This is incorrect and it is unfortunate because it tends to support a viewpoint favored by the enemies of the American patent system whose objective it is to demote the patent from its present honorable estate as a property right to the status of a mere privilege or a franchise of uncertain tenure.

Now, nobody can get a patent or any other reward from the U. S. Government merely by making or developing a patentable invention. This is a matter of common knowledge. That the patent is not granted as a reward for invention is demonstrated by the sequence of events. True, patents on inventions are granted, and no one but the first and true inventor is eligible for the grant. But to be eligible, one must do more than make a patentable invention, and to receive a patent, the inventor must do more than qualify as an eligible candidate.

To be eligible, one must not only have made a patentable invention, he must have filed his application with the Patent Office, and he must have had his claims examined and allowed. All this he must do at his own expense and risk. If, after meticulous examination the patent examiner finds the claims allowable, the inventor becomes eligible for a patent, but he does not get a patent merely because he is eligible. In order to receive a patent he must still take one additional step. He must *earn* his patent by making a full disclosure of his discoveries to the public. To do this, he pays the final fee of $30, whereupon the letter-patent is issued to the inventor over the signature of the U. S. Commissioner of Patents, and the "soft copies" are printed and put on sale to the public. Note that the inventor does not earn his patent by paying the $30 fee. The fee merely takes care of the cost of publication. It is the publication that constitutes the consideration which the inventor must pay to the public for the grant of an exclusive right, for a limited time, in the invention which he has created at his own expense and risk. And the exclusive right is the consideration which the Government must pay to the inventor for his disclosure to the public of his technical discoveries. And note that, to obtain this service for the public, the Government has no choice but to go to the inventor, the reason being that the inventor is the one and only person in the world who is prepared to provide this service.

The hostile critic of the patent system is wont to belittle, to ignore, and even to deny the importance to the public interest of the inventor's disclosure which, as pointed out above, is the consideration that the public receives from the inventor in return for the 17-year exclusive grant. Now, there are none so blind as those who will not see. If the honest critic of the patent system would ever give a little open-minded study to the function of the published patent specification, most of his fears, suspicions, and criticism would fade away and be forgotten.

One who questions the tremendous economic importance of the publication of the patent specification, need only to turn loose his imagination on the situation which could be expected to develop if all the industrial countries of the world should cease to issue patents and to publish specifications. This much, at least, is clear: When patent specifications are no longer published, the world's store of technical knowledge will become practically static. It will become static because the only important source of new and reliable technical information available to the public will be destroyed. When the supply of new information fails, it is inevitable that the rate of progress and of invention will be slowed to a snail's pace.

There are those who hold that the patent system is more or less superfluous, since, as they believe, the inventor, driven by "the spirit of contrivance" will continue to invent without regard to the reward. These people may be partly right, but they miss the main point so far as concerns the justification of the patent system. True, the born inventor may continue to experiment, in so far as he can command the facilities, and he may continue to invent, proceeding on the basis of such information as is available to him. But, the point is that without the lure of the patent, he will not publish his discoveries. The prospect of an exclusive right to his invention is the only consideration that has been devised to date to induce the inventor to share with the public the facts which he has dug up at his own expense and risk.

The exclusive right secured to the inventor by the letter-patent has the legal status of a property right, having been acquired by the inventor, as the consideration, under a fair and honorable contract, to which the U. S. Government is a party, the considerations under said contract being:

(1) That the inventor disclose his discoveries to the public, and

(2) That the Government, acting for the people, secure to the inventor, for a limited time, the exclusive right to his invention, as defined and limited by the claims which have been allowed to him, after examination, by the examiner.

The essential feature of the American patent system is this: The public can get a disclosure of the inventor's discoveries only if the inventor is given his patent; and the inventor can get his patent only if he discloses his discoveries to the public. If ever there was a contract that provided for a fair exchange, we have it here. Both parties to the contract perform important services, and both parties receive benefits of great value—benefits which are obtainable in no other way.

The inventor does not receive his patent from the Government as a gift, as a favor, as a privilege, or as a concession. He pays for what he gets; he pays in advance; for him the terms are cash on the barrelhead, not at the end of the 17-year period, but at the beginning.

The inventor gives up to the public that which, in the aggregate, is of incalculable economic and cultural value; but he takes from the public nothing that the public has ever known or enjoyed previously. In the words of Sir Edward Coke, 1602, in the first case to come up under the Statute of Monopolies, the people are not "restrained of any freedom or liberty that they had before, or hindered in their lawful trade". The trade, which the patent secures to the patentee as an exclusive right, has been created by the invention; it might never have developed at all, and almost certainly would not have developed at the time, without the protection of the patent.

Experimenting, inventing, patenting, producing, and marketing new products—all these are hazardous business in which the entrepreneur assumes the entire risk. The public cannot lose because it makes no investment. Losses are borne by the entrepreneur alone, but the benefits from success accrue to both the entrepreneur and the public. Even in the case where a patented invention must be "suppressed" because it is an economic failure, the public still makes a gain, since the publication of the inventor's discoveries (at his own expense) adds its bit to the store of public knowledge, and thereby performs what is probably the only public service of which such an invention is capable.

Research Supported by Industry through Scholarships, Fellowships, and Grants

CALLIE HULL AND MARY TIMMS, National Research Council, Washington, D. C.

IN THE first list of research scholarships and fellowships supported by industry, compiled by the National Research Council in 1929, 56 companies reported the support of 95 fellowships and grants. There has been an increase as shown in each subsequent compilation which has appeared at two- or three-year intervals.

In the present list 302 companies report a total of approximately 1,800 fellowships, scholarships, or grants for research. This unusual increase over the most recent compilation (201 in 1944) is due in part to the fact that the newly revised edition of the directory of "Industrial Research Laboratories of the United States", which will be off the press in September, was used as a guide for the mailing of questionnaires from which the following data were compiled. The information was received during the spring of 1946.

Subjects of research, in the order of numbers reported, include the following fields: chemistry, engineering, medicine, nutrition, pharmacology, biology, physics, and miscellaneous subjects.

Many companies formerly supporting research outside their own laboratories, and not included in this list, have indicated that funds will be provided for the support of such research whenever university facilities and necessary personnel are available.

Corrections and additions to the list will be welcome. They should be sent to the Library, National Research Council, 2101 Constitution Ave., Washington 25, D. C.

ABBOTT LABORATORIES, North Chicago, Ill. Fellowships of $5,000 each for five years, for research in the sciences related to medicine, are maintained at: California Institute of Technology, Cornell University (2), Harvard University (2), University of Illinois, Jefferson Medical School, Johns Hopkins University, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, Ohio State University, University of Pennsylvania, Purdue University, University of Rochester, Tulane University, Vanderbilt University, University of Washington, Washington University, University of Wisconsin.

A number of grants are maintained in medical schools and universities for the study of biologic problems.

AETNA LIFE AND AFFILIATED COMPANIES, Hartford, Conn. Contributions for research are made to the National Conservation Bureau, The National Safety Council, and the Life Insurance Presidents' Association.

ALLIED CHEMICAL AND DYE CORP., 61 Broadway, New York, N. Y. 24 graduate fellowships are maintained in 20 universities.

The universities and fields of research are as follows:

Chemistry: University of California, California Institute of Technology, Columbia University, Cornell University, Harvard University, University of Illinois (2), State University of Iowa, Northwestern University, Ohio State University, Pennsylvania State College, University of Pennsylvania, Polytechnic Institute of Brooklyn, Princeton University, Purdue University, University of Wisconsin, Yale University.

Chemical engineering: Carnegie Institute of Technology.

Chemistry and chemical engineering: University of Minnesota (2), University of Michigan (2). Physical chemistry or physics and chemical engineering: Massachusetts Institute of Technology (2).

Each stipend, $1,000, exclusive of tuition and laboratory fees.

ALLOY CASTING INSTITUTE, 39 Broadway, New York, N. Y. Research on the effect of corrosion and temperature on high-alloy heat and corrosion castings is sponsored at Battelle Memorial Institute. Annual contract, $43,200.

ALROSE CHEMICAL CO., 180 Mill St., Cranston, R. I. A fellowship is maintained at Purdue University, for research on organic chemicals. $600 per term.

ALUMINUM CO. OF AMERICA, P. O. Box 772, New Kensington, Pa. A scholarship is maintained at Carnegie Institute of Technology, for research on the metallurgy of aluminum.

Fellowships are maintained at University of Oklahoma for the investigation of various applications of alumina; Washington University, for research on activated alumina in drying pharmaceutical products; and New York State Agricultural Experiment Station, Geneva, N. Y., for research in the use of aluminum foil in packaging.

A grant is made to Louisiana State University for the investigation of cryolite as an insecticide.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS, care of L. A. Olney, Chairman, Research Committee, Lowell Textile Institute, Lowell, Mass. Three grants are made to University of Tennessee, for research in textile chemistry to determine the wash fastness of dyes, $250; Lehigh University, for physical chemical investigation of the effects of sodium chloride and sodium sulfate in dyeing, $4,000; and J. C. Penney Co., for the study of the wash fastness of dyes, $1,800.

AMERICAN CAN CO., 11th Ave. and St. Charles Road, Maywood, Ill. A grant is made through the Can Manufacturers Institute to finance the Executive Nutrition Committee in charge of the National Canners Association–Can Manufacturers Institute, for research on the nutritive aspects of canned foods, at the University of Chicago, Pennsylvania State College, University of Maryland, and the University of Wisconsin. $13,500.

A grant is made through the Nutrition Foundation, Inc., in support of the general nutrition research program to universities and colleges throughout the country. $10,000.

Direct grants are made to Massachusetts Institute of Technology, for research in food technology, $10,000; University of California, for research on the public health aspects of packaged frozen foods, $2,500; and University of Utah, Agricultural Experiment Station, through the Utah Canners Association, for research on the control of verticilium wilt, $500.

AMERICAN CAST IRON PIPE CO., 2930 North 16th St., Birmingham, Ala. A fellowship is maintained at Vanderbilt University, for research on the chemistry of cast iron. $800.

AMERICAN DRY MILK INSTITUTE, INC., 221 North La Salle St., Chicago 1, Ill. Fellowships are maintained at State College of Washington, for research in the chemical and physical properties and bacteriology of nonfat dry milk solids, $1,000; and University of Minnesota, for research in the biochemical changes resulting from heat treatment of milk, $800.

A grant is made to the Hillman Clinic, Birmingham, Ala., for clinical observations following the feeding of dry whole milk and nonfat dry milk solids to children, $60,000.

AMERICAN GAS ASSOCIATION, 420 Lexington Ave., New York 17, N. Y. Grants for research projects on manufactured gas production and utilization are assigned to: Institute of Gas Technology, Battelle Memorial Institute, Pennsylvania State College, Purdue Research Foundation, Syracuse University, Surface Combustion Corp., Selas Corp. of America, National Bureau of Standards, and U. S. Bureau of Mines. Budget, $233,410. (This is in addition to research supported in the A. G. A. laboratories.)

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, 101 Park Ave., New York, N. Y. Grants are made to Northwestern University, for the study of laced column elements, $1,000; Welding Research Council, for the study of fatigue and impact in butt and fillet welded members, $750, and welding of structural steel, $1,250; and Lehigh University, Fritz Engineering Laboratory, for the study of short columns and the buckling of plates, $1,200.

AMERICAN IRON & STEEL INSTITUTE, 350 Fifth Ave., New York, N. Y. A Research Associate is maintained at the National Bureau of Standards. Project: the study of bonding value of concrete reinforcing bars.

AMERICAN LAVA CORP., Chattanooga, Tenn. One scholarship is maintained at the University of Illinois, for research in titania compounds. $10,000.

Grants for research are made to Southern Research Institute, for general research, $500; and Industrial Re-

search Institute of University of Chattanooga, for studies in spectroscopy, $8,000, and for spectroscopic examination of materials, $1,000.

AMERICAN MAIZE-PRODUCTS CO., 100 East 42nd St., New York, N. Y. Fellowships are maintained at Iowa State College, for research on characterization of starch, $1,500; and Purdue University, for research on starch and sugar derivatives, $1,200.

AMERICAN MEAT INSTITUTE, 59 East Van Buren St., Chicago 5, Ill. Grants are made to American Meat Institute Foundation, for research on amino acid composition of meat, $7,600; Harvard University, for research on proteins in human nutrition, $9,000; and Texas A. & M. College, for research on amino acid composition of meat, $3,400.

AMERICAN OPTICAL CO., Southbridge, Mass. A fellowship is maintained at Harvard Biological Laboratories, for research in the effect of specific radiation on the eye.

Grants are made to Yale Clinic of Child Development, for the study of children's eyes; Dartmouth Eye Institute, for the study of physiological optics; and Howe Laboratories, Harvard Medical School, for the study of physiological optics.

AMERICAN PETROLEUM INSTITUTE, 50 West 50th St., New York 20, N. Y. Grants for fundamental research are made to National Bureau of Standards, on analysis, purification, and properties of hydrocarbons, $55,000, and on collection and analysis of data on hydrocarbon properties, $29,750; University of Michigan, on functions of water in the production of oil from reservoirs, $8,700; California Institute of Technology, on fundamentals of hydrocarbon behavior, $14,500; Scripps Institution of Oceanography, on the role of microorganisms in petroleum formation, $9,000; Pennsylvania State College, on studies in the fields of chemistry, bacteriology, physical chemistry, and physics, in transformation of organic material into petroleum, $9,600, on synthesis and properties of hydrocarbons of high molecular weight, $12,000, and on hydrocarbons for spectrometer calibration, $25,000; Massachusetts Institute of Technology, on studies of the effects of radioactivity on the transformation of marine organic materials into petroleum hydrocarbons, $15,050; and Ohio State University, on synthesis and properties of hydrocarbons of low molecular weight, $40,000.

AMERICAN PHARMACEUTICAL ASSOCIATION, 2215 Constitution Ave., Washington 7, D. C. Grants are made to University of North Carolina, for research in the chromatographic separation of plant constituents with special reference to the cinchonas, $500; and Purdue University, for study of absorption of medicaments from ointment bases, $600.

AMERICAN POTASH INSTITUTE, INC., 1155 Sixteenth St., N. W., Washington 6, D. C. 39 projects for research in potash and boron are supported in universities, agricultural colleges, and experiment stations.

AMERICAN STEEL AND WIRE CO. *See* United States Steel Corp.

AMERICAN TELEPHONE AND TELEGRAPH CO., BELL TELEPHONE LABORATORIES, New York, N. Y. Frank B. Jewett postdoctorate fellowships (5), for research in the physical sciences. The purpose of the fellowships is to stimulate and assist research in the fundamental physical sciences and particularly to provide the holders with opportunities for individual growth and development as creative scientists. The applicants are expected to select their own problems and awards carry no commitment as to future employment. The stipend is $3,000 to the holder and $1,500 to the institution at which the recipient elects to do research.

AMERICAN TOBACCO CO., 111 Fifth Ave., New York, N. Y. A grant is made to the Medical College of Virginia, for research on the pharmacology of tobacco and tobacco smoke. $10,500.

AMERICAN VISCOSE CORP., P. O. Box 468, Wilmington, Del. Fellowships are maintained at West Virginia University, for the study of industrial chemistry, $1,500; Pennsylvania State College, for the study of fabric testing; and Purdue Research Foundation, Purdue University, for research in the field of chemistry.

ANHEUSER-BUSCH, INC., St. Louis, Mo. Grants for research are made as follows: Washington University, for the study of yeast genetics, $24,000; Washington University for the study of glutamic acid, $6,000; and University of Arkansas for the study of nutritional value of yeast, $1,500.

ANTHRACITE INDUSTRIES, INC., 101 Park Ave., New York, N. Y. A grant is made to the Anthracite Institute for research in the utilization of anthracite coals, $7,200.

ARMOUR AND CO., Union Stock Yards, Chicago 9, Ill. Fellowships are maintained at eight different universities and colleges, involving a total annual expenditure of $39,800.

ARMOUR RESEARCH FOUNDATION, Chicago, Ill. See CHEMICAL AND ENGINEERING NEWS for annual reports on Industrial Research Progress.

ARMSTRONG CORK CO., Lancaster, Pa. The following grants are made. Washington and Jefferson College (2), to study the physical properties of materials; Polytechnic Institute of Brooklyn, for research in organic syntheses; Boston University, for research in organic syntheses; University of Delaware, for study of emulsion polymerization; University of Notre Dame, for research in the physical properties of cork and cork-containing products; Mount Union College for research in organic syntheses; Johns Hopkins University (2), for studies of static and kinetic friction, and power factor and dielectric constants of materials at high frequencies; Rhode Island State College, for research in protective coatings; Brown University for studies of applied mathematics; Lehigh University, for studies in protein chemistry; West Virginia University, for metallurgical investigations; Pennsylvania State College, for refrigeration studies; and Herty Foundation Laboratory, for wood pulp studies.

ASPHALT ROOFING INDUSTRY BUREAU, 2 West 45th St., New York 19, N. Y. A research associate is maintained at the National Bureau of Standards. Project: asphaltic roofing materials. $5,000.

ASSOCIATION OF AMERICAN RAILROADS, 59 East Van Buren St., Chicago 5, Ill. Contracts have been made with the University of Illinois for the following research investigations during 1946: failures in railroad rails, $11,000; fatigue strength of joint bars, fatigue strength of rail web, and proper relation of wheel load to wheel diameter, $14,200; fatigue strength of structural welds, $5,000; and application of soil mechanics to roadbed stabilization, $4,500.

AUTOMOBILE MANUFACTURERS ASSOCIATION, 320 New Center Bldg., Detroit 2, Mich. A research associate is maintained at National Bureau of Standards. Project: cooperative fuel research.

AUTOMOTIVE SAFETY FOUNDATION, Tower Bldg., Washington 5, D. C. Ten fellowships are maintained at Yale Highway Traffic Bureau, for the study of safe and efficient traffic operation.

A total of sixteen fellowships are maintained at National Safety Council, for the study of the relation of accidents to highway design; International Association of Chiefs of Police, for the study of enforcement techniques and procedures; National Conference of Judicial Councils, for the study of administrative procedures in traffic courts; Yale Highway Traffic Bureau, for the study of physical traffic control measures, traffic behavior, and parking; and Northwestern University Traffic Institute, for studies in traffic police administration, and traffic officer training.

BABCOCK AND WILCOX CO., 85 Liberty St., New York, N. Y. Fellowships are maintained at Massachusetts Institute of Technology for research on refractories, heat transmission, and creep of steel.

BAKER CHEMICAL CO., J. T., Phillipsburg, N. J. Two analytical chemistry research fellowships will be assigned in the fall of 1946, one to an institution in the eastern territory, and one in the midwestern territory. $2,000 each.

BARECO OIL CO., Tulsa, Okla. Two grants on a research consulting basis are made for the study of microcrystalline waxes to Oklahoma Agricultural and Mechanical College, $7,800 per of annum; and University of Illinois, $1,200 per annum.

BATTELLE MEMORIAL INSTITUTE, 505 King Ave., Columbus 1, Ohio. Six fellowships, open to candidates for either the master's or doctor's degree, are offered usually only for the academic year immediately preceding the awarding of the degree. Research is undertaken in Battelle laboratories under the guidance of a faculty advisor from the university of the fellow and a member of the Battelle staff. Stipend, $1,000 and certain expenses for Fellows seeking master's degree; $1,200 and certain expenses for year preceding award of doctor's degree. Applications should be made to the Dean of Graduate School of a participating university by March 1.

Six associateships are open to persons who have recently completed their academic training and who desire specialized internship experience in some phase of industrial research. Preference will be given usually to candidates holding a doctor's degree. Research is conducted in the Battelle laboratories under guidance of the staff. Stipend varies from $1,800 to $2,400 and research costs. Applications should be addressed to J. Robert Van Pelt, Battelle Memorial Institute. Appointments are usually for one year, subject to renewal.

BAUSCH AND LOMB OPTICAL CO., 635 St. Paul St., Rochester, N. Y. Grants are made to Ohio State University, for general research in vision, $5,000 for 3 years; University of Chicago, for studies in the relationship of vision of the school child to reading ability, $1,500; Glass Science, Inc., for the basic study of glass, $12,000; and Purdue

University, for the study of vision among industrial employees, $15,300.

BAXTER, INC., DON, Glendale, Calif. One grant is made to the Institute of Experimental Medicine of White Memorial Hospital, Los Angeles, Calif., for research in blood anticoagulant solutions, technical problems of parenteral medication, and protein alimentation. $1,200.

BAY CHEMICAL CO., 1048 Constance St., New Orleans 9, La. A fellowship is maintained at Tulane University, for research on the chlorination of hydrocarbons. $1,000.

BEECH-NUT PACKING CO., INC., Canajoharie, N. Y. Grants are made for research to Cornell University, Northwestern University, and the University of Pennsylvania.

BELDEN MANUFACTURING CO., 4647 West Van Buren St., Chicago 44, Ill. Scholarships are awarded at the Illinois Institute of Technology and at Earlham College. $500 annually for each.

BENZOL PRODUCTS CO., Newark, N. J. A fellowship is maintained at Rutgers University for polymerization studies with benzyl chloride. $2,500.

BETHLEHEM STEEL CO., Bethlehem, Pa. Research programs are supported directly at University of Michigan, for research in spectrographic analysis; Ohio State University for refractories research; and Pennsylvania State College, for refractories and metallurgical research.

Support to cooperative research programs includes Coal Research Laboratory, Carnegie Institute of Technology; and University of Illinois, for research on steel rails and wrought steel wheels.

BITUMINOUS COAL RESEARCH, INC., 803 Southern Bldg., Washington, D. C. Research work is carried on at Battelle Memorial Institute, Johns Hopkins University, Carnegie Institute of Technology, Southern Research Institute, Purdue University, Institute of Gas Technology, and Alco Products Division of the American Locomotive Co. One of the largest projects concerns the development of a coal-gas burning turbine for use particularly on railroad locomotives. 1946 budget totals over $500,000.

BREON AND CO., GEORGE A., 2503 Grand Ave., Kansas City, Mo. A fellowship is maintained at the University of Missouri, for studies in the reduction of diethylstilbestrol. $900 annually.

Two grants are made to the University of Nebraska, for the study of pharmacology of antispasmotic compounds. $600 to $1,000 annually.

BRISTOL LABORATORIES, INC., P. O. Box 657, Syracuse 1, N. Y. The 1946 appropriation for work at various universities and research institutions is approximately $100,000. This will be divided between fellowships and grants dealing with fundamental and applied research in the pharmaceutical field.

BURGESS BATTERY CO., Freeport, Illinois. A grant is made to the Illinois Institute of Technology, for research in electron microscopy. $3,600.

CABOT, INC., GODFREY L., 77 Franklin St., Boston, Mass. A grant had been made to the Massachusetts Institute of Technology, for the investigation of fundamental properties of certain pigments, and of the basic principles involved in subdividing or aggregating matter to produce finely divided pigments. $12,000.

CALCIUM CHLORIDE ASSOCIATION, Penobscot Bldg., Detroit, Mich. Research associates are maintained at National Bureau of Standards, for study on effect of calcium chloride on cements and concretes; and West Virginia University, on treatment of coal with calcium chloride.

CALIFORNIA INK CO., INC., 711 Camelia St., Berkeley 2, Calif. Grants are made to Lehigh University, Printing Ink Research Institute, for research on printing ink, materials, printing processes, etc., $2,500; and Lithographic Technical Foundation, for research on offset printing process, supplies, equipment and technique, $5,000.

CARBIDE AND CARBON CHEMICALS CORP. *See* Union Carbide and Carbon Corp.

CARNATION CO., Milwaukee, Wis. A fellowship is maintained at Northwestern University, for the study of tenulin.

A grant is made to the Midwest Research Institute, for research on cereal (breakfast food).

CARNEGIE-ILLINOIS STEEL CORP. *See* United States Steel Corp.

CARRIER CORP., 300 South Geddes St., Syracuse 1, N. Y. Two fellowships are maintained at Syracuse University, for research on surface-active compounds. $1,500.

CARTER COAL CO., 630 Fifth Ave., New York, N. Y. A contribution is made to the Coal Research Laboratory, Carnegie Institute of Technology.

CAST IRON PIPE RESEARCH ASSOCIATION, 122 South Michigan Ave., Chicago, Ill. A research associate is maintained at the National Bureau of Standards. Project: soil corrosion, including the analysis of soils, the determination of relative corrosibility of metals and alloys, and tests of galvanic anodes for cathodic protection.

CATALIN CORP., Fords, N. J. A fellowship is maintained at Lehigh University, for research in phenolic resins. $7,840.

CELANESE CORP. OF AMERICA, 180 Madison Ave., New York 16, N. Y. A fellowship is maintained at Princeton University, for research in fundamental chemical engineering principles. $1,400.

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago, Ill. Two industrial fellowships are awarded to students majoring in physics, for one year's tenure in the Research and Development Department of the Central Scientific Co. Stipend, $1,800 each.

CENTRAL SOYA CO., INC., Decatur, Ind. Fellowships are maintained at University of Minnesota, for research on proteins of the soybean, $1,800; Purdue University (2), for the study of the nutrition of the growing chicken, and agronomic problems in connection with producing soybeans, $6,000; and University of Illinois, for the study of the nutrition requirements for growth, reproduction, and lactation of swine, $1,500.

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo. Nine fellowships are maintained at Washington University. $1,000 each.

CEROPHYL LABORATORIES, Kansas City, Mo. Fellowships are maintained at Cornell University, for nutritional research on dehydrated grasses, $3,000; and Michigan State College, for the study of plant physiology relationships between plant growth and nutritional values, $200.

CHESAPEAKE AND OHIO RAILWAY CO., Terminal Tower, Cleveland 1, Ohio. Grants are made to Carnegie Institute of Technology, Coal Research Laboratory, for research in the chemistry of coal, $2,000 per annum; General Electric Co., for the development of a coal-burning steam-turbine electric locomotive, for an undetermined amount; and Coal Producers Committee, for studies in smoke abatement, $5,000.

CHICAGO BRIDGE AND IRON CO., 1305 West 105th St., Chicago 43, Ill. A grant is made to the Welding Research Council. $15,000.

CIBA PHARMACEUTICAL PRODUCTS, INC., Summit, N. J. Scholarships and fellowships are maintained at Colorado State College, University of Rochester, Princeton University, Long Island College of Medicine, University of Utah (2), Harvard University, Massachusetts General Hospital, Michael Reese Hospital, Rutgers University, University of Georgia, Duke University, University of Pittsburgh, Michigan State College, University of California, University of Minnesota, New York University, Bellevue Hospital, Western Reserve University, University of Wisconsin, Vanderbilt University, Mount Holyoke College, American Foundation for Tropical Medicine, Association for the Study of Internal Secretions, University of Cincinnati Nutritional Foundation, and Antioch College.

CLARK THREAD CO., Newark, N. J. Three fellowships are maintained at Massachusetts Institute of Technology, for research in textile technology. $1,800 each.

CLEARFIELD BITUMINOUS COAL CORP., Indiana, Pa. A fellowship is maintained at the Carnegie Institute of Technology, for general coal research, to be used at the discretion of the director. $500.

CLINTON INDUSTRIES, INC., Clinton, Iowa. A fellowship is maintained at Iowa State College for the study of the utilization of products of the corn wet-milling industry in the manufacture of dairy products. $2,000.

A fellowship is maintained at the University of Nebraska for research in lactic acid fermentation.

CLOROBEN CORP., 225 Mercer St., Jersey City 2, N. J. A grant is made to New York University, College of Engineering, for studies in sewage disposal. $4,500.

COLGATE-PALMOLIVE-PEET CO., 105 Hudson St., Jersey City, N. J. Fellowships for dental and soap research are maintained at Northwestern University, Polytechnic Institute of Brooklyn, Stanford University, and University of Southern California.

COLUMBIA STEEL CO. *See* United States Steel Corp.

COMMERCIAL SOLVENTS CORP., Terre Haute, Ind. Fellowships are maintained at Northwestern University, Department of Chemistry; Purdue University (5), Department of Chemistry; University of Cincinnati, Kettering Laboratory of Applied Physiology; and University of Wisconsin, Department of Agricultural Chemistry. Applications should be made to the university.

CONTINENTAL OIL CO., Ponca City, Okla. A fellowship is maintained at the University of Illinois, for study of lubricants and lubrication. $750.

COORDINATING RESEARCH COUNCIL, New York, N. Y. A research associate is maintained at the National Bureau of Standards. Project: aviation fuels and pumps; vapor-lock.

COPPER AND BRASS RESEARCH ASSOCIATION, 420 Lexington Ave., New York 17, N. Y. Research projects on copper and brass are sponsored at National Bureau of Standards, Battelle Memorial

Institute University of Illinois, and Purdue University.

CORN INDUSTRIES RESEARCH FOUNDATION, 5 East 45th St., New York 17, N. Y. Fellowships are maintained at Indiana University for studies on conjugated systems; Columbia University, for research on the sizes and shapes of starch molecules; Massachusetts Institute of Technology, for studies on the optical behavior of starch; Washington University, for research on enzymic synthesis of polysaccharides; Northern Regional Research Laboratory, for research on moisture relations in starch; Iowa State College of Agriculture and Mechanical Arts, for research on the structure of corn and cornstarch; Columbia University, for studies on the enzymic reactions on starch; Member Company Laboratories (2), for research on starch paste characteristics and on carbon evaluation; Ohio State University Research Foundation, for studies of the branched chain structure of starch; and University of California, for research on the organic synthesis of starch.

CORN PRODUCTS REFINING CO., 17 Battery Place, New York, N. Y. Fellowships are maintained at State University of Iowa, for studies in carbohydrate chemistry, $1,050; Northwestern University, for studies in carbohydrate chemistry, $1,050; University of Pittsburgh, for research in the chemistry of fats and oils, $1,200; and Midwest Research Institute, for the study of grain sorghums, $25,000.

Grants are made to University of Toronto, for studies in carbohydrate chemistry, $3,000; University of California, for studies of dehydrated fruits, vegetables, and juices in which sweetening agents are used, $3,000; Oregon State Agricultural College, for the study of the effect of dextrose, and other sugars on freezing and processing characteristics of fruit, etc., $3,100.

CORNING GLASS WORKS, Corning, N. Y. A fellowship is maintained at University of Delaware, for research on greenhouse glass for plant protection, $2,000; and University of Wisconsin, for research on thermal conductivity, $2,000.

COWLES DETERGENT CO., 7016 Euclid Ave., Cleveland 3, Ohio. A fellowship is supported at Syracuse University for the study of detergents and related materials, $1,500.

CRANE CO., 4100 South Kedzie Ave., Chicago 5, Ill. A grant is made to the Welding Research Council. $300.

CUTTER LABORATORIES, 4th and Parker Sts., Berkeley 1, Calif. Several research grants are made each year to colleges and universities to support selected studies in the fields of biochemistry, pharmaceutical chemistry, and microbiology; and to various clinical groups for carrying on clinical studies related to these fields.

DENNIS CO., MARTIN, 859 Sumner Ave., Newark 4, N. J. A grant is made to Lehigh University, for research on the fundamental chemistry of chrome tanning. $1,650. (A program supported by several manufacturers.)

DEVOE AND RAYNOLDS CO., INC., 787 First Ave., New York, N. Y. Two fellowships are maintained at Lehigh University for research on paint and varnish.

DIFCO LABORATORIES, INC., 920 Henry St., Detroit, Mich. Grants are made to University of Michigan, for antigen research, $10,000; and University of California, for the study of microbiological analytical methods for quantitative determination of amino acids, $5,000.

DISSTON AND SONS, INC., HENRY, Unruh and Milnor Sts., Philadelphia, Pa. Two industrial scholarships a year are maintained at the Drexel Institute of Technology.

Two grants are made to Temple University, for the study of credit and collection work, and of metallurgy. $36 and $50.

DISTILLATION PRODUCTS, INC., 755 Ridge Road West, Rochester 13, N. Y. A fellowship is maintained at Columbia University, College of Physicians and Surgeons, for research on the metabolism of fat-soluble vitamins using isotopes. $6,000.

Grants are made to Duke University, School of Medicine, for research on tocopherol metabolism in human subjects, $1,400; Michael Reese Hospital, for research on dietary factors which influence cancer, $15,000 over 3-year period 1946–48; University of Cincinnati for Hillman Hospital, Birmingham, Ala., for nutritional research, $1,000; University of North Carolina, School of Medicine, for research on dietary factors influencing arteriosclerosis in dogs with materials and technical assistance estimated at $1,500; and Vanderbilt University School of Medicine, for research on tocopherol metabolism in pregnancy and child health, $2,500 annually for 3 years 1946–48.

DIXON CRUCIBLE CO., JOSEPH, 167 Wayne St., Jersey City 3, N. J. Fellowships are maintained at Stevens Institute of Technology, for research in powder metallurgy, $445 a month; and Battelle Memorial Institute, for research in fine grinding, $1,000 a month.

DOW CHEMICAL CO., Midland, Mich. Fellowships and scholarships are maintained at Rice Institute, for a student of chemistry, chemical engineering, or physics, $750 per year for four years, beginning March 1, 1944; Rutgers University, for research in entomology, $500, authorized Jan. 3, 1946; Brown University, two scholarships of $1,000 each, beginning March 1, 1946; Carnegie Institute of Technology, for research on magnesium cells, $1,400 for one year, beginning Feb. 1946; and Central Michigan College, with ten scholarships of $30 each for academic year 1945–46.

DU-LITE CHEMICAL CORP., Middletown, Conn. A fellowship is maintained at Syracuse University, for research in metal finishing. $1,500.

DU PONT DE NEMOURS AND CO., INC., E. I., Wilmington 98, Del. For the 1946–47 academic year, 68 postgraduate fellowships were awarded to 45 universities. The stipend is $1,200 for a single person and $1,800 for a married person. In addition, $1,000 will go to the university with each fellowship to defray the cost of tuition and fees. 41 of these postgraduate fellowships are in the field of chemistry, 15 in chemical engineering, seven in mechanical engineering, and five in physics.

These fellowships were awarded to Brown University, California Institute of Technology, Carnegie Institute of Technology, Columbia University, Cornell University, Duke University, Harvard University, Iowa State College, Johns Hopkins University, Lehigh University, Massachusetts Institute of Technology, New York University, Northwestern University, Ohio State University, Pennsylvania State College, Polytechnic Institute of Brooklyn, Princeton University, Purdue University, Rutgers University, Stanford University, Syracuse University, Vanderbilt University, Western Reserve University, Yale University, University of California at Berkeley and at Los Angeles, University of Chicago, University of Delaware, University of Illinois, University of Indiana, University of Iowa, University of Maryland, University of Michigan, University of Minnesota, University of Missouri, University of Nebraska, University of North Carolina, University of Notre Dame, University of Pennsylvania, University of Rochester, University of Tennessee, University of Texas, University of Virginia, University of Wisconsin, and University of Washington.

In addition, six postdoctoral fellowships in chemistry are awarded to six universities, with the stipend of $3,000 and an award of $1,500 to the University. These fellowships were awarded to Cornell University, Harvard University, Massachusetts Institute of Technology, University of Illinois, University of Minnesota, and University of Wisconsin.

EASTMAN KODAK CO., Rochester 4, N. Y. The following fellowships are maintained:

Chemical engineering: Massachusetts Institute of Technology, $1,000.

Organic chemistry: University of Illinois, University of Michigan, Harvard University, University of Wisconsin, Pennsylvania State College, University of Nebraska, $1,000 each.

Physical chemistry: University of Rochester, Rice Institute, Princeton University, $1,000 each.

Physics: Ohio State University, University of California, $1,000 each.

Mechanical engineering: State University of Iowa, Cornell University, University of Illinois, University of Michigan, $750 each.

Electrical engineering: Massachusetts Institute of Technology, Rensselaer Polytechnic Institute, $750 each.

Business administration: University of Pennsylvania, Wharton School; Dartmouth College, Tuck School; Harvard Graduate School of Business Administration; Stanford University, $750 each.

EATON LABORATORIES, INC., 17 Eaton Ave., Norwich, Conn. Two fellowships are maintained at Syracuse University, for investigation of furan compounds. $3,350.

Grants are made to University of Maryland, Department of Pharmacology, $1,000, and Department of Surgery, $1,000; Harvard University Medical College, for research on antibacterial agents, $2,800; and Tufts Medical School, for research on drug sensitization, $2,500.

ECONOMICS LABORATORY, INC., 914 Guardian Bldg., St. Paul, Minn. A fellowship is maintained at Macalester College, for research on any problem in chemistry the student adviser wishes to have the recipient work on For the current year, polarographic analysis, $300.

Grants are made to University of Minnesota, the Hormel Institute, for research on skin irritation by detergents, $5,000; and New York State Agricultural Experiment Station, for research on cleaning and sterilizing, including bacterial aspects of the food

serving and food processing fields, $500.

EDIBLE GELATIN MANUFACTURERS RESEARCH SOCIETY OF AMERICA, INC., 55 West 42nd St., New York, N. Y. Fellowships are maintained at Philadelphia College of Pharmacy and Science, for the study of gelatin in pharmaceuticals, $1,250; Pennsylvania State College, for the study of gelatin in ice cream, $1,800; and Harvard Medical School, for the study of antithrombotic action of gelatin, $3,000.

ELASTIC STOP NUT CORP., Union, N. J. A fellowship is maintained at each of the following: Pennsylvania State College, for study of the action of threaded connections under vibration, $7,000; and Princeton University, for study of the effect of flow properties of plastics on their mechanical strength, $3,000.

ELECTRO METALLURGICAL CO. *See* Union Carbide and Carbon Corp.

ELECTRO REFRACTORIES AND ALLOYS CORP., Vars Bldg., Buffalo, N. Y. A fellowship is maintained at New York State College of Ceramics, Alfred University, for research on superrefractories. $400.

ELGIN NATIONAL WATCH CO., Elgin, Ill. A fellowship for the study of problems in watch technology is maintained at Battelle Memorial Institute.

EMERSON DRUG CO., Eutaw and Lombard Sts., Baltimore, Md. A scholarship is supported at the Rhode Island College of Pharmacy. $225.

Chair of Bio-Assay is supported at the University of Maryland, School of Pharmacy.

A fellowship is supported at the University of Maryland, for the study of analgesics. $5,000.

Grants are made to Institute for the Study of Analgesic and Sedative Drugs, $11,000; University of Maryland, School of Pharmacy, for research on analgesics, $2,250; State University of Iowa, $1,500; and New York Academy of Medicine, $1,000.

ENCYCLOPAEDIA BRITANNICA FILMS, INC., 20 North Wacker Dr., Chicago 6, Ill. Ten scholarships at the University of Chicago, eight at the University of Wisconsin, and eight at the University of Indiana, are maintained for audio-visual education. $75 each.

ENDO PRODUCTS, INC., 84–40 101st St., Richmond Hill 18, N. Y. Three grants ($7,800) are made to the following: New York University Medical School and Philadelphia General Hospital, for research on gold compounds in human arthritis; and Brooklyn College, for research on synthetic organic chemistry.

ESTERBROOK PEN CO., Camden, N. J. A grant is made to Battelle Memorial Institute for research in hard material for pen nibs. $8,000.

ETHYL CORP., Chrysler Bldg., New York, N. Y. Fellowships, carrying a stipend of $1,000 each are maintained at Brown University, Duke University, Iowa State University, Louisiana State University, University of North Carolina, Princeton University, and Wayne University, for research in chemistry; Cornell University, Stanford University, and Yale University, for research in mechanical engineering; University of Cincinnati, for research in medicine; Massachusetts Institute of Technology, for research in chemical engineering; University of Michigan (2), for research in electrical and chemical engineering; University of Oklahoma, for research in chemical physics; Pennsylvania State College, University of Texas, and University of Tulsa, for research in petroleum engineering; and Purdue University (3), for industrial research.

EXOLON CO., Tonawanda, N. Y. A fellowship is maintained at New York State College of Ceramics for ceramic research in the manufacture of abrasives and refractories.

FANSTEEL METALLURGICAL CORP., North Chicago, Ill. A fellowship is maintained at Battelle Memorial Institute, for research on tantalum and tantalum alloys. Stipend, variable; established on semiannual or quarterly basis.

FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS, Kenneth J. Howe, Chairman, care of Thibaut and Walker Co., Long Island City, N. Y. A fellowship is maintained at the University of Minnesota, for research in the chemistry of film formation. $3,000.

FIRESTONE TIRE AND RUBBER CO., Akron 17, Ohio. Scholarships are maintained as follows: University of Akron, for research in rubber chemistry, $1,200; and University of Minnesota, for research in plant pathology, $1,000.

Fellowships are maintained at the Case School of Applied Science for research in synthetic rubber; and at Ohio State University and at Princeton University, for research in rubber chemistry.

FORD MOTOR CO., Rouge Plant, Dearborn, Mich. Grants are made to University of Michigan, Department of Engineering Research, for the development of spectrographic analyses for the production of irons and steels, $20,000; the study of the application of the Geiger Counter to the analysis of phosphorus in steel, $8,000; for the development and construction of electron diffraction camera, $5,000; and for the investigation by electron diffraction analysis of the film formed on aluminum sheets, chemically cleaned prior to spot welding, $2,500.

FORSTMANN WOOLEN CO., 2 Barbour Ave., Passaic, N. J. A grant is made to the Philadelphia Textile Institute. $7,500.

FREEPORT SULPHUR CO., 122 East 42nd St., New York, N. Y. Scholarships are maintained at Tulane University, for a male Cuban student in engineering or accounting, $1,000; and Louisiana State University (2), for male Cuban students in engineering or accounting, $750 each.

Grants are made to Louisiana State University, for control of coccidiosis of chickens, $700, insect control investigations of cotton, etc., $1,500, soil acidification investigations, $250, and external poultry parasite control demonstrations, $2,700; Florida Agricultural Experiment Station, for poultry parasite control investigations, $500; Agricultural Experiment Station, Cornell University, for sulfur spray equipment investigations on apples, peaches, and cherries, $300; Michigan Agricultural Experiment Station, for sulfur spray material investigations on apples and cherries, $300; Agricultural Experiment Station of University of Minnesota, for potato scab control investigations, $300; Georgia Agricultural Experiment Station, for control of peanut leafspot, $350; and Texas Agricultural Experiment Station, for cotton insect investigations using sulfur dust mixtures, $900.

FROMM LABORATORIES, INC., Grafton, Wis. A grant is made to the University of Minnesota, for cancer research. $2,500.

GAYLORD CONTAINER CORP., Bogalusa, La. Two scholarships are maintained at Louisiana State University for by-products research. $3,000 and $850.

GENERAL ANILINE AND FILM CORP., 230 Park Ave., New York, N. Y. Fellowships are maintained at University of Texas, for organic chemical research, $1,000 annually; Pennsylvania State College, for a research assistantship in the field of agricultural chemicals, $4,500 annually and incidentals; and University of Illinois, for a half-time research assistantship in the Department of Chemistry, $875.

GENERAL ELECTRIC CO., Schenectady, N. Y. Charles P. Steinmetz Memorial Scholarships (5), Union College, for engineering or academic courses, up to $500 a year; John E. Popper Scholarship, Union College, for engineering or academic courses, $500 a year; Richard H. Rice Memorial Scholarship (about every other year), Stevens Institute of Technology, for engineering or academic courses, $400 a year; Charles A. Coffin Fellowships, for graduate work in the fields of electricity, physics, and physical chemistry, up to $1,500 annually; Gerard Swope Fellowships, for graduate work in the fields of industrial management, engineering, the physical sciences, and any other scientific or industrial field, up to $1,500 annually.

GENERAL FOODS CORP., Research and Development Dept., 250 Park Ave., New York, N. Y. Fellowships (one each) are maintained at Purdue University, for research on the improvement of wheat varieties, $6,000; University of Illinois, for research on the improvement of white corn by breeding, $1,200.

GENERAL MILLS, INC., 400 Fourth St., South, Minneapolis 15, Minn. Fellowships are maintained at University of California, for research in biological chemistry; University of Minnesota, for research in cereal chemistry; and University of Texas, for research in steroids.

GENERAL RADIO CO., 30 State St., Cambridge, Mass. Grants are made to Massachusetts Institute of Technology and to Northeastern University, to promote a cooperative educational plan.

GENERAL TIRE AND RUBBER CO., Akron, Ohio. Fellowships are maintained for research in synthetic rubber and resins at Carnegie Institute of Technology (5); Notre Dame University (7); and Purdue University (9).

GLOBE STEEL TUBES CO., 3839 West Burnham St., Milwaukee 4, Wis. Occasional grants for research are made to Purdue University for studies in high-temperature effects on steel.

GOODYEAR TIRE AND RUBBER CO., 1144 East Market St., Akron, Ohio. Fellowships (one each) are maintained at Akron University for research in rubber chemistry; University of Florida, and the University of Iowa, for research in pliofilm packaging; and Wayne University, for research in pliofilm packaging of airborne cargo.

GRIFFITH LABORATORIES, 1415 West 37th St., Chicago, Ill. A grant is made to Wayne University Medical School, for toxicity studies on food products. $5,000.

GRUMMAN AIRCRAFT ENGINEERING CORP., Bethpage, Long Island, N. Y. Ten scholarships are awarded annually, at any approved engineering school of applicant's choice. These are open to high school graduates of Nassau and Suffolk Counties to foster study in aeronautical engineering. 4 years' tuition.

GULF OIL CORP., 3800 Gulf Bldg., Pitts-

burgh, Pa. Fellowships for research in physics, chemistry, geology, and engineering are maintained at Massachusetts Institute of Technology, Pennsylvania State College, University of Chicago, University of Wisconsin, University of Minnesota, University of Texas, Agricultural and Mechanical College of Texas. Stipend, standard grant, $900 (total for seven fellowships $6,500).

HANSEN'S LABORATORY, INC., CHR., Little Falls, N. Y. A grant is made to the Children's Memorial Hospital, Philadelphia, Pa., for the study of the effect of the rennet enzyme in the digestibility of milk. $4,000 annually.

HARROWER LABORATORY, INC., 920 East Broadway, Glendale 5, Calif. Grants are made to College of Medical Evangelists, Alumni Research Foundation, $2,000; Cornell University School of Medicine, for research in digitalis, $1,000; and National Physicians Committee for Extension of Medical Service, $1,000.

HARSHAW CHEMICAL CO., 1945 East 97th St., Cleveland, Ohio. Fellowships are maintained at Western Reserve University (4): two for research in inorganic chemistry, $1,500 each, annually, and two for cooperative research in inorganic chemistry, $1,200 each, annually; and Massachusetts Institute of Technology for research in inorganic chemistry, $5,000 for two years.

Grants are made to Rutgers College, Agricultural Experiment Station, for research on copper fungicides, $1,650 annually for 3 years; Ohio Agricultural Experiment Station, $800; and to Cornell University, New York Agricultural Experiment Station, $700, for the study of the use of copper fungicides.

HASKINS LABORATORIES, INC., 321 East 43rd St., New York 17, N. Y. Fellowships are maintained at Harvard University (2) and at Union College. One or two fellowships in physics, chemistry or biology each year will be announced specially, at irregular and infrequent intervals.

HAWAIIAN PINEAPPLE CO., INC., Honolulu, T. H. A grant is made to the University of Chicago Nursery School, for a study of the relationship of midmorning feeding to the incidence of negative emotional behavior in nursery school children. $1,500 per annum, plus requisite pineapple juice.

HERCULES POWDER CO., Wilmington, Del. Fellowships are maintained at University of Delaware, for research in insecticides, $8,000; Princeton University, for research in nuclear physics, $3,000; and University of Tennessee, for research in catalytic hydrogenation, $4,000, for 18 months.

HEWLETT-PACKARD CO., 395 Page Mill Rd., Palo Alto, Calif. One fellowship is maintained at Stanford University for research on electronic measurements. $1,200.

One grant is made to Stanford University for the study of special measurement problems to supplement research done in the company laboratories. $1,500.

HEYDEN CHEMICAL CORP., Garfield, N. J. Fellowships are maintained at Lehigh University, $3,000; and at University of Wisconsin (2), $4,400.

Grants are made to Children's Hospital of Philadelphia, $3,500; and to Hahnemann Medical College, $1,000.

HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y. Two fellowships are maintained at Purdue Research Foundation, for research on hydrocarbon chlorination. $3,000 each.

HORMEL AND CO., GEORGE A., East Brownsdale Ave., Austin, Minn. A grant is made to the University of Minnesota, for research on problems connected with the meat packing industry. $25,000.

HUNTINGTON LABORATORIES, INC., Huntington, Ind. A grant is made to Huntington College, for optional research. $200.

HYNSON, WESCOTT, AND DUNNING, INC., 1030 North Charles St., Baltimore, Md. Fellowships are maintained at Johns Hopkins University, Dunning Fellowship in Chemistry, $1,000, research on isotope separation, $5,000, student research, department of chemistry, $1,000, sustaining fund, $1,000; University of Maryland, Dunning Fellowship in Pharmacy, $1,000; American Foundation for Pharmaceutical Research, $2,000; National Physicians' Committee, $1,000; and Johns Hopkins Hospital, $2,000.

INDIANA STEEL PRODUCTS CO., 700 Valparaiso St., Valparaiso, Ind. Three scholarships are maintained at Valparaiso University. $175 each.

INDUSTRIAL RESEARCH LABOATORIES, Wolf Lake, Route 4, Box 572, Muskegon, Mich. A grant is made to a research student, to be spent by him in any way he decides best in the solution of problems concerning soybeans. $2,000.

INDUSTRIAL TESTING LABORATORIES, 315 Fourth Ave., New York 10, N. Y. A scholarship is maintained at the National Brewer's Academy, for the study of brewing technology. $500.

INNIS SPEIDEN AND CO., 117 Liberty St., New York, N. Y. A grant is made to the Boyce-Thompson Institute for Plant Research, Yonkers, N. Y., for research on soil fumigation. $7,000.

INSTITUTE OF GAS TECHNOLOGY, 3300 Federal St., Chicago, Ill. The Institute will offer 12 two-year fellowships ($1,500 per year) beginning with the fall semester, 1946. The subjects of research are basic problems of interest to the gas industry, including gasification of coal and oil, carbonization of coal, combustion of gases of all kinds, fluid flow heat transfer, and chemical processes pertaining to gas production or utilization. The fellowships are supported by member companies' dues and by contributions.

INSTITUTE OF PAPER CHEMISTRY, Appleton, Wis. About 60 scholarships, valued at approximately $1,200 a year, are maintained at the Institute, by the pulp and paper and allied industries.

INTERNATIONAL BONE CHAR PROJECT, 333 Medford St., Charlestown 29, Mass. A research associate is maintained at the National Bureau of Standards. Project: adsorption studies on carbon and other commercial adsorbents.

INTERNATIONAL MINERALS AND CHEMICAL CORP., 20 North Wacker Drive, Chicago 6, Ill. Projects for research of one- to five-year periods are maintained as follows: Massachusetts Agricultural Experiment Station, for studies in New England crop response to magnesium, $7,200; Cornell University, for the study of dry edible beans, $9,000, for biochemical studies of the growth of potatoes as influenced by potash salts and Sul-Po-Mag in fertilizers, $3,000, for potato studies in New York state, $750, for research on fertilizers for yield and quality of canning crops, $4,000, and for studies in the yield and quality of canning crops, $4,000; New Jersey Experiment Station, for magnesium studies on soils and crops of New Jersey, $4,600, for the study of the action and response of commercial sources of magnesium in commercial fertilizers, $9,600; Ontario Agricultural College, for magnesium deficiency studies of crops in Canada, $3,000; New York Experiment Station, Fredonia, for a study of the role of magnesium and potash in grape nutrition, $2,900; Georgia Experiment Station, for research in the value of fertilizing fall grains for pasture in the Southeast, $9,600; Mississippi State College, for studies in plant nutrition of the sweet potato, $3,000; Michigan State College, for a study of the effect of different fertilizer treatments upon shipping quality of tomatoes, $1,850; Indiana Agricultural Experiment Station, for studies in fertilizers for longevity of alfalfa, $4,500; University of Wisconsin, for research in the response of canning corn and peas to commercial fertilizers of different composition, $7,500, and for research in magnesium phosphorus influences upon growth of plants, $3,000; Florida Experiment Station, for a study of the shipping quality of perishable crops, $4,500; University of Illinois, for research on the intake and utilization of plant foods for corn, $4,500; Kentucky Experiment Station, for studies in Burley tobacco nutrition, $3,600; and University of California, for the study of formation of active glutamic acid in sugar beets, $2,500.

INTERNATIONAL TELEPHONE AND TELEGRAPH CORP., 67 Broad St., New York 4, N. Y. A grant is made to the Massachusetts Institute of Technology, for fundamental electronic research. $50,000 payable at the rate of $10,000 a year starting July 1, 1946.

INTERSTATE COTTON OIL REFINING CO., Sherman Tex. A grant has been made to Southern Methodist University, Institute of Plant Technology, for research on vegetable oils. $3,000.

IRVINGTON VARNISH AND INSULATOR CO. 6 Argyle Terrace, Irvington 11, N. J. One grant is made to Columbia University for chemical investigation of cashew nut shell liquid. $5,000.

JANSKY AND BAILEY, 970 National Press Bldg., Washington 4, D. C. A fellowship is maintained at the University of Illinois, for research on radio communications. $700.

JOHNSON AND SON, S. C., Racine, Wis. A fellowship is maintained at each of the following institutions: Cornell University, for research in chemical engineering processing of waxes with emphasis on refining of crude natural waxes, $7,500; Massachusetts Institute of Technology, for research on the fundamental colloid chemistry of waxes, with special attention to emulsion type finish, $5,000; Michigan State College, for research on the permeability of wax films to water vapor and gases, $3,000; Northwestern University, for physical, chemical, or engineering studies of waxes, $6,000; Ohio State University, for research on the isolation and identification of the constituents of natural waxes, $4,500; and University of Wisconsin, for identification of individual commercial waxes with additional work on synthesis and isolation of fatty acid and fatty alcohol constituents, $4,500.

JONES AND LAUGHLIN STEEL CORP., Jones and Laughlin Bldg., Pittsburgh, Pa. A major contribution has been made to Carnegie Institute of Technology. Work being done for the company on a paid basis is being handled at the University of Pittsburgh and Carnegie

Institute of Technology. A contribution has been made to the Coal Research Laboratory, Carnegie Institute of Technology.

KELLOGG Co., Battle Creek, Mich. A grant is made to Michigan State College for dog food research, and another to the University of Notre Dame for germ-free life research. $2,500 each.

KNOX GELATINE Co., INC., CHARLES B., Johnstown, N. Y. Grants are made to University of Pennsylvania, Harrison Department of Surgical Research, for research on oral and parenteral protein feeding studies; University of Louisville Medical School, department of physiology, for research on blood substitutes; and University of California, department of medicine, for dietary studies.

KOPPERS Co., INC., Koppers Bldg., Pittsburgh 19, Pa. Fellowships are maintained at University of Delaware, for research in fungicides; University of Illinois, for research in insecticides; University of Pennsylvania, for studies in veterinary medicines; and Lehigh University, for research in leather chemicals.

A contribution is made to the Coal Research Laboratory, Carnegie Institute of Technology.

LADOX LABORATORIES, INC., Delaware Ave. and Vine St., Philadelphia, Pa A grant is made to Temple University for research in pharmacy. $1,000.

LAKESIDE LABORATORIES, Milwaukee, Wis. Grants are made to Cornell University Medical College, for research in heart failure, $1,000; Iowa State University, for research in estrogenic therapy, $1,000; New York University College of Medicine, for research in heart failure, $1,000; and University of North Carolina, for research in syphilis, $3,000.

LAMBERT PHARMACAL Co., St. Louis, Mo. Grants (one each) are made to Northwestern University, Dental School, for the study of mouth odors, $5,000; New York Postgraduate Medical School, for the study of filtrable viruses, $5,000; Cornell University Medical School, for the study of penicillin preparations, $2,500; and American Foundation for Tropical Medicine, Inc., $1,000.

LAWRENCE LEATHER Co., A. C., 10–19 Sawyer St., Peabody 1, Mass. Grants are made to University of Cincinnati, Tanners' Council Research Laboratory, for general leather research, $5,000; and Massachusetts Institute of Technology, department of biology and biological engineering, for the study of protein fibers, $5,000.

LEDERLE LABORATORIES, INC., Pearl River, N. Y. 13 fellowships are maintained at seven medical schools, four schools of pharmacy, and at two universities, for research in pharmacology (6), antibiotics (4), and pharmaceutical chemistry (3). Each annual stipend, $1,000 to $1,200.

60 grants are made to 20 hospitals, 21 medical schools, 15 universities, and four schools of veterinary medicine for research in the following fields: pharmaceutical research (13), cancer research (2), biochemistry (4), antibiotics (3), human clinical research (8), pharmacology (7), biophysics (2), biological research (11), veterinary medicine (4), human nutrition (3), and animal nutrition (3). Each annual grant varies from $300 to $25,000.

LEVER BROTHERS Co., 164 Broadway, Cambridge, Mass. Fellowships for research in organic chemistry are maintained at Stanford University and the University of Southern California. Stipend, under $5,000.

Grants are made for organic chemistry research at Massachusetts Institute of Technology and at Boston University. Stipend, under $5,000.

LILLY AND Co., ELI, Indianapolis, Ind. Research grants and fellowships are maintained in universities, medical schools, and other research centers throughout the country, for research in organic chemistry, biochemistry, pharmacology, biology, and other basic medical sciences, and in clinical medicine.

LITTLE, INC., ARTHUR D., Cambridge 42, Mass. Two fellowships are maintained at Brown University, for research in infrared spectrum of hydrogen sulfide, and in assembly of special grating spectrograph. $1,000 each and $500 for materials.

The company also serves as scientific advisors for clients in the administration of fellowships and grants-in-aid at different universities.

LOUISVILLE PAINT, VARNISH AND LACQUER ASSOCIATION, 922 Heyburn Bldg., Louisville 2, Ky. A fellowship is offered at the University of Louisville, Speed Scientific School, for research on paint and varnish chemistry. $320.

LOWE CORP., JOE, 601 West 26th St., New York, N. Y. Grants are made to New York Medical Hospital, for research on pulmonary physiology to be carried on at the Metropolitan Hospital, $1,000; Massachusetts Institute of Technology, for fundamental studies relating to the baking and ice cream industries, $1,500; and Syracuse University, for research in the baking industry, $1,500.

MCNEIL LABORATORIES, INC., 2900 North 17th St., Philadelphia, Pa. Grants are made to Ohio State University Hospital, for a study of gall bladder and liver complications; Lankenau Hospital Research Institute, Philadelphia, Pa., for a study of the metabolism of the sulfur-containing amino acids; and Jefferson Medical College, Philadelphia, Pa., for a study of barbituric acid derivatives.

MASTER BUILDERS Co., 7016 Euclid Ave., Cleveland 3, Ohio. A fellowship is maintained at Ohio State University Research Foundation, for research on the hydration of portland cement. $125 a month.

MAY SEED Co., EARL E., Shenandoah, Iowa. A grant is made to Iowa State College, for the study of basic problems relating to the growth and development of the corn of Mexico and Central and South America, and the contribution the corn of those areas may be able to make to the United States. $75,000 for five years.

MELLON INSTITUTE, 4400 Fifth Ave., Pittsburgh, Pa. See CHEMICAL AND ENGINEERING NEWS for annual reports on industrial research progress.

MERCK AND Co., INC., Rahway, N. J. Ten undergraduate scholarships are awarded at Princeton University. $5,000. Grants and fellowships are maintained as follows: Columbia University (2), for chemical research $1,800, for medical research, $5,000; Cornell University, for entomological research, $550; Kansas State College of Agriculture and Applied Science, for nutritional research, $500; Mount Sinai Hospital, for medical research, $2,000; New York Botanical Gardens, for microbiological research, $1,000; Pennsylvania State College, for nutritional research, $2,280; Purdue University, for veterinary medical research, $1,500; Rutgers University (3), for nutritional research, $1,000, for entomological research, $5,020, and for microbiological research, $750; University of California at Los Angeles, for chemical and microbiological research, $1,500; University of Kentucky, for veterinary medical research, $500; University of Minnesota (2), for chemical research, $1,400, and for veterinary medical research, $500; and University of Wisconsin (2), for veterinary medical research, $3,000, and for microbiological research $1,500.

MERRELL, WM. S., Lockland Station, Cincinnati 15, Ohio. Laboratory fellowships for research are maintained at Miami University (2), Ohio State University (3) in synthetic medicinals and vaccines; Purdue University, Indiana University, Lehigh University (2), University of Illinois, University of Maryland, University of North Carolina, and University of Michigan, in synthetic medicinals; Kansas State Teachers College, in vaccines; Philadelphia College of Pharmacy, in germicides; and Cornell University, in antibiotics; clinical fellowships are maintained at Washington University, on estrogens; University of Louisville (2), on germicides and vasopressor amines; University of Cincinnati, on vasopressor amines; University of Nebraska, on detoxification; Longview State Hospital, in antibiotics; Southwestern Medical College, in vasopressor amines; Wayne University, in diuretics; Cornell University in digitalis; Columbia University in synthetic medicinals; Temple University, in vaccines; Ohio State University, in vaccines; and Tulane University, in germicides.

METAL HYDRIDES, INC., 12–14 Congress St., Beverly, Mass. Grant is made to Massachusetts Institute of Technology, for metallurgical research. $7,000.

MICHIGAN GAS ASSOCIATION, Grand Rapids, Mich. Two fellowships are maintained at the University of Michigan, for research in gas engineering. $1,500.

MINE SAFETY APPLIANCES Co., Braddock, Thomas, and Meade Sts., Pittsburgh, Pa. A fellowship is maintained at the University of Pittsburgh, School of Medicine, for studies in industrial medicine. $3,000.

MINNESOTA MINING AND MFG. Co., St. Paul, Minn. Grants are made to Pennsylvania State College for organic silicon compounds research, $5,400, and fluorine compounds research, $23,500.

MINNESOTA VALLEY CANNING Co., 1200 Commerce St., LeSueur, Minn. A grant is made to the University of Minnesota, for research on soil drainage. $9,000.

MONSANTO CHEMICAL Co., St. Louis, Mo. Fellowships (11) are maintained at Polytechnic Institute of Brooklyn, for research in polymers, $1,500; University of Michigan (2), for research in pharmaceuticals and organic chemistry, $1,200 each; Princeton University, for chemical engineering research, $1,000; University of Wisconsin, for research in catalysis, $1,200; University of Minnesota, for research in organic chemistry, $1,200; University of Illinois, for research in organic chemistry, $1,000; Washington University, for patch testing research; University of Cincinnati, for research in applied physiology; University of Illinois, for research in insecticides; and Carnegie Institute of Technology, Coal Research Laboratory.

MOORMAN MANUFACTURING CO., Quincy, Ill. A fellowship is maintained at Kansas Agricultural Experiment Station to study the mineral composition of wheat pasture. $1,000.

MORGAN CONSTRUCTION CO., 15 Belmont St., Worcester 5, Mass. Two scholarships are maintained at Worcester Polytechnic Institute, in engineering. Full tuition.

MORRIS AND CO., LTD., INC., PHILIP, 119 Fifth Ave., New York, N. Y. A grant is made to the New York Medical College, for research on cigarettes and the physiological effects of smoke. $3,500.

NATIONAL CANNERS ASSOCIATION, 1739 H St., N. W., Washington, D C. Grants are made to Pennsylvania State College, for nutrition research, $6,800; Michigan State College, for nutrition research, $4,500; University of Maryland, for nutrition research, $1,000, and for quality studies, $6,500; and University of Chicago, for nutrition research, $2,000, and for research in food poisoning, $1,500.

NATIONAL CARBON CO., INC., *See* Union Carbide and Carbon Corp.

NATIONAL CHEESE INSTITUTE, Chicago, Ill. Grants are made to University of Wisconsin, for research on methods of sampling and analyzing cheese, $3,850; and Cornell University, for research on the pasteurization of milk for cheese, with special emphasis on the development of high flavors and the survival of certain pathogens during ripening, $3,500.

NATIONAL FERTILIZER ASSOCIATION, INC., 616 Investment Bldg., Washington 5, D. C. A grant is made to the University of California, for research on soils and plants. $300.

NATIONAL LEAD CO., 111 Broadway, New York 6, N. Y. A fellowship is maintained at Lehigh University, for research in the chemistry of drying oils. $13,500.

NATIONAL LEAD CO., TITANIUM DIVISION, Box 58, South Amboy, N. J. A fellowship is maintained at Columbia University, for research on the chemistry of titanium. Stipend, $4,000 for two years.

NATIONAL LIME ASSOCIATION, 927 Fifteenth St., N. W., Washington 5, D. C. Fellowships are maintained as follows: one or more at Massachusetts Institute of Technology, for fundamental research on lime, $5,000; Five at New Jersey Agricultural Experiment Station, for studies in agricultural lime, $8,100; one or more at Rutgers University, for research on sewage and trade wastes, $6,500; and a research associate at National Bureau of Standards, for studies in structural lime and mortars for unit masonry, $10,000.

NATIONAL LIVE STOCK AND MEAT BOARD, 407 South Dearborn St., Chicago 5, Ill. Grants are made to University of Chicago, department of pathology, for studies in the utilization of amino acids; and to the Division of Biological Sciences for studies in the retention of B vitamin in cooking meats; University of Nebraska, department of home economics, for a study of the effects of generous amounts of meat in the diet on the nutritional status of infants, six weeks to two years of age; University of Wisconsin, department of biochemistry, for a study of the effect of fresh and stored meats in mixed diets, and for a study of the amino acid content of meat; New York University College of Medicine, to study the amino acid requirements of man; Texas Agricultural Experiment Station, for research in the retention of B vitamin during stewing; University of Minnesota, for a study of the factors affecting the nutritive value of fats; University of Texas, school of medicine, for studies in fat metabolism in relation to human nutrition; and Pennsylvania State College, for the comparison of two dietaries containing different levels of meat, both of which have the same calculated values of energy and of major nutrients.

NATIONAL OIL PRODUCTS CO., INC., First and Essex Sts., Harrison, N. J. Fellowships are maintained at Harvard Medical School, for dermatological research, $4,000 a year; and Lehigh University, for research in tanning, $4,000 a year.

NATIONAL RESEARCH CORP., 100 Brookline Ave., Boston, Mass. A scholarship is maintained at the Massachusetts Institute of Technology for the study of fundamental applications of high vacuum in the fields of physics, metallurgy, chemistry, or engineering. $2,500.

NATIONAL SAND AND GRAVEL ASSOCIATION, 951 Munsey Bldg., Washington, D. C. Two fellowships are maintained at the University of Maryland for the study of properties and uses of mineral aggregates. $600 each.

NATIONAL SLAG ASSOCIATION, 644 Earle Bldg., Washington 4, D. C. Fellowships are supported at Ohio State University, at Alabama Polytechnic Institute, and at the University of Maryland for research on the agricultural value of blast furnace slag.

NATIONAL SOUTHERN PRODUCTS, INC., 12th and 14th Sts., Tuscaloosa, Ala. Two fellowships are maintained at the University of Alabama, for studies in the refining and hydrogenation of tall oil. $1,000 each.

NATIONAL STARCH PRODUCTS, INC., 270 Madison Ave., New York 16, N. Y. A grant is made to the College of Agriculture, University of Nebraska, for research on hybrid waxy corn. $1,200.

NATIONAL TUBE CO. *See* United States Steel Corp.

NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION, 145 Public Square, Cleveland, Ohio. A grant is made to the University of Illinois, Engineering Experiment Station, for research in warm air heating and air conditioning. $16,000 annually.

NORFOLK AND WESTERN RAILWAY CO., Roanoke, Va. Grants are made to the Coal Research Laboratory, Carnegie Institute of Technology.

NORTH AMERICAN CEMENT CORP., 41 East 42nd St., New York 17, N. Y. A fellowship is maintained at Alfred College, for research on cement. $3,500.

NORTON CO., Worcester 6, Mass. Two grants are made to Battelle Memorial Institute, one of which is for the study of surface finish.

NORWICH PHARMACAL CO., Norwich, N. Y. A grant is made to Bellevue Hospital and New York University department of therapeutics, for research to determine the effect of Pepto-Bismol on gastrointestinal tract, etc. $10,000 per year for two years.

NOVOCOL CHEMICAL MANUFACTURING CO., INC., 2921 Atlantic Ave., Brooklyn, N. Y. A grant is made to the Hahnemann Medical College, for research in the vasodilating properties of commonly used local anesthetics. $1,500.

NUODEX PRODUCTS CO., INC., Elizabeth F, N. J. A scholarship is maintained at the University of Louisville, for research on protective coatings. $1,200 a year for three years. A fellowship is maintained at McGill University, for research on protective coatings. Approximately $2,000.

NUTRITION FOUNDATION, INC., Chrysler Bldg., New York, N. Y. The foundation, whose membership consists of food and related products manufacturers, makes 111 grants for fundamental studies in the science of nutrition to 46 universities and medical centers located in the United States and Canada. $1,047,755.

OHIO-APEX, INC., P. O. Box 98, Nitro, W. Va. A grant is made to the West Virginia University, for research in plasticizers. $1,200.

OHIO CHEMICAL AND MFG. CO., 60 East 42nd St., New York, N. Y. A fellowship is maintained at the University of Maryland, department of pharmacology, school of medicine, for research on anesthetics. $4,000.

ONEIDA, LTD., Oneida, N. Y. One to three grants are made to the American Electroplaters Society and others, for research in electroplating. $300 to $500 annually.

ORTON CERAMIC FOUNDATION, EDWARD, JR., 1445 Summit St., Columbus 1, Ohio. Fellowships are maintained at the New York State School of Ceramics, Ohio State University, Pennsylvania State College, Rutgers University, and University of Illinois. $750 each. In each case, the subject is to be chosen by the school and approved by the foundation.

OWENS-CORNING FIBERGLAS CORP., Toledo, Ohio. Fellowships are maintained at Texas Agricultural and Mechanical College for research in petroleum technology, and at the University of Louisville, for research in gas absorption. $1,800 each.

Grants are made to Ohio State University, Purdue University, University of Pittsburgh, Pennsylvania State College, University of Minnesota, and University of Michigan, for research on basic problems involving glass composition, refractories and plastics, and physical property measurements of Fiberglas products. $1,500 to $7,500.

OZARK CHEMICAL CO., Tulsa, Okla. Three fellowships are maintained at Purdue Research Foundation, for research on fluorinating agents. Two for $2,500 and one for $6,000.

PAN AMERICAN REFINING CORP., 122 East 42nd St., New York 17, N. Y. A fellowship is maintained at the University of Texas, for research in chemistry or chemical engineering. $1,000.

PARKE, DAVIS & CO., Detroit 32, Mich. Fellowship grants are maintained at: University of Utah, University of Michigan, University of Detroit, Iowa State College, University of Texas, Pennsylvania State College, Wayne University, Michigan State College, University of Missouri, University of Notre Dame, University of Illinois, Massachusetts Institute of Technology, State University of Iowa, University of North Carolina, Johns Hopkins University, Western Reserve University, Northwestern University Medical School, Yale University, University of Southern California, and Columbia University.

PARKER PEN CO., Janesville, Wis. A fellowship is maintained at Tuskegee Institute, for research in writing ink. $200 per month.

PATCH CO., E. L., 38 Montvale Ave., Stoneham 80, Mass. A scholarship is supported at the Massachuseets Col-

lege of Pharmacy. Tuition and expenses.

PENNSYLVANIA RAILROAD CO., Room 908, Pennsylvania Station, Pittsburgh 22, Pa. A contribution is made to the Coal Research Laboratory, Carnegie Institute of Technology.

PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7, Pa. Three research projects are being conducted, two at universities and one at a research institute.

PEPSI-COLA SCHOLARSHIPS, NATIONAL ADMINISTRATIVE BOARD, 532 Emerson St., Palo Alto, Calif. 122 four-year scholarships were awarded to high school seniors who graduated during the calendar year 1946. Full tuition, a travel allowance, and $25 per month.

PERMATEX CO., INC., Brooklyn, N. Y. Two scholarships are maintained at Polytechnic Institute of Brooklyn, in chemistry. $2,000 each.

PFIZER & CO., INC., CHAS., 81 Maiden Lane, New York, N. Y. Fellowships are maintained at Brooklyn Polytechnic Institute, for research in polymers of itaconic acid esters, $3,000; and University of Wisconsin, for studies of the growth-factor requirements of microorganisms, $1,700. Grants are made to Cornell University Medical College, for study of pharmacology of itaconic acid salts, $2,500 to $3,000; Alexander Fleming Fund, on a subject to be chosen by Dr. Fleming, $13,000; Pennsylvania State College, for research in the veterinary use of antiobiotic substances, $2,400; New York Botanical Gardens, for research on fungi, $1,000; National Research Council, for research in streptomycin; and Spies' Nutrition Clinic, for studies in nutrition, $5,000.

PHILLIPS PETROLEUM CO., Bartlesville, Okla. Nine graduate research fellowships are supported, for investigations in the chemistry and physics of petroleum and petroleum derivatives, at the Johns Hopkins University, Pennsylvania State College, Princeton University, and the University of Oklahoma.

PILLSBURY MILLS, INC., Minneapolis 2, Minn. A number of fellowships are maintained at universities and colleges. Approximately $35,000 annually.

PORTLAND CEMENT ASSOCIATION, 33 West Grand Ave., Chicago, Ill. Research associate at the National Bureau of Standards. Project: constitution and hardening of portland cement.

POTLACH FORESTS, INC., Lewiston, Idaho. Fellowships (2) are maintained at the School of Forestry, University of Idaho, for research in wood utilization of sawmill and planer mill wastes through coalescence. $400 each. Applications should be sent to the Dean, School of Forestry, University of Idaho, Moscow, Idaho.

Scholarships (2) are awarded to eligible members of 4-H clubs for the study of forestry. $100 and $25.

RADIO CORP. OF AMERICA, 30 Rockefeller Plaza, New York 20, N. Y. Scholarships are maintained at Columbia University, Harvard University, University of Minnesota, Princeton University, Yale University, University of Washington, and California Institute of Technology. $600 each.

RADIO RECEPTOR CO., INC., 251 West 19th St., New York 11, N. Y. A scholarship is maintained at the City College of New York for electrical, mechanical, or chemical engineering research. $1,200 during Junior and Senior years.

Fellowships are maintained at Columbia University, $2,500; and for research in physics at New York University, $2,500.

REED & CARNICK, Jersey City 6, N. J. Grants for research are made to Columbia University, Princeton University, New York University, and Boston University School of Medicine.

RESEARCH CORP., 405 Lexington Ave., New York 17, N. Y. Grants-in-aid for postwar scientific research will be made to institutions of learning to support research in chemistry, physics, mathematics, and their applications, such as engineering, in sums of $2,500 to to $5,000 per year, over a five-year period. A fund of $2,500,000 is available for this purpose, derived from the revenues of inventions assigned to RESEARCH CORP. by public-spirited inventors.

RHINELANDER PAPER CO., Rhinelander, Wis. One scholarship is maintained at the University of Wisconsin, for research in the microbiological treatment of sulfite waste liquors. $3,300.

ROCHESTER AND PITTSBURGH COAL CO., Indiana, Pa. Annual contributions are made to the Coal Research Laboratory, Carnegie Institute of Technology.

ROHM AND HAAS CO., Washington Square, Philadelphia 5, Pa. Fellowships are maintained at Pennsylvania State College, Rutgers University, University of Illinois, University of Indiana, and University of Maryland.

RUMFORD CHEMICAL WORKS, 9 Newman Ave., Rumford, R. I. Occasional grants are made to various universities and institutions for research on food products and heavy chemicals. $3,000 to $5,000 annually.

RYSTAN CO., 50 Church St., New York 7, N. Y. Grants are made to Georgetown Dental School, for research in chlorophyll therapy in periodontal diseases and oral sepsis, $600; and Temple University School of Medicine, for research in the physical chemistry of chlorophyll, $2,600.

ST. JOSEPH LEAD CO. OF PENN., 250 Park Ave., New York 17, N. Y. A scholarship is maintained at the University of Pittsburgh, for studies in spectrochemical analysis. Approximately $400.

Fellowships are maintained at the University of Pittsburgh, for studies in spectrochemical analysis, $1,500; and at Carnegie Institute of Technology, for research in pigment technology, $1,000.

A grant is made to the University of Pittsburgh, for research in electron microscopy. Approximately $1,000.

SCHENLEY DISTILLERS CORP., 350 Fifth Ave., New York, N. Y. Six fellowships and nine grants have been established for research on distillers' by-products at College of Wooster, for the study of feed-plant by-products, $1,200; Massachusetts State College and Massachusetts Agricultural Experiment Station, for the study of feed-plant by-products, $2,000; Pennsylvania State College, for the study of feed-plant by-produ ts, $1,500; University of Arizona (2), for studies in the use of antibiotics in treatment of plant diseases, $3,800, total; and Massachusetts Institute of Technology, for general research, $8,000 (Fellowship); and Ohio State University, for a poultry research project, $3,000; New York Post Graduate Medical School, for penicillin research, $5,000; Northwestern University Medical School, for penicillin research, $2,500; University of Cincinnati Medical School, for research in the dermatology of antibiotics, $1,500; Cincinnati General Hospital, for penicillin research, $1,500; University of Texas Medical School, for general research, $1,200; Brooklyn Polytechnic Institute, for general research, $1,800; Ohio State University, for the study of penicillin and other agents in treatment of animal disease, $1,320; and Brookline, Mass., Free Hospital for Women, for penicillin research, $2,500.

SCHLITZ BREWING CO., JOSEPH, 235 West Galena St., Milwaukee, Wis. A grant is made to the University of Illinois. $1,200 annually.

SCHOLLER FOUNDATION, SCHOLLER BROTHERS, INC., Collins and Westmoreland St., Philadelphia 34, Pa. One grant is made to the Philadelphia Textile Institute for general research. $10,000.

SEAGRAM AND SONS, INC., JOSEPH E., 7th St. Road, Louisville, Ky. Fellowships are maintained at Purdue University, for research in the determination of growth factors in distillers' dried solubles, $295; University of Kentucky, for the study of metallurgical problems in blending and bottling equipment, $430; University of Louisville, for the study of drum drying of distillers' solubles, $350; Notre Dame University, for the study of problems in distillation, $350; George Washington University, leading to Doctor of Laws degree, $380; Indiana University (2), for the study of the physiology of the yeast cell, and (1) for the study of micro techniques in analyses of alcohol, $350; and Louisiana State University, for research on the development of high carbohydrate crop, $350. Grants are made to Yale University, Laboratory of Applied Physiology, for study of the physiological effect of distilled spirits, $15,000; and Ohio University, for study relative to evaluation of psychometric methods, $1,800.

SEARLE AND CO., G. D., Box 5110, Chicago 80, Ill. Fellowships, both chemical and clinical in nature, are maintained at several universities, medical schools, and research foundations.

SHARP AND DOHME, Glenolden, Pa. Fellowships and grants in organic chemistry, biochemistry, pharmacology, and bacteriology, and for clinical and pharmaceutical research are maintained in a number of universities and medical schools.

SHARPLES CHEMICALS, INC., 123 South Broad St., Philadelphia, Pa. A fellowship is maintained at Kansas State College, for research in the chlorination of organic chemicals. $3,000.

A grant is made to Jefferson Medical College, for toxicological studies of certain chemicals. $10,000.

SHELL CHEMICAL CORP., 100 Bush St., San Francisco, Calif. Grants are made to University of California, Berkeley, for research on D-D control of wireworms, $1,000; University of California, Davis (2), to obtain further information on soil, organism, and tree phase of the nitrogen cycle, $1,300, and for further study to develop a process for fertilizing by direct injection of ammonia gas into soil, $500; Massachusetts State University, for research on allyl starch, $500.

A fellowship is maintained at the University of Arizona, for the study of the chemical reactions of D-D in soil. $1,000 plus $300 for expenses.

SHELL OIL CO., INC., Shell Bldg., San Francisco 6, Calif. Grants are made for uninstructed research to California

Institute of Technology, $1,000; Pomona College, $1,000; College of the Pacific, $1,000; and University of Santa Clara, $150.

A grant is made to the University of California for DDT research. $150.

SHERWIN-WILLIAMS CO., 101 Prospect Ave., N. W., Cleveland, Ohio. Fellowships are maintained at Ohio State University, for research on insecticides, $10,000 a year; Western Reserve University, for research on drying oils, $2,500 a year; and University of Chicago, for development in plant hormones and in the botanical field.

SINCLAIR AND VALENTINE CO., 611 West 129th St., New York, N. Y. A Research Foundation fellowship is maintained at the University of Cincinnati for the study of drying of lithographic inks. $1,350.

SMITH, KLINE, AND FRENCH LABORATORIES, 105 North Fifth St., Philadelphia, Pa. Grants are made to universities, usually for medical or chemical research.

SMITH PHARMACAL CO., CARROLL DUNHAM, 350 Scotland Rd., Orange, N. J. A fellowship is maintained at the New York University, department of therapeutics, College of Medicine, for research on sedatives, cardiacs, and antiluetics. $6,000.

A grant is made to the Louisiana State University, department of dermatology and syphilology, for research on antiluetics. $1,000.

SPERRY GYROSCOPE CO., INC., Clinton Rd. and Stewart Ave., Garden City, N. Y. A grant is made to Stanford University, for the study of the klystron tube and microwave techniques. $20,000.

SPRAGUE ELECTRIC CO., North Adams, Mass. Two grants are made to Rensselaer Polytechnic Institute for research in special organic syntheses, and for studies in high frequency dielectric and conductor phenomena.

STANDARD BRANDS, 595 Madison Ave., New York 22, N. Y. Ten fellowships, from a sum of $15,000, are awarded to Cornell School of Agriculture, for research in bacteriology, $1200; Harvard University, for research in organic chemistry, $1,600; Indiana University, for research in organic chemistry, $1,000; Massachusetts Institute of Technology, for research in chemical engineering; Princeton University, for research in organic chemistry, $1,400; Rutgers University, for research in microbiology, $1,800; Stanford University, for research in microbiology, $1,400; University of Pittsburgh, for research in biochemistry, $1,500; University of Wisconsin, for research in biochemistry, $1,400; and Yale University, for research in microbiology, $1,500. Seven grants are made from a sum of $32,150, to Massachusetts Institute of Technology, for research in food technology, $2,200; National Farm Chemurgic Council, for research in chemurgy; New York Botanical Gardens, for research in botany; Nutrition Foundation, for research in nutrition; Spies' Committee for Clinical Research, for research in nutrition; University of California, Los Angeles, for research on amino acids; and University of Michigan, for research in nutrition.

STANDARD OIL CO. OF CALIFORNIA, 225 Bush St., San Francisco, Calif. Fellowships are maintained at California Institute of Technology, two in chemical engineering and one in mechanical engineering; Colorado School of Mines, one in geology; Massachusetts Institute of Technology, one in chemical engineering; Oregon State College, one in mechanical engineering; Stanford University, two in engineering; University of Texas, one in geology; University of Washington, two in chemical engineering; University of Wisconsin, one in chemical engineering.

Grants are made to University of California, Berkeley, one in chemical engineering and two in mechanical engineering; and University of California, Los Angeles, one in geology and one in chemistry.

Stipends: Available for graduate work only in fields designated above. Amounts received by ex-servicemen under the Servicemen's Readjustment Act of 1944 are supplemented by a $500 fellowship bringing this total support for a 9 months' college year to $1,085 plus tuition and books if single, or $1,310 plus tuition and books if married. Those not eligible under the Servicemen's Readjustment Act receive $1,000 plus tuition.

STANDARD OIL CO. (OHIO), Midland Bldg., Cleveland 15, Ohio. Fellowships are maintained at Cornell University, for research in inorganic chemistry, $1,400; and Western Reserve University (2), for research in organic chemistry, $1,400 each.

STANDARD OIL DEVELOPMENT CO., 30 Rockefeller Plaza, New York 20, N. Y. Fellowships are maintained at Brown University (2), for research in catalytic polymerization, $1,000 each; and at Cornell University, for agricultural research, $1,000.

Grants are made to University of Chicago for research in the field of nuclear physics, $50,000 per year for 5 years; Columbia University, for research on heat flow, $5,000; University of Delaware, for heat exchanger research, $5,000; and New Memorial Cancer Center, for cancer research, $2,500 per year for 10 years.

Other research, by contract, is maintained at Massachusetts Institute of Technology, $97,000 for 1946; and at Pennsylvania State College, $45,000 for 1946.

STANGE CO., WM. J., 2536 West Monroe St., Chicago 12, Ill. Grants are made to the University of Minnesota, and to the University of Illinois, for research on antioxidants.

STANOLIND OIL AND GAS CO., Tulsa, Okla. A fellowship is maintained at the University of Texas, for research on oil well drilling fluids. $900.

STEARNS AND CO., FREDERICK, 6533 East Jefferson Ave., Detroit, Mich. Fellowships are maintained at University of Georgia, for pharmacological studies; New York University, for clinical and pharmacological studies; University of California, for pharmacological studies; Wayne University, for studies in amino acid nutrition; University of Michigan, for research in organic syntheses. Grants for clinical studies are made to Wayne County General Hospital, University of Texas, University of Michigan, Tufts College of Medicine, and Hektoen Institute for Medical Research.

STERN AND CO., INC., EDWARD, 140 North Sixth St., Philadelphia 6, Pa. Grants are made to Lithographic Technical Foundation, for research in lithography, $1,000; and Carnegie Institute of Technology, for research in printing, $500.

STROMBERG-CARLSON CO., 100 Carlson Rd., Rochester 3, N. Y. A grant has been made to Cornell University for magnetron research and development. This grant was made in connection with a war contract for the Navy Department and may not be renewed upon completion of the project. $75,000.

STRUCTURAL CLAY PRODUCTS INSTITUTE, 1856 K St., N. W., Washington 6, D. C. Fellowships are maintained at Ohio State University for investigation of fire resistance and resistance to weathering of structural and facing tile; University of Texas for determination of factors affecting strength of precast tile and reinforced concrete beams and development of a rational method of design; and Virginia Polytechnic Institute for the study of effect of brick texture on bond between mortar and brick.

A Research Associate is maintained at the National Bureau of Standards. Project: Survey of industry products including standard specification tests.

SUGAR RESEARCH FOUNDATION, INC., 52 Wall St., New York 5, N. Y. Grants-in-aid for research not related to sugar production, but directed toward fundamental and exploratory studies of the kind from which new uses of sugar as a chemical material may ultimately develop, are made for research projects at the University of Minnesota; University Hospital, State University of Iowa; Harvard University, Schools of Medicine and Public Health and of Dental Medicine; Ohio State University, department of chemistry; Washington Square College of Arts and Science, department of chemistry; New York University, College of Medicine; Lafayette College, department of chemistry; Cornell University Medical College; Johns Hopkins University, School of Medicine; Emory University, School of Medicine; University of California, Fruit Products Division, Agricultural Experiment Station, College of Agriculture; University of Colorado, Engineering Experiment Station; University of Rochester, School of Medicine and Dentistry; Texas College of Arts and Industries, department of chemistry; University of Wisconsin, College of Agriculture; Cornell University, New York State Agricultural Experiment Station; University of Texas, School of Medicine; the AMERICAN CHEMICAL SOCIETY; Pennsylvania State College, School of Agriculture and School of Chemistry and Physics; McGill University Medical School and Montreal General Hospital; Michael Reese Hospital, Chicago, Ill.; University of Wyoming, Natural Resources Research Institute; University of California, division of physiology, Medical School; University of Utah, department of chemistry; McGill University Medical School, department of histology; Yale University Medical School, department of physiological chemistry; New York Sugar Trade Laboratory, New York; University of Utah, School of Medicine, department of biological chemistry; Polytechnic Institute of Brooklyn, department of chemistry; University of Pittsburgh, department of chemistry; California Institute of Technology, William G. Kerckhoff Laboratories of Biological Sciences; Purdue University, department of chemistry; University of Texas, School of Medicine, department of physiology; Rutgers University, department of dairy husbandry; and Tufts College Dental School.

SWENSON EVAPORATOR CO., Division of Whiting Corp., Harvey, Ill. Two scholarships are maintained at the University of Michigan, for research in filtration and evaporation. $12,000.

A grant is made to the University of Michigan, for the study of the mechanism of scale formation. $25,000.

SWIFT AND CO., Union Stock Yards, Chicago 9, Ill. Fellowships are maintained at University of California, for research in amino acid requirements of the chick; University of Chicago, for the study of diet in relation to health and longevity; University of Cincinnati, for the study of the role of proteins in nutrition; University of Southern California, for a study of the comparative rate of absorption of various hydrogenated fatty materials including bland lard; Columbia University, for research in protein enrichment of the dietary as related to phosphorus and riboflavin requirements; Massachusetts Institute of Technology, for the study of the sparing action of fat on protein; University of Minnesota, for research in protein metabolism in relation to edema in infants, and for the study of protein and calcium relationships in diets of normal children and children with certain bone diseases; North Carolina State College, for research on meat packing by-products as sources of cystine in swine rations; Northwestern University, for the study of nutritional and physiological aspects of food allergies; Pennsylvania State College, for the study of factors influencing the value of pork as a source of the vitamin B-complex in the human diet; University of Pittsburgh, for research in the efficiency of food utilization; Rutgers University, for research in protein metabolism; Stanford University, to study the separation and characterization of the protein of certain organs and tissues; University of Wisconsin, for a study of the significance in normal nutrition of the newer members of the vitamin B-complex, especially biotin and the norite eluate factor; Dalhousie University, for the study of dietary requirements of young children; University of Manitoba, for research on the thiamine content of Canadian foods and the effect of cooking processes on them; Macdonald College, for the study of incipient changes which occur in the fat and protein of foods during processing and storage; University of Toronto, for studies in the effect on learning of added thiamine in the diet; and University of Western Ontario, for research in the role of arginine in growth and reproduction.

Grants and their duration are as follows: Alabama Polytechnic Institute, Agricultural Experiment Station, for a study of heritability in swine, 5 years; University of California, Los Angeles, for the analysis of amino acids in meat, 2 to 4 years; University of California, Agricultural Experiment Station, for the study of lesions in livers of meat animals, 4 to 6 years; Colorado Agricultural Experiment Station, for the study of the effects of fringed tapeworm and other parasites on gains and death losses in relation to nutritional diseases in range and feedlot lambs and means of control, 3 years; Cornell University Agricultural Experiment Station, for research on the physiological basis of sterility in livestock, 3 years; Georgia Institute of Genetics, for the development of improved strains of small grain adapted to soils and climate in the southeast, 4 years; Harvard Medical School, for histochemical studies in tissues, 4 to 6 years; University of Illinois, for the study of the chemical composition of forage crops (cereals and other grasses and possibly legumes) as influenced by environmental factors, 5 years; University of Illinois Agricultural Experiment Station, for studies of the nutritive requirements of the young dairy calf, 3 years; Iowa State College Agricultural Experiment Station (2), for a study of native proteins, 4 to 6 years, and for research into methods of obtaining statistics of morbidity and mortality in livestock populations, directed toward making estimates of consequent losses; Kansas State College of Agriculture and Applied Science, for the improvement of cream for buttermaking, 4 to 6 years; University of Kentucky Agricultural Experiment Station, for a study of factors affecting utilization of forage by late lambs; Massachusetts Institute of Technology, for research in the colloidal properties of proteins, 4 to 6 years; Massachusetts State College Agricultural Experiment Station, for the investigation of respiratory diseases in poultry, 4 years; Michigan State College Experiment Station (3), for improving cream and milk for manufacturing purposes, 2 years, for the study of turkey diseases and protezoan parasitic infestations, 4 years, and for a study of the microscopic anatomy of the fowl, 2 years; University of Minnesota, Department of Agriculture (2), for a study of virus diseases of food-producing animals, 4 to 6 years, and for physiological studies of the pig with special reference to the factors affecting viability and growth, 5 years; University of Missouri, College of Agriculture, for a study of the influence of soil composition and treatment on the composition of forages and the resulting development of animals, 5 years; National Research Council, for a service on feed composition; New Jersey Agricultural Experiment Station, for the study of the production and characterization of subacute nutritional deficiencies, 5 years; Northwestern University (2), for research on the marketing of meat, 1 to 3 years, and for the study of the chemistry of amino acids, 4 years; Ohio Agricultural Experiment Station, for research in the physiology of rumen digestion and special reference to bacteriological studies, 3 years; Oklahoma Agricultural and Mechanical College, for a study of the mineral supplement requirements of range beef cattle in Oklahoma, 4 to 6 years; Oregon State College Experiment Station (2), for a study of food preservation, 3 years; and for studies in the breeding and management factors as related to hatchability in turkey eggs, 4 years; University of Pittsburgh, for a study of the molecular structure of glycerides, natural and synthetic, 5 years; Purdue University Agricultural Experiment Station, for a study of the future of the livestock industry in the United States, 2 years, and for off-flavor development in fatty foods of both animal and vegetable origin, 4 to 6 years; Tuskegee Institute Agricultural Experiment Station, for study of mung bean and other special proteins for poultry feeding, 2 years; Utah State Agricultural College, for a study of the nutritional deficiencies in range forage and the supplementary feeding of range livestock, 5 years; State College of Washington Agricultural Experiment Station, for a fundamental study of the relationship of nutrition to the improvement of animals for meat production through breeding, 5 years; West Virginia University Agricultural Experiment Station, for research in the composition of feeding stuffs and their digestibility by farm animals, 1 year; University of Wisconsin Agricultural Experiment Station, for research in determining how much fertilizer can be used with profit in general farming in Wisconsin, 8 years; and University of Wisconsin, Department of Agricultural Economics, for research in marketing services and marketing charges, 3 years.

SYLVANIA ELECTRIC PRODUCTS, INC., 500 Fifth Ave., New York 18, N. Y. Fellowships are maintained at University of Wisconsin, for the promotion of scientific knowledge in the field of physics, $1,000; and Stanford University, for graduate work in electrical engineering, $1,000.

TANNERS COUNCIL LABORATORY, INSTITUTE OF SCIENTIFIC RESEARCH, University of Cincinnati, Cincinnati, Ohio. Ten fellowships and four scholarships are maintained at the University of Cincinnati for tanning research. Stipends: fellowships, six at $1,000, and four at $500; scholarships' deletion of all fees.

TENNESSEE COAL, IRON, AND RAILROAD CO. *See* United States Steel Corp.

TENNESSEE EASTMAN CORP., Kingsport, Tenn. A scholarship is maintained at Brown University for research in chemistry. $1,000.

Three scholarships for unspecified research are awarded. $1,000 each.

A fellowship is maintained at Purdue Research Foundation, for research in ketene chemistry. $2,500.

TENNESSEE PRODUCTS CORP., 412 American National Bank Bldg., Nashville, Tenn. A scholarship is offered at Vanderbilt University for research on wood distillation products. $150 per month.

TEXAS COTTONSEED CRUSHERS' ASSOCIATION, INC., 617 Wilson Bldg., Dallas 1, Tex. A graduate fellowship is maintained at the Agricultural and Mechanical College of Texas, for research in the mechanized production of cotton, and the study of varieties best adapted to mechanization. $750.

TEXAS GULF SULPHUR CO., INC., 75 East 45th St., New York 17, N. Y. Fellowships are maintained at: University of Illinois, department of chemistry, for research on the mechanism of the combustion of sulfur; Rutgers University, New Jersey Agricultural Experiment Station, for the study of the oxidation of sulfur in the soil; University System of Georgia, department of agronomy, College of Agriculture, for the study of the effects of sulfur in various fertilizers; Oregon State College, Agricultural Experiment Station, for research on the use of sulfur as a soil ameliorant; and Purdue University, Agricultural Experiment Station, for studies in the effect of sulfur compounds on crop production.

Grants are made to Rutgers University, Thomas J. Headlee Research Foundation, for the study of entomological problems; Agricultural and Mechanical College of Texas, for research on the use of sulfur in controlling diseases and insects on cotton and fruit; and University of California, Citrus Experiment Station, for

research in the use of sulfur in controlling diseases and insects on fruit.

TEXTILE FOUNDATION, Industrial Bldg., National Bureau of Standards, Washington, D. C. Research associates are maintained at Princeton, N. J., for fundamental research on silk, wool, and cellulosic fibers.

TEXTILE RESEARCH INSTITUTE, INC., Princeton, N. J. Three fellowships are maintained at Princeton University, for research of interest to the textile industry. $70 per month first year and $100 per month after first year.

TIMKEN ROLLER BEARING CO., Canton 6, Ohio. A grant is made to the University of Michigan for development of steels for high-temperature service. $10,000.

TITANIUM ALLOY MFG. CO., Hyde Park Blvd., Niagara Falls, N. Y. A scholarship is supported at Rutgers University for the study of chemistry. $1,500 annually.

Grants are made to Rutgers University for research in chemistry ($2,400 annually); and to University of Michigan for research in metallurgy ($9,000 annually).

UNION CARBIDE AND CARBON CORP., 30 East 42nd St., New York 17, N.Y. The following scholarships, fellowships, and grants are maintained by various operating units of Union Carbide and Carbon Corp.

CARBIDE AND CARBON CHEMICALS CORP. Fellowships are maintained at Crop Protection Institute, for research on agricultural chemicals, $31,000 for four fellowships and assistants; Duke University, for research on organic chemistry, $1,500; Rutgers University, for research on insecticides and repellents, $15,060 for five fellowships and assistants; and University of Minnesota, for research on organic chemistry, $1,500.

Grants have been made to Cornell University, for research on foliage fungicides, $1000; and University of Chicago Medical School, for the continuing study of the use of triethylene glycol and other chemicals in the sterilization of air, $5,000.

ELECTRO METALLURGICAL CO. A fellowship is maintained at Battelle Memorial Institute for the study of uses of alloys. Correspondence should be addressed to A. B. Kinzel, 30 East 42nd St., New York, N. Y.

Grants have been made to the Saranac Laboratory, for the study of dust inhalation, $5,700; and as a contribution to the fund to enlarge the Laboratory, $10,000. Grants made jointly with National Carbon Co., Inc.

NATIONAL CARBON CO., INC. A grant is made to Saranac Laboratory, for research on intermittent exposures to silica, $2,500. See grants made jointly with Electro Metallurgical Co.

UNION OIL CO. OF CALIFORNIA, Union Oil Bldg., Los Angeles, Calif. A grant is made to Pennsylvania State College, School of Mineral Industries, for research on petroleum production, $1,500.

UNITED REXALL DRUG CO., 43 Leon St., Boston 15, Mass. Grants are made to Massachusetts Institute of Technology, through Research Corp. for vitamin A research, $1,000; and to the University of Cincinnati, for nutritional research, $2,500.

U. S. CANE SUGAR REFINERS, J. M. Brown, Secretary of Committee, 333 Medford St., Charlestown, Mass. A research associate is maintained at the National Bureau of Standards. Project: determination of the functions of bone char.

U. S. INDUSTRIAL CHEMICALS, INC., 60 East 42nd St., New York 17, N. Y. A grant is made to Rhode Island State College, for research in aliphatic chemistry, and one to the University of Maryland, for research in poultry nutrition.

UNITED STATES STEEL CORP., 436 Seventh Ave., Pittsburgh 30, Pa. (with its affiliates: CARNEGIE-ILLINOIS STEEL CORP., AMERICAN STEEL AND WIRE CO., NATIONAL TUBE CO., TENNESSEE COAL, IRON AND RAILROAD CO., COLUMBIA STEEL CO.).

Research projects are supported at Carnegie Institute of Technology, for research on the effect of hydrogen in steelmaking, for the determination of gases in steel, and for research on steel sheets for deep drawing; Coal Research Laboratory, Carnegie Institute of Technology, for study of the properties of coal and coke; University of Pittsburgh, for acid open-hearth research; University of Illinois, for the investigation of steel rails, for research on wrought steel wheels, and for research on braking action; Cornell University, for study of the characteristics of light steel structural members.

Battelle Memorial Institute for study of the effectof alloying elements on the mechanical and welding characteristics of steel, and for research on the influence of the size of carbide on properties of steel; Pennsylvania State College, for research in physical metallurgy; Rensselaer, Lehigh, University of Illinois, and other institutions for Welding Research Committee projects; and Purdue University, for the study of steel for high-pressure boilers and use at high temperatures.

UNITED STATES SUGAR CORP., Clewiston, Fla. Two scholarships are maintained at the University of Florida, for courses leading to work in growing sugar cane or in the manufacture of sugar, $500 each; and two for the development of additional data with respect to the soil, water, climate, general agriculture, and other characteristics of the Florida Everglades, $1,000 each.

A fellowship is maintained at Louisiana State University and at the Agricultural and Mechanical College, for special breeding investigations with sweet potatoes for starch adaptable to Florida Everglades.

UNIVIS LENS CO., 401 Leo St., Dayton, Ohio. A grant is made to Ohio State University, for the study of the relationship between aniseikonia and anisophoria. $6,500.

UPJOHN CO., Kalamazoo, Mich. Fellowships are maintained at: Kalamazoo College (3), for research in chemistry. $2,250 each.

Grants are made to Beth Israel Hospital, for vitamin B research, $2,000; University of Chicago, for surgical research, $2,000; Children's Hospital, Washington, D. C., for comparative penicillin studies, $1,000; University of Cincinnati for Hillman Hospital, for the study of vitamin deficiency diseases, $5,000; Eloise Hospital, Eloise, Mich., for general clinical testing, $6,000; Evans Memorial Hospital, Boston, for research in amines, $3,500; Harvard University, for the study of sensitivity diseases, $3,000; University of Illinois (cooperative), for research in the chemistry of new antibiotics, $7,750; Iowa State College, for research on penicillin, $2,000; Massachusetts Institute of Technology, through Research Corp., for research on the synthesis of vitamin A, $1,000; University of Michigan (cooperative), for studies on penicillin synthesis, $5,000, and studies on thiouracil, $2,000, penicillin research, $750, and penicillin research, $2,800. Northwestern Medical School, for research on drug allergies, $1,500; Ohio State University for research on the synthesis of vitamin A, $15,000, and for research in antiseptics, $2,000; Princeton University, for studies in delaying the absorption and renal elimination of penicillin, $4,000; University of Southern California, for research in heteropolar antiseptics, $5,000; Tufts Medical College, Boston, for the study of hemorrhagic diseases, $3,000; Tulane University, for the study of amines, $3,000; University of Utah, for studies in nutrition, $4,000; Washington University for endocrine research, $2,000, and for research in surgical hemostasis, $1,000; Wayne University, for general clinical testing, $3,200; Western Reserve University, for penicillin research, $500; and University of Wisconsin, for microbiological and chemical studies of new antibiotic agents, $3,600.

UTAH-IDAHO SUGAR CO., Beneficial Life Bldg., Salt Lake City 13, Utah. Two scholarships at Washington State College, for the study of salinity problems in sugar beet production. $1,000 each.

One grant is made to Utah State Agricultural College for research in irrigation and soil fertility relationships. $4,500.

Large contributions are made to the Sugar Beet Development Foundation.

VALENTINE'S MEAT-JUICE CO., 1600 Chamberlayne Parkway, Richmond 9, Va. Grants are made to Medical College of Virginia, for research on pharmaceutical formulation, $200 to $500; and Medical College of Virginia, for research on comparative fungicidal and fungistatic activities, $500.

VANADIUM ALLOYS STEEL CO., Latrobe, Pa. One grant is made to the Massachusetts Institute of Technology, for investigations on the transformations in and properties of special high-speed steels. $3,000 per year.

VELSICOL CORP., 120 East Pearson St., Chicago 11, Ill. Fellowships are maintained at Cornell University for research in entomology, $5,000; Northwestern University Medical School (2), for research in toxicology and zoology, $5,000, and for cancer research, $4,000. University of Florida, for research in entomology, $4,000; and University of Illinois, for research in toxicology and zoology, $3,000.

One grant is made to the Thomas Say Foundation at Purdue University, for the publication of monographs on entomology. $500.

VICTOR ANIMATOGRAPH CORP., 809 Kahl Bldg., Davenport, Iowa. Two scholarships are awarded to two 4-H clubs, for studies in visual education at any state agricultural college. $400.

VICTOR CHEMICAL WORKS, 141 West Jackson Blvd., Chicago, Ill. A fellowship is maintained at the University of Illinois, for horticultural research. $2,000.

A grant is made to the University of Illinois, for chemical research. $1,750.

VIOBIN CORP., 105 West Main St., Monti-

cello, Ill. Grants are made to University of California, Los Angeles, for research on the unknown factors in wheat germ oil, $1,000; University of Indiana, department of biochemistry, for research on sunflower seed, wheat germ, and corn germ, $1,000; University of Indiana, department of medicine, for research on unknown factors in wheat germ oil, $1,000; and University of Illinois, department of animal husbandry, for research on sunflower seed meal in animal nutrition, $1,000.

VIRGINIAN RAILWAY CO., Terminal Bldg., Norfolk, Va. A grant is made to the Coal Research Laboratory, Carnegie Institute of Technology. $500.

VITRIFIED CHINA ASSOCIATION, 1010 Shoreham Bldg., Washington, D. C. A research associate is maintained at the National Bureau of Standards. Project: the study of vitrified chinaware.

WAHL, MANFRED, The Kenilworth, Alden Park, Germantown, Philadelphia 44, Pa. Two fellowships are maintained at University of Pennsylvania, School of Medicine, for research in the mechanism of resistance of sulfonamides, $750 each; two grants are made to the New York Botanical Garden, Physiological Laboratory, for research concerning a rhodotorula deficient for *p*-aminobenzoic acid, $1,000 each.

WALKER, HIRAM-GOODERHAM AND WORTS, Peoria, Ill. Grants are made to University of Illinois, for research on distillers' by-products in swine nutrition; University of Wisconsin, for research on distillers' by-products in poultry nutrition; and Ohio State University, for research on distillers' by-products in calf nutrition.

WESIX ELECTRIC HEATER CO., Wesix Bldg., San Francisco 5, Calif. A fellowship is maintained at Stanford University, to develop the facts concerning electric space heating in homes, schools, and offices, and particularly its effect on electric distribution systems. $1,000.

WESTERN CONDENSING CO., 935 East John St., Appleton, Wis. An investigatorship is maintained at Cornell University, for the study of the nutritive properties of whey and of products developed from it. $6,000 annually.

WESTERN PENNSYLVANIA COAL OPERATORS ASSOCIATION, Oliver Bldg., Pittsburgh 22, Pa. A grant is made to Pennsylvania State College, to investigate new uses for coal and for the improvement in present equipment, power, and heat. $8,750 for two years.

WESTINGHOUSE ELECTRIC CORP., 306 Fourth Ave., Pittsburgh 30, Pa. 145 undergraduate scholarships, 30 fellowships, and 3 professorships are maintained. Undergraduate scholarships have been established as follows: 50 George Westinghouse scholarships at the Carnegie Institute of Technology, open to all young men who are high school seniors, for a five-year program including a four-year engineering education at Carnegie Institute of Technology and the equivalent of two years' Westinghouse experience, $1,850 plus work assignments at regular pay; 70 Science Talent Search Scholarships, open to high school seniors (men and women), $100 to $2,400; 16 Westinghouse War Memorial Scholarships, open to sons of employees and junior employees, $2,000 each; six scholarships, open to 4-H Club members, $200 each; a Westinghouse Scholarship at Worcester Polytechnic Institute, open to young men who are high school seniors, $1,600; and a Westinghouse Achievement Scholarship (George Westinghouse Memorial) at Union College, $500, and two at Pratt Institute, $250 each; graduate scholarships and fellowships have been established as follows: the Benjamin Garver Lamme Scholarship, $1,500; ten Postdoctoral Fellowships at Westinghouse Research Laboratories, $3,300; other Westinghouse fellowships at Stanford University, $1,000; Illinois Institute of Technology, for the study of power systems engineering, $2,100; Yale University, for research in electrical engineering, $1,500; Texas Agricultural and Mechanical College, for studies in mass spectroscopy, $1,500; Purdue University (4), for studies in heat transfer, stipends varying; Stevens Institute of Technology, in powder metallurgy research, salary payment; University of Michigan, for electrical engineering research, $1,000; University of Wisconsin, for electrical engineering research, $1,000; Harvard Graduate School of Business Administration (2), $1,500 each, for the two-year program; Case School of Applied Science, for research in metallurgy, $1,000; Cornell University, for mechanical engineering research, $1,000; Georgia School of Technology, for research in power systems engineering, $1,250; and one Westinghouse postdoctoral fellowship, $3,600, and two predoctoral fellowships, $1,000 each, at Ohio State University for research in electron optics. A grant is made to Penn State College for metallurgical research, $250. Professorships are maintained as follows: George Westinghouse Professorship at Carnegie Institute of Technology; Westinghouse Graduate Professorship at the University of Pittsburgh; and Westinghouse Research Professorship in heat transfer at Purdue.

WESTVACO CHLORINE PRODUCTS CORP., 405 Lexington Ave., New York, N. Y. A fellowship is maintained at Lehigh University, for research on the uses of magnesium oxide. $6,000.

WHEELING STEEL CORP., Wheeling, W. Va. The corporation participates in fellowships at Coal Research Laboratory, Carnegie Institute of Technology, and Battelle Memorial Institute. Subjects: research on coal and beneficiation of lean iron ores.

WHITE LABORATORIES, INC., 113 North 13th St., Newark 7, N. J. A fellowship is maintained at the University of Pennsylvania Dental School, for the study of treatment of oral infections. $4,500.

17 grants are made to New York University, University of Cincinnati, Boston University School of Medicine, Oklahoma Agricultural and Mechanical College, Indiana University, Ottawa Experimental Station, and New Jersey Experimental Station, for nutritional studies, endocrine studies, bacteriological studies, and studies of anemia. $32,040.

WILSON AND CO., 41st St. and South Ashland Ave., Chicago, Ill. Fellowships are maintained at University of Wisconsin (2), for the study of the effect of canning processes on the nutritive value of meat and meat by-products, $1,600; and University of Illinois, for study of use of gelatin in ice cream and dairy products, $1,200.

A grant is made to the Massachusetts Institute of Technology, for research in food technology. $10,000 annually.

WINTHROP CHEMICAL CO., INC., 170 Varick St., New York 13, N. Y. Grants are made to Alton Ochsner Medical Foundation, New Orleans, La., for investigations in the department of chemistry, $5,000; American Foundation for Tropical Medicine, N. Y., for a fellowship in tropical medicine, $1,500; American Institute for the History of Medicine, $250; Columbia University, for the study of tropical diseases, $2,250, and for studies in enzyme chemistry, $3,000; Cook County Hospital, Chicago, for the study of continuous caudal anesthesia, $2,400; Hahnemann Hospital, Philadelphia, for studies in anesthesia, $1,500; Harvard University, for the study of antiseptics and detergents, $1,600, and for the study of mercurial diuretics, $600; Massachusetts General Hospital, Boston, for studies in antibiotics, $3,500; Massachusetts State College, for industrial research, $1,500; Michigan State College, for investigations in chemistry, $9,000, and for the study of plant molds, fungi, etc., $100; New York University, for pharmacologic and clinical investigation of new drugs, $2,000; Northwestern University, for a fellowship in chemistry, $1,050; Rensselaer Polytechnic Institute, for a fellowship in chemistry, $1,400; Stanford University, for a fellowship in pharmacology, $3,600; University of Cincinnati, for research in experimental medicine, $3,500; University of Chicago, for a fellowship in pharmacology, $5,000; University of Iowa, for vitamin research, $3,000; University of Minnesota, for the study of epilepsy, $250 and for pharmacologic and clinical investigations of new products, $750; University of Texas, for studies in anesthesia, $600, and for study of vitamins and Diodrast, $300; University of Wisconsin, for a fellowship in chemistry, $1,000; George Washington University, for investigations in pharmacology, $1,150; Washington University, for studies in internal medicine, $1,200; Yale University, for a fellowship in pharmacology, $7,200; and to individuals for the study of ointments and ointment bases, $1,500, and for the study of tuberculosis, $10,805.

WOLVERINE TUBE DIVISION OF CALUMET AND HECLA CONSOLIDATED COPPER CO., 1411 Central Ave., Detroit, Mich. A fellowship is supported at the University of Michigan, $5,000, and grants are made to the University of Michigan, $6,500, and to the University of Oklahoma, $2,000, for the study of heat transfer characteristics of finned tube.

A grant is made to Battelle Memorial Institute, for research in the spinning of nonferrous tubes. $12,000.

WRIGLEY CO., WILLIAM JR., 410 North Michigan Ave., Chicago 11, Ill. A grant is made to Michigan State College for research on peppermint oil. $5,000.

WRISLEY CO., ALLEN B., 6801 West 65th St., Chicago 38, Ill. A grant is made to the University of Chicago for research in biological science. $5,000.

WYANDOTTE CHEMICALS CORP., Wyandotte, Mich. Fellowships are maintained at University of Michigan, for research on colloidal phenomena, $1,200; and Western Reserve University, for research (unspecified), $1,200.

WYETH, INC., 900 North Broad St., Philadelphia 30, Pa. Fellowships or grants have been established in support of research in the medical sciences at the following institutions and hospitals: Cornell University Medical School, Jefferson Medical College, University of Pennsylvania, University Hospitals of Cleveland, Hektoen Institute, Temple University School of Medicine, Western Reserve University, University of Chicago, and Northwestern University Medical School.